

The genus *Alterosa* Blahnik 2005 (Trichoptera, Philopotamidae, Philopotaminae) in northeastern Brazil, including the description of three new species and an identification key for the genus

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Abstract

Alterosa Blahnik 2005 contains 35 described species distributed in southern and southeastern Brazil. Three new species of *Alterosa* from northeastern Brazil are described and illustrated, *Alterosa amadoi* **sp. n.**, *A. castroalvesi* **sp. n.** and *A. caymmii* **sp. n.**, the first records of the genus from northeastern Brazil. An identification key for all known species of the genus is also presented.

Keywords

Atlantic Forest, caddisflies, distributional notes, Neotropical Region, taxonomy

Introduction

Philopotamidae are distributed throughout the world with 1,194 described species in 19 extant genera (Holzenthal et al. 2011). The family contains 3 subfamilies: Rossodinae, with the monotypic genus *Rossodes* Özdikmen & Darilmaz 2008 limited to Madagascar, originally described as *Paulianodes* by Ross (1956); Chimarrinae, with nearly 600 species mainly in the cosmopolitan genus *Chimarra* Stephens 1829; and the also cosmopolitan subfamily Philopotaminae, with more than 400 species (Blahnik 2004, 2005). The subfamily Philopotaminae contains 16 genera, most of relatively restricted distribution (Holzenthal et al. 2007). Only 3 genera of Philopotaminae are recorded from the Neotropics: *Sortosa* Navás, 1918, *Wormaldia* McLachlan, 1865, and *Alterosa* Blahnik, 2005 (Blahnik 2005).

The genus *Alterosa* was originally described by Blahnik (2005) to include 2 previously described species, *Dolophilodes* (*Sortosa*) *sanctipauli* Flint, 1971 and *Dolophilodes* (*Sortosa*) *marinonii* Almeida & Duarte, 2003, and 20 new species, totaling 22 species. More recently, 13 new species were described by Jardim and Dumas (2012) and Dumas and Nessimian (2013), raising the total to 35 species distributed exclusively in south and southeastern Brazil. These species are usually found in pristine headwaters and rapids of streams or small rivers in the Atlantic Forest; they are rarely encountered near large rivers. Despite the recent increase in the number of species known from the country, the Brazilian diversity of *Alterosa* seems to be greatly underestimated, with many more unknown species remaining to be collected. Additionally, there is a lack of knowledge of most aspects of the biology, ecology and distribution of the species, including their immature stages, which are unknown.

In this paper we provide descriptions, diagnoses and illustrations of 3 new species of *Alterosa* from Bahia state, the first records from northeastern Brazil. In addition, we provide an identification key for all known species of the genus.

Material and methods

The specimens were collected with UV light pan traps (Calor and Mariano 2012) and preserved in 70% ethanol. In order to observe the genital structures, the abdomen of each specimen was removed and cleared in a heated lactic acid 85% solution, followed by a rinse in distilled water, transferred to a solution of 95% EtOH, and mounted temporarily in glycerin or glycerin jelly on a slide for viewing and drawing (Blahnik et al. 2007). After that, removed abdomens were transferred back to alcohol and stored permanently in micro vials with 80% EtOH. A Zeiss stereomicroscope and a Zeiss optical microscope, each equipped with a camera lucida, were used to observe specimens. Genitalia were drawn in pencil and drawings were inked with a technical pen and light table. Females were not illustrated because the minor differences among them were not diagnostic. The terminology used in the descriptions follows that of Blahnik (2005).

The type specimens and additional material were deposited in Coleção Entomológica Professor José Alfredo Pinheiro Dutra, Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro state, Brazil (DZRJ), Museu de Zoologia da Bahia, Universidade Federal da Bahia, Bahia state, Brazil (UFBA), and Museu de Zoologia, Universidade de São Paulo, São Paulo state, Brazil (MZSP).

Taxonomy

Alterosa amadoi sp. n.

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http://species-id.net/wiki/Alterosa_amadoi

Figs 1A–D

Remarks. *Alterosa amadoi* sp. n. cannot be easily placed in any of the species groups defined by Blahnik (2005). *Alterosa amadoi* sp. n. and *A. caymmii* sp. n. share character similarities with *A. ruschii* Dumas & Nessimian 2013 and *A. spiesae* Dumas & Nessimian 2013, regarding the general structure of the branched intermediate appendages. However, unlike *A. ruschii* and *A. spiesae*, the 2 new species cannot be placed in or even near the *A. sanctipauli* group because of the lack of a basal rounded protuberance on tergum X, with cuticle scabrously developed, and the absence of a crest-like process at the apex of tergum X. *Alterosa amadoi* sp. n. can be diagnosed by the overall shape of the intermediate appendages, especially the rod-like mesal branch with spines at its apex, and the inferior appendages with the 1st article short and nearly as wide as long. An additional diagnostically unique character for this new species is the dorsal spiny crest-like projection at midlength of tergum X.

Description. Adult. Color (in alcohol) brown; legs, palps, and antennae pale brown, forewing pattern not discernible. Male forewings 5.6–6.4 mm (n=3).

Male genitalia. Tergum VIII with posteromesal margin moderately emarginate; emargination U-shaped and extending no more than halfway to anterior margin. Sternum IX with anterolateral margin weakly rounded, subtruncate; posteroventral margin greatly produced, extending nearly linearly from dorsum (Fig. 1A). Tergum IX greatly reduced, membranous or fused to base of tergum X (Fig. 1B). Tergum X tapered from base in lateral view; dorsally with spiny crest-like projection at midlength; apex sensillate, subtruncate, slightly enlarged in lateral view (Figs 1A, 1B). Intermediate appendages heavily sclerotized, branched subbasally; mesal branch elongate, surpassing preanal appendages, rod-like, blunt and with small spines apically; lateral branch lobe-like, rounded, covered by spine-like setae, subacute apically in dorsal view, apex greatly enlarged and rounded as viewed laterally (Figs 1A, 1B). Preanal appendages elongate, club-like, covered with stiff, small setae; apex rounded with elongate subacuminate projection bearing small apical setae as viewed laterally and dorsally (Figs 1A, 1B). Inferior appendages robust, setose; 1st article, in lateral view, short, nearly as wide as long, bulging mesally; 2nd article longer than 1st article, relatively wide, base

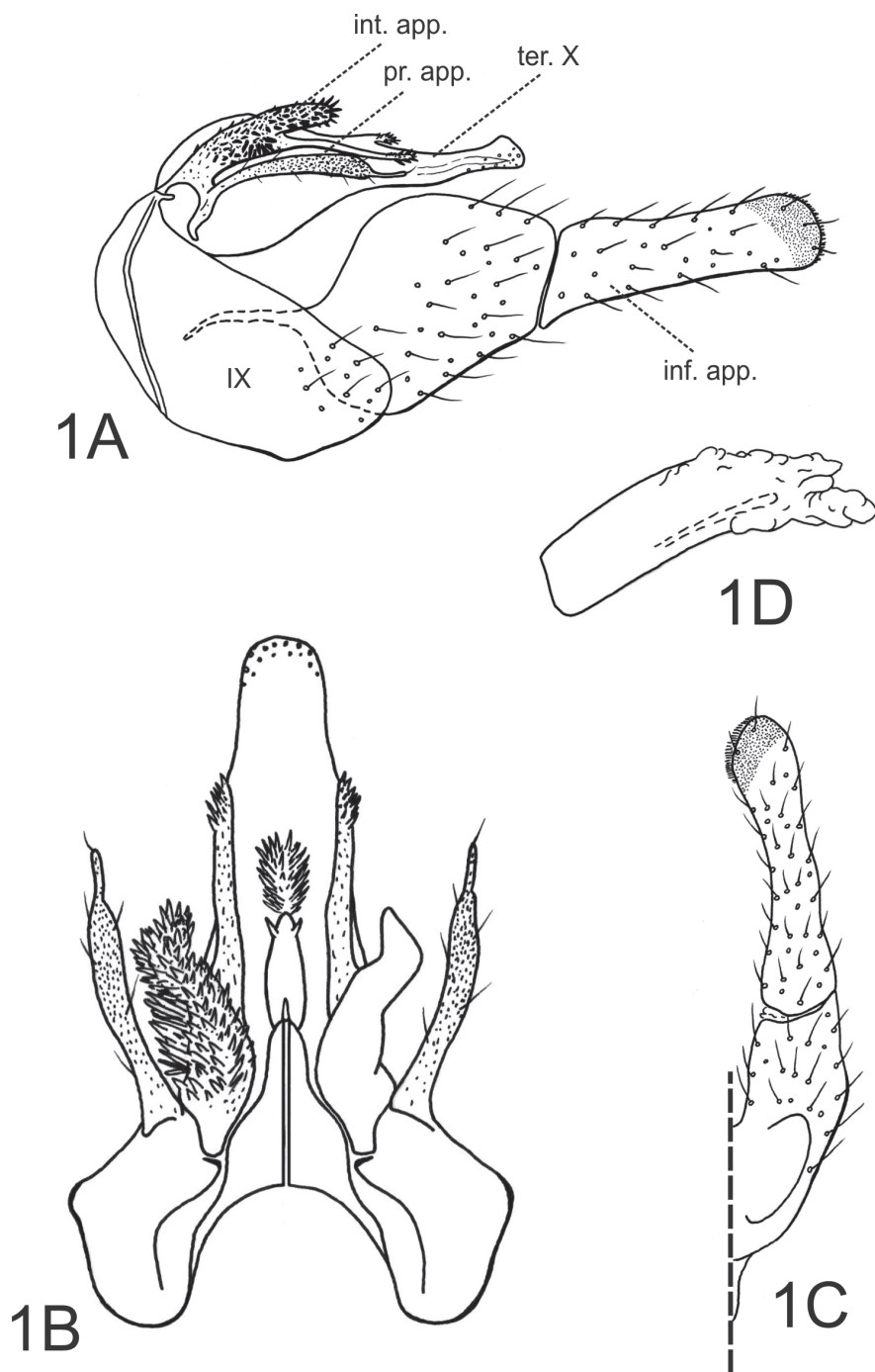


Figure 1. *Alterosa amadoi*, new species, male genitalia. **A** left lateral view **B** dorsal view (setae of left lateral branch of intermediate appendages omitted) **C** left inferior appendage, dorsal view **D** phallic apparatus, left lateral view. Abbreviations: inf. app. – inferior appendage; int. app. – intermediate appendage; pr. app. – preanal appendage; ter. X – tergum X; IX – tergum IX.

as wide as apex of 1st article, slightly enlarged apically and with small pad of short, stiff apicomesal setae (Figs 1A, 1C). Phallobase tubular, relatively short, slightly curved; endotheca without spines; phallotremal sclerites indistinct (Fig. 1D).

Materials. Holotype male: BRAZIL: Bahia: Camacan, RPPN Serra Bonita, riacho 1, trilha nova, 15°23'35"S, 39°33'50"W, ca 770 m, bandeja, 1.iv.2011, F. Quinteiro, D. França & H. Barreto leg. (MZSP).

Paratypes: BRAZIL: Bahia: Camacan, RPPN Serra Bonita, riacho 1, trilha nova, 15°23'35"S, 39°33'50"W, ca 770 m, bandeja, 30.iii.2011, F. Quinteiro, D. França & H. Barreto leg., 1 male (DZRJ 3791); Camacan, RPPN Serra Bonita, 2ª cachoeira, over night, 03.xi.2009, A. R. Calor leg., 1 male (UFBA).

Distribution. Brazil (Bahia).

Etymology. The species is dedicated to the deceased Brazilian writer Jorge Amado, who was born in Bahia state in 1912 and died in 2001. Amado is one of the most acclaimed contemporary Brazilian novelists, whose 32 novels have sold millions of copies. Among his best-known works are “Capitães de Areia”, “Gabriela, Cravo e Canela”, and “Tieta do Agreste”. In 2012, Brazil celebrated the centenary of his birth.

***Alterosa castroalvesi* sp. n.**

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http://species-id.net/wiki/Alterosa_castroalvesi

Figs 2A–D

Remarks. *Alterosa castroalvesi* sp. n. is closely related to *Alterosa truncata* Blahnik 2005, resembling that species in the broadened and truncate apices of the inferior appendages, the elongate, narrow, and arched intermediate appendages, each terminating in a very prominent apical lance-like seta, and the general structure of preanal appendages. Additionally, the general structure of tergum X with paired longitudinal, serrate ridges, is also similar between these species. It differs in that the intermediate appendages in *A. castroalvesi* sp. n. have 2 prominent lance-like setae, the usual apical 1 and an additional 1 at the apical third. *Alterosa castroalvesi* sp. n. also differs from *A. truncata* in the length of 2nd article of preanal appendages, that is relatively shorter in the new species. The differences are relatively minor and it is possible that the 2 species may eventually prove to be not specifically distinct. As *A. truncata*, the new species probably belongs to *A. sanctipauli* Group, as defined by Blahnik (2005).

Description. Adult. Color (in alcohol) brown; legs, palps, and antennae pale brown, forewing pattern not discernible. Male forewings 6.0–6.8 mm (n=4).

Male genitalia. Tergum VIII with posteromesal margin deeply emarginate, emargination V-shaped and extending more than half way to anterior margin. Sternum IX with anterolateral margins broadly rounded; posteroventral margin greatly produced, forming broadly rounded expansion (Fig. 2A). Tergum IX greatly reduced, membranous or fused to base of tergum X (Fig. 2B). Tergum X narrow, wider at base, lateral margins subparallel in dorsal view; dorsally with mesally divided crest-like projection near base,

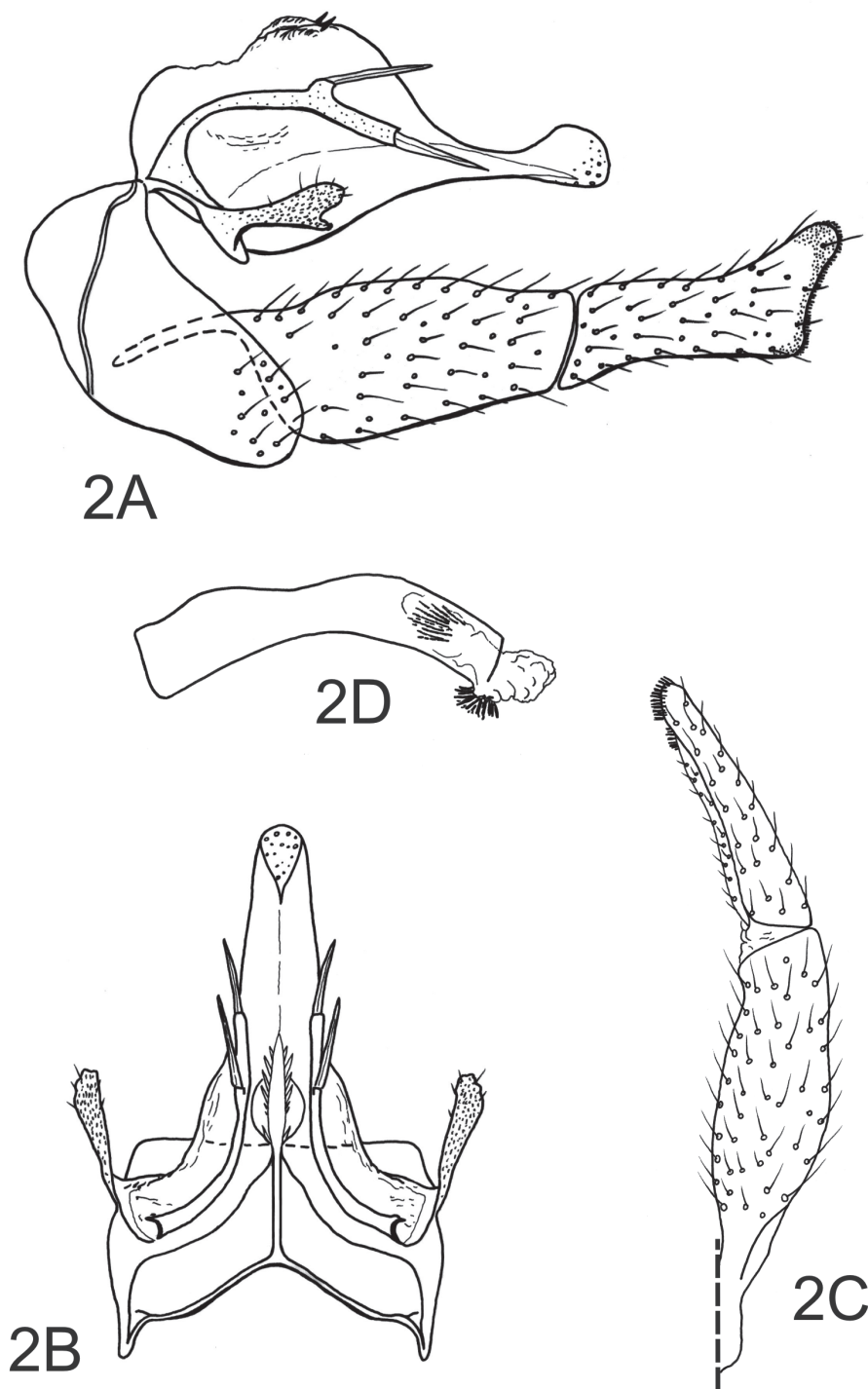


Figure 2. *Alterosa castroalvesi*, new species, male genitalia. **A** left lateral view **B** dorsal view **C** left inferior appendage, dorsal view **D** phallic apparatus, left lateral view.

with spine-like projections along each side of divided margin; apex sensillate, rounded as viewed dorsally, rounded and slightly enlarged in lateral view (Figs 2A, 2B). Intermediate appendages heavily sclerotized, elongate, extending past preanal appendages, rod-like, curved at base, narrowly paralleling lateral margins of tergum X; intermediate appendages with small projection at apical third bearing 1 apical lance-like seta; apex acute, terminating in apical lance-like seta (Figs 2A, 2B). Preanal appendages narrow, constricted basally, moderately elongate, not greatly modified, covered with scant setae and numerous minute spine-like setae; apex rounded, without apical setae, with 1 short preapical projection from the ventral surface, fringed apically with minute spines (Figs 2A, 2B). Inferior appendages elongate, linear, flattened on mesal surface, setose; each with 1st article, in lateral view, approximately 2 times as long as wide, tapering apically; 2nd article slightly shorter than 1st article, moderately wide, nearly as wide at base as apex of 1st article, apex enlarged and subtruncate, with fringing pad of short, stiff apicomesal setae (Figs 2A, 2C). Phallobase tubular, narrow, moderately elongate, with slightly curvature; endotheca with 2 tracts of fine spines, 1 of needle-like spines and 1 ventral of shorter spines (Fig. 2D).

Materials. Holotype male: BRAZIL: Bahia: Camacan, Serra Bonita, Córrego das Torres, 15°23'01"S, 39°34'19"W, ca 860 m, 02.viii.2008, A. R. Calor, L. Lecci, L. C. Pinho & A. Moretto leg. (MZSP).

Paratypes: BRAZIL: Bahia: same data as holotype, 2 males (DZRJ 3797), 1 male (UFBA).

Distribution. Brazil (Bahia).

Etymology. This species is named in memory of Antônio Frederico de Castro Alves, known as “the poet of the slaves” because of his sympathy for the Brazilian abolitionist cause. Castro Alves was born in Bahia state in 1847 and died at 1871. He is the patron of the 7th chair of the Brazilian Academy of Letters. Some of his abolitionist poems, like “Espumas Flutuantes”, “A Cachoeira de Paulo Afonso”, and “O Navio Negroiro”, were collected in a posthumous book called “Os Escravos”, published in 1883.

Alterosa caymmii sp. n.

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http://species-id.net/wiki/Alterosa_caymmii

Figs 3A–F

Remarks. *Alterosa caymmii* sp. n. is very similar to *Alterosa amadoi* sp. n., as discussed under that species. It differs in that the lateral branch of each intermediate appendage is apically projecting in *A. caymmii* sp. n., while in *A. amadoi* sp. n. it is broadly rounded. *Alterosa caymmii* sp. n. also differs from *A. amadoi* sp. n. in the shape of inferior appendages. Additionally, the phallus of *A. caymmii* sp. n. is more developed, with endotheca bearing several tracts of numerous large spines.

Description. Adult. Color (in alcohol) brown; legs, palps, and antennae pale brown, forewing pattern not discernible. Male forewings 5.2–6.4 mm (n=10).

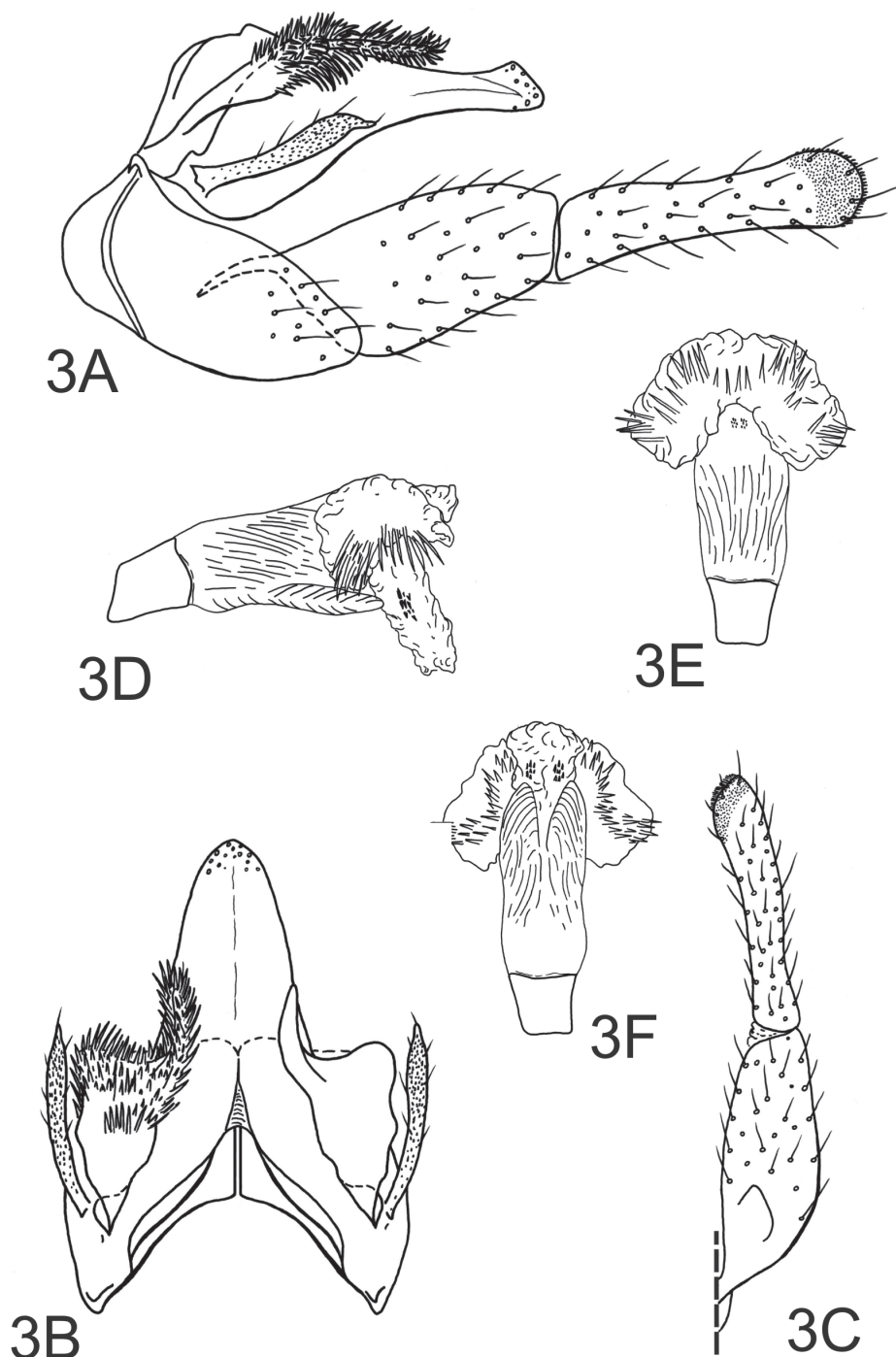


Figure 3. *Alterosa caymmii*, new species, male genitalia. **A** left lateral view **B** dorsal view **C** left inferior appendage, dorsal view (setae of left lateral branch of intermediate appendages omitted) **D** phallic apparatus, left lateral view **E** phallic apparatus, dorsal view; **3F**, phallic apparatus, ventral view.

Male genitalia. Tergum VIII with posteromesal margin not or scarcely emarginate. Sternum IX with anterolateral margins weakly rounded, subtruncate; posteroventral margin greatly produced, forming broadly rounded expansion (Fig. 3A). Tergum IX greatly reduced, membranous or fused to base of tergum X (Fig. 3B). Tergum X tapered from base in lateral view; apex sensillate, rounded as viewed dorsally, subtruncate and slightly enlarged in lateral view (Figs 3A, 3B). Intermediate appendages heavily sclerotized, branched subbasally; mesal branch moderately elongate, surpassing preanal appendages, slightly curved outward at midlength in dorsal view, rod-like, rounded apically, covered with spine-like setae; lateral branch short, flange-like, covered with spine-like setae in apical half, apex enlarged and rounded in lateral and dorsal views (Figs 3A, 3B). Preanal appendages elongate, club-like, covered with stiff, small setae; apex rounded with small subacuminate projection bearing small apical setae as viewed laterally and dorsally (Figs 3A, 3B). Inferior appendages elongate, linear, flattened on mesal surface, setose; each with 1st article, in lateral view, approximately 2 times as long as wide, tapering apically; 2nd article subequal in length to 1st article, relatively narrow, especially at midlength, apex rounded, with prominent pad of short, stiff apico-mesal setae (Figs 3A, 3C). Phallobase tubular, very short, scarcely curved; endotheca elongate, with several tracts; 1 paired tract near base without spines, 1 apicolateral tract with several large spines, and 1 single tract at apex with 2 clusters of small spines; phal-lotremal sclerites indistinct (Figs 3D, 3E, 3F).

Materials. Holotype male: BRAZIL: Bahia: Varzedo, Serra da Jibóia, Reserva Jequitibá, 12°52'21.5"S, 39°28'56.5"W, 07.xi.2010, ca 400 m, A. M. Silva-Neto & M. Araújo leg. (MZSP).

Paratypes: BRAZIL: Bahia: same data as holotype, 7 males, 3 females (UFBA); Varzedo, Reserva Gambá, 12°57'12"S, 39°28'32"W, ca 510 m, 08.xi.2010, bandeja, A. R. Calor, F. Quinteiro, D. França, R. Mariano & A. Costa leg., 17 males, 1 female (UFBA); Santa Teresinha, Serra da Jibóia, Riacho das Torres, 12°50'59"S, 39°28'47"W, ca 490 m, 06.x.2010, Luz, A. R. Calor, F. Quinteiro, D. França, R. Mariano & A. Costa leg., 37 males, 16 females (DZRJ 3792); Santa Teresinha, Distrito de Pedra Branca, Riacho das Torres, 12°51'00"S, 39°28'48"W, ca 490 m, 28.ix.2009, Luz, A. R. Calor & A. Cruz leg., 1 male (UFBA); Santa Teresinha, Distrito de Pedra Branca, Riacho das Torres, 12°51'00"S, 39°28'48"W, ca 490 m, 10.vi.2010, Luz, A. R. Calor, D. França & F. B. Quinteiro leg., 1 male (UFBA); Santa Teresinha, Distrito de Pedra Branca, Riacho das Torres, 12°51'01"S, 39°28'48"W, ca 500 m, 07.viii.2009, A. R. Calor & L. Lecci leg., 1 male (UFBA); Varzedo, Serra da Jibóia, Fazenda Baixa da Areia Cai Camarão, 12°57'45"S, 39°27'12"W, ca 260 m, 27.iii.2012, Pan light trap, F. B. Quinteiro, T. Duarte & I. Garcia leg., 2 males (UFBA); Camacan, Serra Bonita, córrego 1, 15°23'28"S, 39°33'56"W, ca 820 m, 31.vii.2008, Luz UV e branca, A. R. Calor, L. Lecci, L. C. Pinho & R. Moretto leg., 2 males, 1 female (DZRJ 3793); Camacan, Serra Bonita, 1ª cachoeira, 15°23'28"S, 39°33'57"W, ca 830 m, 04.xi.2009, A. R. Calor et al. leg., 2 males (UFBA); Camacan, Fazenda Waldemar da farmácia, 15°25'17"S, 39°34'01"W, ca 310 m, 28.iii.2011, A. R. Calor, F. Quinteiro, D. França & H. Barreto leg., 1 male (DZRJ 3794); Camacan, RPPN Serra Bonita, riacho 1, 15°23'40"S,

39°33'44"W, ca 720 m, 31.iii.2011, F. Quinteiro, D. França & H. Barreto leg., 2 males (UFBA); Camacan, RPPN Serra Bonita, Malaise 1, 15°23'28"S, 39°33'56"W, ca 260 m, iv.2011, A. R. Calor leg., 5 males, 2 females (DZRJ 3795); Wenceslau Guimarães, Estação Ecológica Estadual Wenceslau Guimarães, Riacho Serra Grande, cachoeira em cima, 13°35'43"S, 39°43'12"W, ca 580 m, 10.x.2010, A. R. Calor et al. leg., 2 males, 2 females (UFBA); Wenceslau Guimarães, Estação Ecológica Estadual Wenceslau Guimarães, Rio Patioba, 13°34'50"S, 39°42'17"W, ca 540 m, 09.x.2010, A. R. Calor et al. leg., 1 male (DZRJ 3796); Amargosa, Serra do Timbó, Fazenda Timbó, Córrego Santa Rita, 13°06'22"S, 39°39'59"W, ca. 710 m, 17.vii.2009, A. R. Calor & L. Lecci leg., 1 male (UFBA).

Distribution. Brazil (Bahia).

Etymology. This species is named in memory of Dorival Caymmi, considered one of the most important Brazilian songwriters. Caymmi was born in Bahia state in 1914 and died at 2008. He became a national icon with his lyrics that evoked the charm of Bahia's fishing villages, beaches and beautiful women, like "O Que é Que a Baiana Tem?", "Marina", "Rainha do Mar", "Samba da Minha Terra", among others.

Key to species of *Alterosa* (males)

- 1 Intermediate appendages curved, sickle-like (see figs 10A, 18A in Blahnik 2005).....**2**
- Intermediate appendages apparently absent or not sickle-like.....**6**
- 2 Tergum X with cuticle mesally rough, covered by numerous spines; endotheca of phallus without prominent spines (see figs 9A, 9B, 9D in Dumas and Nessimian 2013)..... ***Alterosa morato* Dumas & Nessimian**
- Tergum X without spiny cuticle; endotheca of phallus with small number of large spines (see figs 18A, 18B, 18D in Blahnik 2005).....**3**
- 3 Tergum IX short, forming a mesal projection over base of tergum X (see figs 2, 3 in Jardim and Dumas 2012)**4**
- Tergum IX greatly reduced, membranous or fused to base of tergum X**5**
- 4 Intermediate appendages with 2 small spines; inferior appendages enlarged at apex (see figs 2, 3 in Jardim and Dumas 2012) ***Alterosa nessimiani* Jardim & Dumas**
- Intermediate appendages without spines; inferior appendages not enlarged at apex (see figs 18A, 18B in Blahnik 2005).....***Alterosa jordaensis* Blahnik**
- 5 Tergum X dorsally with small preapical projection, forming small prominence; preanal appendages robust, surpassing the intermediate appendages (see figs 1A, 1B in Dumas and Nessimian 2013)..... ***Alterosa affinis* Dumas & Nessimian**
- Tergum X dorsally with variable small projection, never preapical (absent in some specimens); preanal appendages not surpassing the intermediate appendages (see figs 10A, 10B in Blahnik 2005).....***Alterosa falcata* Blahnik**

6	Intermediate appendages absent.....	7
–	Intermediate appendages present	8
7	Tergum X with basoventral paired spine-like projection; tergum X with paired bristle-like setae; preanal appendages present (see figs 7A, 7B in Dumas and Nessimian 2013).....	<i>Alterosa graciosa</i> Dumas & Nessimian
–	Tergum X with no basoventral projection nor bristle-like setae; preanal appendages absent (see figs 8A, 8B in Dumas and Nessimian 2013).....	<i>Alterosa inappendiculata</i> Dumas & Nessimian
8	Intermediate appendages forming a short, rounded, knob-like, spinose processes (see figs 24B, 25B in Blahnik 2005)	9
–	Intermediate appendages elongate or moderately elongate, not forming a rounded, knob-like, spinose processes	11
9	Tergum IX forming mesal, hood-like projection over base of tergum X; tergum X with not basolateral expansions nor apical crest-like process (see figs 25A, 25B in Blahnik 2005).....	<i>Alterosa tripuiensis</i> Blahnik
–	Tergum IX greatly reduced, membranous or fused to base of tergum X; tergum X basolaterally with broadly rounded wing-like expansions on either side and with longitudinally narrowed crest-like process at apex (see figs 10A, 10B in Dumas and Nessimian 2013)	10
10	Preanal appendages with subacuminate projection apicoventrally; inferior appendages rounded apically (see figs 10A, 10B in Dumas and Nessimian 2013).....	<i>Alterosa paranaensis</i> Dumas & Nessimian
–	Preanal appendages without subacuminate projection apicoventrally; inferior appendages subtruncate apically (see figs 24A, 24B in Blahnik 2005)	<i>Alterosa schadrackorum</i> Blahnik
11	Preanal appendages apically with oblique concavity bearing a stout, spine-like seta (see figs 14A, 14B in Blahnik 2005)	12
–	Preanal appendages without oblique concavity at apex.....	13
12	Tergum X with lateral margins subparallel, not constricted as viewed dorsally; intermediate appendages rounded at apex, with apical small spines (see figs 14A, 14B in Blahnik 2005).....	<i>Alterosa guapimirim</i> Blahnik
–	Tergum X constricted at apical third as viewed dorsally; intermediate appendages concave at apex, with 1 or 2 spine-like small setae (see figs 20A, 20B in Blahnik 2005).....	<i>Alterosa orgaosensis</i> Blahnik
13	Tergum X with rounded basal protuberance, usually bearing scabrous cuticle; tergum X with longitudinally narrowed crest-like process at apex (see figs 5A, 7A, 11A in Blahnik 2005)	14
–	Tergum X with neither basal protuberance nor crest-like process at apex...24	
14	Intermediate appendages branched basally or subbasally (see figs 4A, 12A in Dumas and Nessimian 2013).....	15
–	Intermediate appendages single, not branched	20
15	Tergum X dorsally with paired longitudinal rows of short spines (see figs 7A, 7B in Blahnik 2005)	16

- Tergum X without longitudinal rows of spines..... **17**
- 16 Intermediate appendages with lateral branch very short, positioned laterally to mesal branch; intermediate appendages with lateral and mesal branches bearing apical brush of setae (see figs 7A, 7B in Blahnik 2005) ***Alterosa boraceiae** Blahnik*
- Intermediate appendages with lateral branch elongate, positioned below mesal branch; intermediate appendages with lateral and mesal branches covered with modified long, stout spine-like setae (see figs 4A, 4B in Dumas and Nessimian 2013)..... ***Alterosa caissara** Dumas & Nessimian*
- 17 Tergum X apically covered with numerous elongate spine-like setae (see figs 8A, 8B in Blahnik 2005)..... ***Alterosa caparaonensis** Blahnik*
- Tergum X without spine-like setae at apex **18**
- 18 Tergum X with apicodorsal crest-like Y-shaped expansion; preanal appendages short, not surpassing the lateral branch of intermediate appendages; intermediate appendages with lateral branch lobe-like, laterally compressed (see figs 11A, 11B in Dumas and Nessimian 2013) ***Alterosa ruschii** Dumas & Nessimian*
- Tergum X without crest-like expansion at apex; preanal appendages elongate, at least equal in length to lateral branch of intermediate appendages; intermediate appendages with lateral branch rod-like, not compressed..... **19**
- 19 Preanal appendages abruptly narrowing at apex, forming subacuminate projection; mesal branch of intermediate appendages almost equal in length to lateral branch (see figs 12A, 12B in Dumas and Nessimian 2013)..... ***Alterosa spiesae** Dumas & Nessimian*
- Preanal appendages not forming subacuminate projection apically; mesal branch of intermediate appendages much longer than lateral branch (see figs 5A, 5B in Blahnik 2005)..... ***Alterosa beckeri** Blahnik*
- 20 Preanal appendages elongate, thick, stout, apically enlarged and with brush of setae (see figs 17A, 17B in Blahnik 2005) ***Alterosa itatiaiae** Blahnik*
- Preanal appendages short or moderately elongate, narrow, apex usually narrowed (see figs 11A, 23A in Blahnik 2005) **21**
- 21 Intermediate appendages narrow, rod-like, elongate, apically with spine-like setae (see figs 6A, 11A in Blahnik 2005) **22**
- Intermediate appendages wide, short, apically broadened, covered by many coarse setae (see figs 16A, 23A in Blahnik 2005) **23**
- 22 Tergum X dorsally with paired longitudinal rows of short spines, apex truncate in lateral view; intermediate appendages with preapical row of about 4 elongate spine-like setae (see figs 16A, 16B in Blahnik 2005)..... ***Alterosa intervalles** Blahnik*
- Tergum X dorsally without longitudinal rows of short spines, apex rounded in lateral view; intermediate appendages with 2 or 3 small apical spine-like setae (see figs 23A, 23B in Blahnik 2005) ***Alterosa sanctipauli** (Flint)*

- 23 Tergum X dorsally with paired longitudinal rows of short spines; intermediate appendages without long basal stalk, broadly expanded at apex (see figs 11A, 11B in Blahnik 2005)..... ***Alterosa fimbriata* Blahnik**
- Tergum X dorsally without longitudinal rows of short spines; intermediate appendages with long basal stalk, moderately expanded at apex (see figs 6A, 6B in Blahnik 2005) ***Alterosa bocainae* Blahnik**
- 24 Inferior appendages truncate or subtruncate apically..... **25**
- Inferior appendages rounded apically..... **27**
- 25 Tergum X dorsally with mesally divided spinose crest-like projection near base; preanal appendages club-like, moderately elongate, not surpassing tergum X; intermediate appendages rod-like, arched, with 1 or 2 lance-like setae (see figs 2A, 2B) **26**
- Tergum X without crest-like projection basally; preanal appendages thick, rod-like, very elongate, about same length of tergum X; intermediate appendages pencil-like, glabrous (see figs 5A, 5B in Dumas and Nessimian 2013)
..... ***Alterosa capixaba* Dumas & Nessimian**
- 26 Intermediate appendages with 1 apical lance-like seta; inferior appendages with 2nd article subequal in length to 1st article (see figs 26A, 26B in Blahnik 2005)..... ***Alterosa truncata* Blahnik 2005**
- Intermediate appendages with 2 lance-like setae, 1 at apical third and 1 at apex; inferior appendages with 2nd article slightly shorter than 1st article (figs 2A, 2B) ***Alterosa castroalvesi* sp. n.**
- 27 Preanal appendages greatly modified and enlarged, widened basally, armed with stout, modified setae (see figs 13A, 19A, 22A in Blahnik 2005) **28**
- Preanal appendages not enlarged basally, without stout setae..... **33**
- 28 Intermediate appendages branched basally, with mesal branch spine-like (see figs 12B, 22B in Blahnik 2005) **29**
- Intermediate appendages single, not branched **31**
- 29 Preanal appendages club-like, elongate, surpassing the intermediate appendages, with a basal enlargement, not forming a process (see figs 2A, 2B in Dumas and Nessimian 2013)..... ***Alterosa bandeira* Dumas & Nessimian**
- Preanal appendages bulbous, moderately elongate, not surpassing the intermediate appendages, with mesal process or dorsal process (see figs 12A, 22A in Blahnik 2005)..... **30**
- 30 Preanal appendages with a mesal spinose pad-like process, without dorsal lobe (see figs 22A, 22B in Blahnik 2005) ***Alterosa sanctateresae* Blahnik**
- Preanal appendages without mesal process, forming a greatly enlarged, rounded dorsal lobe process, laterally compressed (see figs 12A, 12B in Blahnik 2005)..... ***Alterosa flinti* Blahnik**
- 31 Preanal appendages club-like, without process basally (see figs 19A, 19B in Blahnik 2005)..... ***Alterosa marinonii* (Almeida & Duarte)**
- Preanal appendages subtriangular, with a flange-like process at base (see figs 9A, 13A in Blahnik 2005) **32**

- 32 Tergum IX forming a mesal projection over base of tergum X (in some specimens with small, stalked basal process); preanal appendages with short, stout setae apically, extending along ventromesal margin; intermediate appendages glabrous (see figs 13A, 13B in Blahnik 2005) *Alterosa fluminensis* Blahnik
- Tergum IX greatly reduced, membranous or fused to base of tergum X; preanal appendages brush-like, with short, stout setae confined to posterolateral margin; intermediate appendage with scale-like spines along dorsal margin (see figs 9A, 9B in Blahnik 2005)..... *Alterosa escova* Blahnik
- 33 Inferior appendages with 2nd article longer than 1st article 34
- Inferior appendages with 2nd article subequal in length or shorter than 1st article..... 37
- 34 Intermediate appendages not branched, narrow, pencil-like, closely adpressed to lateral margin of tergum X, with a short, stout apical setae (see figs 15B, 21B in Blahnik 2005) 35
- Intermediate appendages branched subbasally, large, covered by stout, spine-like setae 36
35. Tergum VIII with paired rod-like forked projections; tergum IX with lateral margins forming elongate dorsoventrally flattened plates (see figs 21A, 21B in Blahnik 2005)..... *Alterosa paprockii* Blahnik
- Tergum VIII without projections; tergum IX forming a shelf-like projection over base of tergum X (see figs 15A, 15B in Blahnik 2005)..... *Alterosa holzenthali* Blahnik
- 36 Tergum X dorsally with spiny crest-like projection at midlength; intermediate appendages with lateral branch lobe-like; inferior appendages with 1st article short, nearly as wide as long; endotheca of phallus without prominent spines (figs 1A, 1B, 1D) *Alterosa amadoi* sp. n.
- Tergum X without crest-like projection; intermediate appendages with lateral branch flange-like; inferior appendages with 1st article approximately 2 times as long as wide; endotheca of phallus with several paired tracts bearing prominent spines (figs 3A, 3B, 3D, 3E, 3F) *Alterosa caymmii* sp. n.
- 37 Tergum X robust, abruptly tapered subapically; intermediate appendages bent downward beneath tergum X, branched basally; phallobase without projections (see figs 6A, 6B, 6D in Dumas and Nessimian 2013)..... *Alterosa catarinae* Dumas & Nessimian
- Tergum X narrow, enlarged at base, with margins weakly protruding, subparallel; intermediate appendages rod-like, not bent, unbranched; phallobase with 2 long spear-like projections on posteroventral margin (see figs 3A, 3B, 3D, 3E in Dumas and Nessimian 2013) *Alterosa bilanceolata* Dumas & Nessimian

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Anagnorisma chamrani sp. n. (Lepidoptera, Noctuidae) from Iran

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Abstract

A new *Anagnorisma* species, *A. chamrani* sp. n., is described from Binaloud Mountains of Khorasan-e-Razavi province in north-eastern Iran, and compared with its sister species, *A. eucratides* (Boursin, 1960). The adults, and male and female genitalia of both species are illustrated in 11 figures. The genus *Anagnorisma* is recorded for the first time for the fauna of Iran.

Keywords

Anagnorisma, Noctuidae, new species, Iran

Introduction

The genus *Anagnorisma* was erected by Ronkay and Varga (1999), together with two further genera of the *Eugnorisma* Boursin, 1946 generic complex, *Protognorisma* Ronkay & Varga, 1999 and *Schizognorisma* Ronkay & Varga, 1999. These three genera

represent the more ancient lineages of this clade; their species are generally distributed in the wide sense Himalayan region. The detailed comparison of the three genera, and the main differential features between the sister genera *Anagnorisma* and *Schizognorisma*, are given in the original descriptions (Ronkay and Varga op. cit.).

The genus *Anagnorisma* was known to comprise four taxa, *A. eucratides* (Boursin, 1957), *A. goniophora* (Hacker, Ronkay & Varga, 1990), *A. glareomima* (Varga & Ronkay, 1991) and *A. zakaria* Ronkay & Varga, 1999. The fifth species, the most westerly distributed member of the genus, *A. chamrani* sp. n., is described below.

Material and methods

The material examined was collected in late summer 2012 in Khorasan-e-Razavi province located in north-eastern Iran, using 8 watt black light UVB tubes. The genitalia of both sexes were dissected, stained, and mounted following the standardised way. The adults were photographed by Gábor Ronkay, the genitalia slides by Zoltán Soltész and Tibor Csővári; the digital images have been adjusted and edited by Gábor Ronkay.

Systematic Account

Subfamily Noctuidae Latreille, 1809

Tribe Noctuini Latreille, 1809

Subtribe Noctuina Latreille, 1809

Anagnorisma chamrani Gyulai, Rabieh & Ronkay, sp. n.

urn:lsid:zoobank.org:act:B912288F-2152-4743-B131-AAA3C08F7D48

http://species-id.net/wiki/Anagnorisma_chamrani

Figs 3, 4, 8–10

Type material. Holotype. female, Iran, prov. Khorasan-e-Razavi, Binaloud, 2507 m, 36°28'56"N; 59°46'17"E, 10.IX.2012; slide No. 3145 PGY. The holotype is deposited in the collection of P. Gyulai, later to be deposited in the Hungarian Natural History Museum, Budapest, Hungary

Paratype. Male, with the same data as the holotype; slide No. 3144 PGY (coll. P. Gyulai, Miskolc).

Diagnosis. *Anagnorisma chamrani* is the sister species of *A. eucratides* (Boursin, 1957), which is only known from eastern Afghanistan at altitudes of 2050 to 2450 m of the Hindu Kush Mountains. The main external differential features, in comparison with *A. eucratides* (Figs 1, 2), are the following: thoracic pubescence, ground colour of forewing and filling of stigmata more unicolorous, not brownish red as in *A. eucratides*; antemedial line oblique, somewhat zigzagged; postmedial line more crenellate, both of them have a

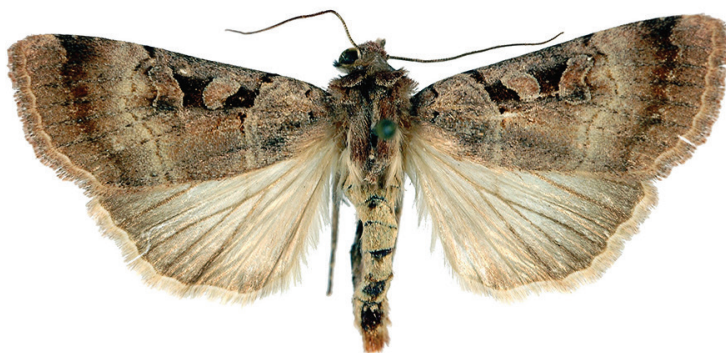


Figure 1. *A. eucratides* female, HT.

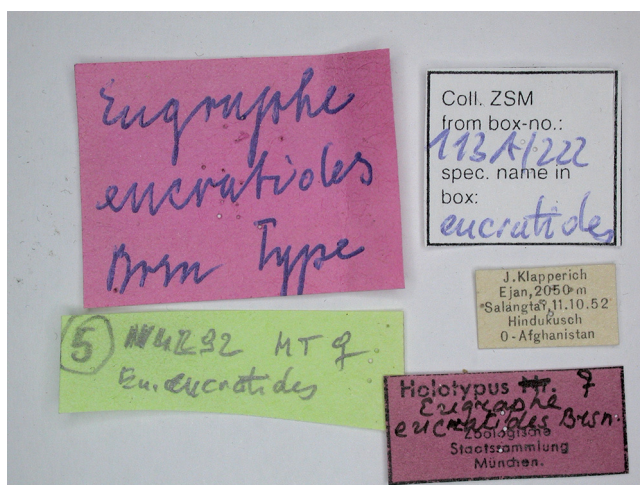


Figure 2. *A. eucratides* female, HT labels.

finer black-marked definition; subterminal line less wavy; hindwing darker greyish; cilia pale pinkish. The new species is also similar to the Pakistani *A. goniophora*, but the ante-medial line is more zigzagged, the postmedial line is less evenly arched, being terminally oblique and not perpendicular to the inner edge of the forewing, the subterminal line is more wavy in the upper half and more conspicuously ochreous. The two other members of *Anagnorisma* are less similar to the new species; *A. chamrani* differs from *A. glareomima* by its darker and more elongated wings, larger stigmata and the different configuration of the stigmata and the black intermaculation; finally, it cannot be confused with the conspicuously different, orange-brown coloured *A. zakaria*. Wingspan 34–35 mm. The configuration of the genitalia of both sexes indicates the close relationship between *A. eucratides* and *A. chamrani*. In the male genitalia (Figs 6, 7, 9, 10), the dorsal costa of the valva of *A. chamrani* is more extended medially, so the costal and dorsal margins are less



Figure 3. *A. chamrani* female, HT.



Figure 4. *A. chamrani* male, PT.

parallel than in *A. eucratides*; the valval apex is evenly rounded, more prominent dorsally than ventrally (it is the opposite in *A. eucratides*); the apical lobe and the ventral extension are smaller; the vinculum is somewhat longer; the aedeagus is slightly curved ventrad; the dorsal and ventral carinal plates are narrow, crest-like, long and strongly sclerotised, the ventral plate terminates in an obtuse, small peak (the ventro-lateral carinal plate of *A. eucratides* is markedly stronger, bearing a conspicuous, strong thorn).

The male genitalia of *A. chamrani* are strikingly dissimilar from those of the externally similar *A. goniophora*, especially the broader valva of *A. chamrani*, particularly its distal

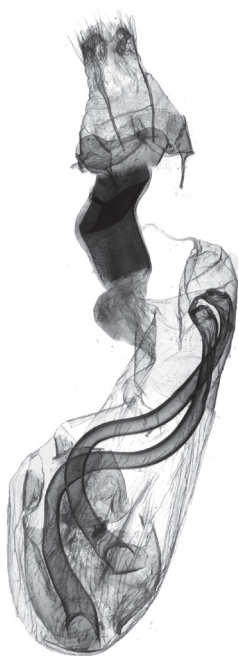


Figure 5. *A. eucratides* female genitalia ZSM N4212 HT.

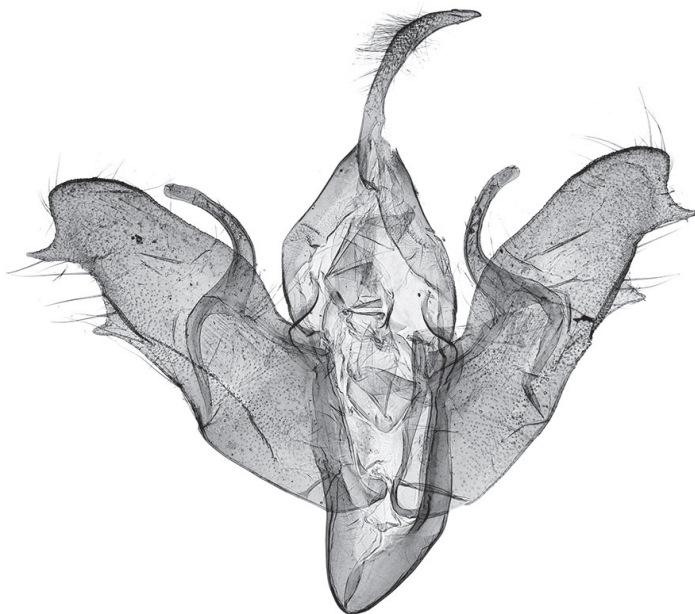


Figure 6. *A. eucratides* male genitalia, clasping apparatus PT.

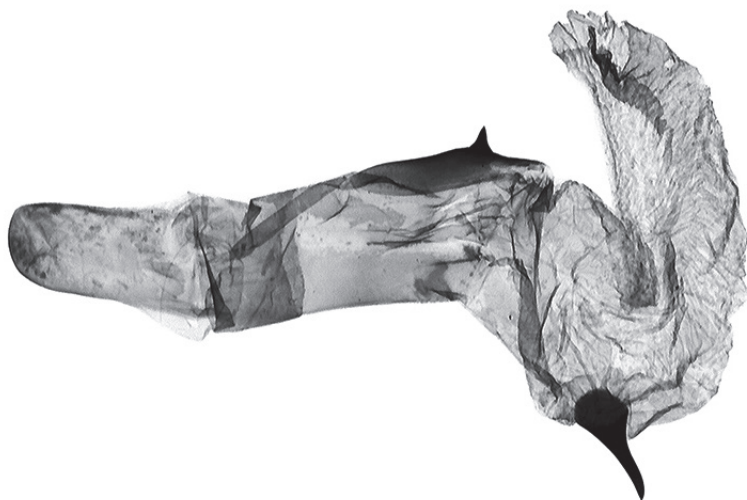


Figure 7. *A. eucratides* male genitalia, aedeagus PT.

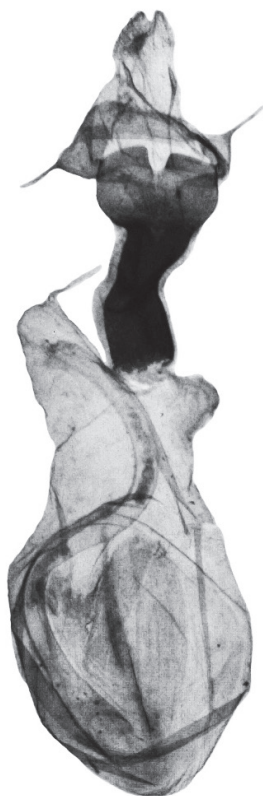


Figure 8. *A. chamrani* female genitalia, HT.

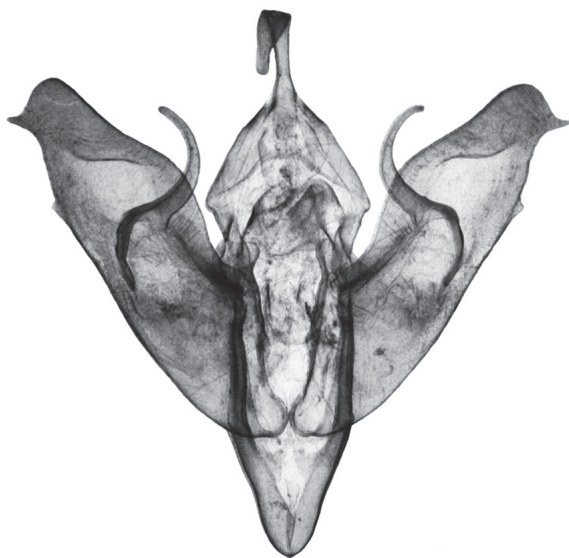


Figure 9. *A. chamrani* male genitalia clasp apparatus PT.

part and the assemblage of the valval apex; the much longer, arched harpe and the longer, crest-like carinal plates. The diagnostic features, in comparison with *A. zakaria*, are the much longer, arched harpe, the considerably shorter (about half as long) ventral valval extension and the longer and not extended, crest-like ventral carinal plate in *A. chamrani*.

In the female genitalia, *A. chamrani* (Fig. 8) differs from *A. eucratides* by its narrower but higher, more sclerotised, asymmetrically subquadrangular antrum with U-shaped postero-medial incision; longer ductus bursae with less elbow-like lateral projection and the almost twice as long, more prominent, conical appendix bursae. Comparing with *A. glareomima* and *A. zakaria*, the most conspicuous difference is the shape of ductus bursae: *A. chamrani* has an almost evenly-broad ductus bursae with an asymmetrical medial constriction in one side and elbow-like lateral projection on the opposite side, whereas the two other species have a funnel-like ductus bursae.

Distribution. The new species is known only from the type locality, the higher Binaloud Mountains (Fig. 11). The dominant species in the vegetation of the habitat are Mountain Sainfoin, Wild almond (*Amygdalus scoparia*), Downy brome (*Bromus tectorum*); the other mentionable plants are *Bromus*, *Artemisia* and *Astragalus* spp. The adults were attracted to light early on a cold night in September. The early stages are unknown.

Etymology. The new species is named in honour of the martyr Dr. Mostafa Chamran (1932–1981). In 1982 the Jundi Shapur University was renamed to Shahid Chamran University after the martyrdom of Dr. Chamran, an outstanding Iranian warrior in the 8 years Iran–Iraq war. The university was closed in those days due to the war conditions in the area.



Figure 10. *A. chamrani* male genitalia aedeagus PT.



Figure 11. Habitat of the type locality of the new species.

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An illustrated key to the genera of Thripinae (Thysanoptera, Thripidae) from Iran

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Abstract

An illustrated key is provided for the identification of 35 genera of Thripinae (Thysanoptera: Thripidae) from Iran with comments for each genus. *Chirothrips maximi* Ananthakrishnan and *Limothrips cerealium* Haliday are recorded from Iran for the first time. A checklist is provided of Thripinae recorded from this country.

Keywords

Thysanoptera, Thripinae, identification, Iran

Introduction

The family Thripidae (Thysanoptera: Terebrantia) at present comprises more than 2000 described species, which are classified into four subfamilies, Thripinae, Dendrothripinae, Sericothripinae, and Panchaetothripinae (Bhatti 1989). The present study follows the interpretation of Thripinae in this classification. Another recent classification of Terebrantia (Bhatti 2006) recognizes three superfamilies and 12 families for taxa included in the four subfamilies of Thripidae, and the taxa of the earlier subfamily Thripinae are included in three families (Chirothripidae, Projectothripidae, and Thripidae) (Bhatti 2006).

Thripinae (sensu Bhatti 1989) comprising 1600 species in 230 genera worldwide is the largest subfamily. Members of Thripinae exhibit a wide range of biologies. Many

species live in flowers, on leaves, some species live in both habitats, particularly the pest species, and a few species are predators. In this subfamily, several genus-groups, which are probably monophyletic, have been recognized, including the *Anaphothrips* genus-group, the *Frankliniella* genus-group, the *Megalurothrips* genus-group, the *Scirtothrips* genus-group, the *Trichromothrips* genus-group, the *Taeniothrips* genus-group and the *Thrips* genus-group (Mound and Palmer 1981a, Mound 2002, Masumoto and Okajima 2005, 2006, 2007, Mound and Masumoto 2009).

Countries of the eastern Mediterranean comprised the most important centre for the early development of human civilization, including the development of the agricultural systems on which so much of mankind depends. In contrast, our knowledge of the natural biological systems of this area has been less actively developed. Despite excellent floristic studies, such as Flora Iranica that now provides an identification system to more than 10,000 plant species, comprehensive studies on the insect fauna of this area are sadly lacking. Iran, in particular, is a bridge between the faunas of the European and Oriental Realms, and this produces considerable difficulties in studying any single group.

Keys are available for species of some Iranian genera, such as for the genera of *Thrips* and *Frankliniella* genus-groups (Minaei et al. 2007; Mirab-balou and Chen 2011a), and the *Megalurothrips* genus-group (Mirab-balou and Chen 2011b).

Within the 35 genera of Thripinae that are now listed from Iran, many species are widely distributed and their habitats are known. The species of several genera are grass-living, including *Agalmothrips*, *Anaphothrips*, *Aptinothrips*, *Bregmatothrips*, *Chirothrips*, *Collembolothrips*, *Exothrips*, *Limothrips*, *Sitothrips*, *Sphaeropothrips*, *Stenchaetothrips*, and *Stenothrips*. On the other hand, many species especially in *Thrips* and *Frankliniella* live in various flowers, and these include economic pests of agricultural crops, fruit trees, ornamental plants, greenhouses (Mirab-balou and Chen 2011a, Mirab-balou et al. 2012a). A few are predators, such as species of *Scolothrips* and *Parascolothrips*, playing an important role in checking the multiplication of tetranychid mites (Mound 2011b).

An annotated bibliography of publications on Thysanoptera of Iran was provided by Bhatti et al. (2009a). However there is not any available key to distinguish the genera. The objective of this paper is to provide an identification key to the 35 genera of Thripinae that can be recognized currently in Iran. Comments are provided for each genus. A checklist of Thripinae known from Iran are also represented here.

Material and methods

For new records, thrips have been prepared and mounted on slides using the method of Mirab-balou and Chen (2010a) and specimens are deposited in the Institute of Insect Sciences, Zhejiang University, Hangzhou, China (ZJUH). All descriptions, measurements and photos were made with a Leica DM IRB microscope, a Leica MZ APO microscope with a Leica Image 1000 system. All measurements are given in micrometers (µm).

Key to genera of Thripinae from Iran

- 1 Pronotum without any posteroangular setae longer than discal setae (Fig. 5)...**2**
- Pronotum with at least one pair of posteroangular or posteromarginal setae longer than discal setae (Figs 1–4, 6).....**5**
- 2 Antennal segments III and IV each with a simple sensorium.....**3**
- Antennal segments III and IV each with a forked sensorium.....**4**
- 3 Antennae 9-segmented (cf. Fig. 26); apterous or macropterous; abdominal sternites without discal setae; tarsi 2-segmented; male with a transverse pore plate on abdominal sternites III–VII ***Agalmothrips***
- Antennae 6- or 8-segmented (Fig. 29); apterous; abdominal sternites with or without discal setae; tarsi 1- or 2-segmented (tarsi 2-segmented if antennae 8-segmented, in *A. stylifer* Trybom); male without pore plate on abdominal sternites ***Aptinothrips***
- 4 Median pair of setae (S1) on abdominal tergites II–VIII shorter than distance between their bases (Fig. 12); abdominal tergite VIII with comb at posterior margin ***Anaphothrips***
- Median pair of setae (S1) on abdominal tergites II–VIII longer than distance between their bases; abdominal tergite VIII without comb at posterior margin ***Rubiothrips***
- 5 Abdominal tergites V–VIII each with a pair of lateral ctenidia **6**
- Abdominal tergites V–VIII without ctenidia **13**
- 6 Abdominal tergite VIII with ctenidium situated antero-lateral to spiracle ... **7**
- Abdominal tergite VIII with ctenidium situated posteromesad of spiracle ... **9**
- 7 Pronotum anterior margin without long setae (cf. Fig. 1); mesosternum without spinula; maxillary palp 2-segmented (cf. Fig. 20) ***Sitothrips***
- Pronotum anterior margin with 1 or 2 pairs of setae much longer than discal setae (Fig. 6); mesosternum with spinula (cf. Fig. 15); maxillary palp 3-segmented (cf. Fig. 22) **8**
- 8 Fore tarsus with a small tooth at apex (Fig. 23); ocellar setae pair III inserted between posterior ocelli; abdominal sternite VII of female with S1 setae inserted ahead of posterior margin (cf. Fig. 36) ***Kakothrips***
- Fore tarsus without tooth (Fig. 21); ocellar setae pair III arising at a level ahead of posterior ocelli (Fig. 9); abdominal sternite VII of female with S1 setae arising at posterior margin (Fig. 38)..... ***Frankliniella***
- 9 Mesothoracic sternopleural sutures absent; antennal segment II without seta basad of campaniform sensillum ***Sphaeropothrips***
- Mesothoracic sternopleural sutures present; antennal segment II with dorsal seta basad of campaniform sensillum **10**
- 10 Prosternal basantra with several small setae; abdominal tergites at posterior margin with large triangular teeth (Fig. 45)..... ***Microcephalothrips***
- Prosternal basantra without setae; posterior margin of abdominal tergites without teeth; head not distinctly smaller than pronotum **11**

11	Postocular setae pair II inserted far back of the others; abdominal tergites III–V with three setae arranged straight line along the lateral margin.....	<i>Stenothrips</i>
–	Postocular setae pair II not displaced to the posterior although it is often slightly behind setal row; abdominal tergites III–V with three setae arranged not in straight line, median setae far from the lateral margin.....	12
12	Ocellar setae pair II longer than ocellar setae pair III.....	<i>Stenchaetothrips</i>
–	Ocellar setae pair II not longer than ocellar setae pair III (Fig. 10).....	<i>Thrips</i>
13	Spinula absent on mesosternum.....	14
–	Spinula present on mesosternum (Fig. 15).....	18
14	Abdominal tergite X of female with a pair of prominent thorn-like setae (Fig. 8); pronotum with a pair of well developed posteroangular setae. [Male apterous, with a pair of short stout setae medially on tubercles on abdominal tergite IX (Fig. 44)].....	<i>Limothrips</i>
–	Abdominal tergite X of female without such thorn-like setae (Fig. 42); pronotal posteroangular setae variable.....	15
15	Abdominal sternite VII of female with posteromarginal setae S1 and S2 arising closer to each other than to setal pair S3.....	<i>Exothrips</i>
–	Abdominal sternite VII of female with posteromarginal setae arising equidistant from each other.....	16
16	Abdominal tergites with median pair of campaniform sensilla close to the posterior margin (Fig. 7); abdominal sternite II with three pairs of posteromarginal setae. [Male apterous, and bicolored yellow and brown (Fig. 35)].....	<i>Bregmatothrips</i>
–	Abdominal tergites with median pair of campaniform sensilla arising at anterior third (cf. Figs 14, 46); abdominal sternite II with two pairs of posteromarginal setae.....	17
17	Pronotum broadly rectangular, with 3 pairs of posteromarginal setae; antennal segment II not prolonged laterally; fore tarsus with a curved tooth (Fig. 18); maxillary palp 2-segmented.....	<i>Collembolothrips</i>
–	Pronotum trapezoidal, with 5–8 pairs of posteromarginal setae (Fig. 1); antennal segment II usually projecting laterally (Fig. 30); fore tarsus without tooth (Fig. 16); maxillary palp 3-segmented.....	<i>Chirothrips</i>
18	Metasternum with prominent spinula.....	19
–	Metasternum without spinula.....	24
19	Antennae 6-segmented (cf. Fig. 29).....	<i>Drepanothrips</i>
–	Antennae 7- or 8-segmented (Figs 27–28).....	20
20	Antennae 7-segmented, VII slightly longer than VI; tarsi 1-segmented (cf. Fig. 17).....	<i>Parascolothrips</i>
–	Antennae 8-segmented; tarsi 2-segmented.....	21
21	Pronotum with six pairs of very long setae (Fig. 2).....	<i>Scolothrips</i>
–	Pronotum with no more than two pairs of elongate setae.....	22
22	Abdominal tergites without numerous microtrichia occupying lateral thirds, rarely with a few microtrichia near lateral margins; maxillary palp 2-segmented (cf. Fig. 20).....	<i>Psilothrips</i>

- Abdominal tergites with lateral thirds fully covered with numerous microtrichia (Fig. 37); maxillary palp 3-segmented (cf. Fig. 22).....**23**
- 23 Pronotum with two pairs of prominent posteroangular setae; antennal segment I with pair of dorsoapical setae; males of some species with antennal segment VI three times as long as segment V (Fig. 40)..... ***Mycterothrips***
- Pronotum with closely spaced lines of sculpture, without long setae, or only one pair of prominent posteroangular setae (Fig. 4); antennal segment I without dorsoapical setae; antennae not sexually dimorphic..... ***Scirtothrips***
- 24 Spiracles on abdominal tergite VIII with area of specialised sculpture extending to antecostal ridge..... ***Chaetanaphothrips***
- Spiracles on tergite VIII without extensive area of specialised sculpture**25**
- 25 Head with 4 or more pairs of ocellar setae..... ***Florithrips***
- Head with 2 or 3 pairs of ocellar setae**26**
- 26 Setae on fore wing first and second veins very long, longest seta twice as long as wing width..... ***Euphysothrips***
- Setae on fore wing first and second veins shorter, longest seta scarcely as long as wing width.....**27**
- 27 Pronotum with four pairs of setae well-developed; antennae 9-segmented
..... ***Ficothrips***
- Pronotum with one or two pair of posteroangular setae well-developed, with no long anteromarginals and anteroangulars setae.....**28**
- 28 Pronotum with two pairs of posteroangular setae well-developed.....**29**
- Pronotum with one pair of posteroangular setae**33**
- 29 Head with only one pair of anteocellar setae (ocellar seta pair I absent) (cf. Fig. 10) ***Taeniothrips***
- Head with two pairs of anteocellar setae (ocellar seta pair I present) (cf. Figs 9, 11).....**30**
- 30 Sensorium on antennal segment VI with elongate base (Fig. 31); fore tibia usually with 1 or 2 claw-like processes at apex; fore tarsus often with 1 or 2 small tubercles (Fig. 19) ***Odontothrips***
- Base of sensorium on antennal segment VI not elongate; fore tibia without tubercles**31**
- 31 Fore wing first vein with nearly complete row of setae and short interval before two distal setae (Fig. 34); clavus with 4 or 5 veinal setae
..... ***Megalurothrips***
- Fore wing upper vein with setal row broadly interrupted, with 1+2 distal setae (cf. Fig. 33); clavus usually with 5 veinal setae**32**
- 32 Antennal segment I without pair of dorsoapical setae; male with a single oval or circular pore plate on each of abdominal sternites III–VII (Fig. 43).. ***Tenothrips***
- Antennal segment I with a pair of dorsal apical setae (Fig. 32); male with numerous small pore plates on abdominal sternites III–VII (Fig. 41).. ***Pezothrips***
- 33 Antennae 9-segmented..... ***Eremiothrips* [in part]**
- Antennae 7- or 8-segmented.....**34**

- 34 Abdominal tergites III–VI with lines of sculpture medially; sternites without discal setae *Oxythrips*
- Abdominal tergites without lines of sculpture medially; sternites with or without discal setae (Fig. 39)..... 35
- 35 Head longitudinally striate behind eyes; abdominal sternite II with 0–4 discal setae..... *Tamaricothrips*
- Head weakly striate behind eyes; abdominal sternite II without discal setae.. *EremiOTHrips* [in part]

Agalmothrips Priesner

Remarks. Included here only from descriptions, the sole species in this genus, *A. parviceps* Priesner, was described from Sudan (Priesner 1964), subsequently reported and re-characterized from India (Bhatti 1978). It was reported from Iran by zur Strassen (2003b) based on two males and eight females collected on *Kochia* sp. (Chenopodiaceae), in Ahwaz region (Khuzestan province). *Agalmothrips* was included in the *Anaphothrips* genus-group (Mound and Masumoto 2009).

Anaphothrips Uzel

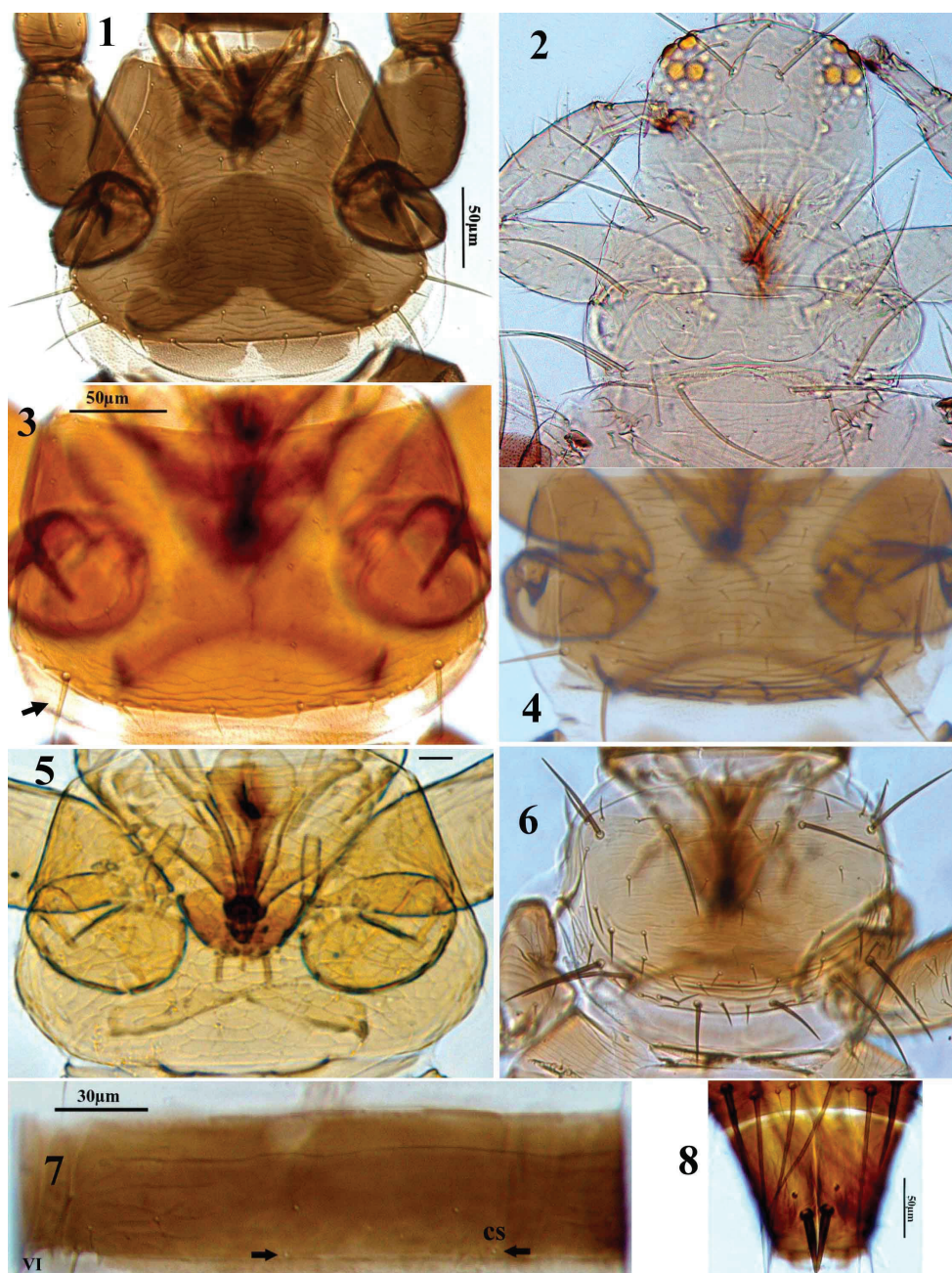
Remarks. This genus includes 79 species in the world (ThripsWiki 2013), and many of these are grass-living. In Iran, only *A. obscurus* (Müller) and *A. sudanensis* Trybom have been reported (Bhatti et al. 2009a). Recently, the male of the widely distributed species *A. obscurus* is described only from Iran (Mirab-balou and Chen 2010b).

Aptinothrips Haliday

Remarks. The four species included in this genus (Mirab-balou et al. 2011a) are all apterous. Three of these are known from Iran: *A. elegans* Priesner, *A. rufus* (Haliday) and *A. styliifer* Trybom (Bhatti et al. 2009a). The genus is included in the *Anaphothrips* genus-group (Mound and Masumoto 2009).

Bregmatothrips Hood

Remarks. This is a common genus of grass-living species in tropical and subtropical areas (Mound and Marullo 1996; Mound 2011a), with nine species worldwide (Mound



Figures 1–8. Thripinae genera. **1** *Chirothrips aculeatus*, pronotum **2** *Scolothrips longicornis* head and pronotum **3–6** pronotum **3** *Limothrips angulicornis* **4** *Tenothrips frici* **5** *Aptinothrips stylifer* **6** *Frankliniella occidentalis*, **7** *Bregmatothrips bournieri* abdominal tergite VI **8** *Limothrips angulicornis*, abdominal tergite X.

2011a, ThripsWiki 2013) of these *B. bournieri* Pelikán is found in Iran (Pelikán 1988; Bhatti et al. 2009a). This genus is closely related to *Sorghothrips* by having antennal segment I with paired median dorsoapical setae, and the abdominal tergites with posteromarginal craspeda and the median campaniform sensilla close to the posterior margin (Masumoto and Okajima 2006).

***Chaetanaphothrips* Priesner**

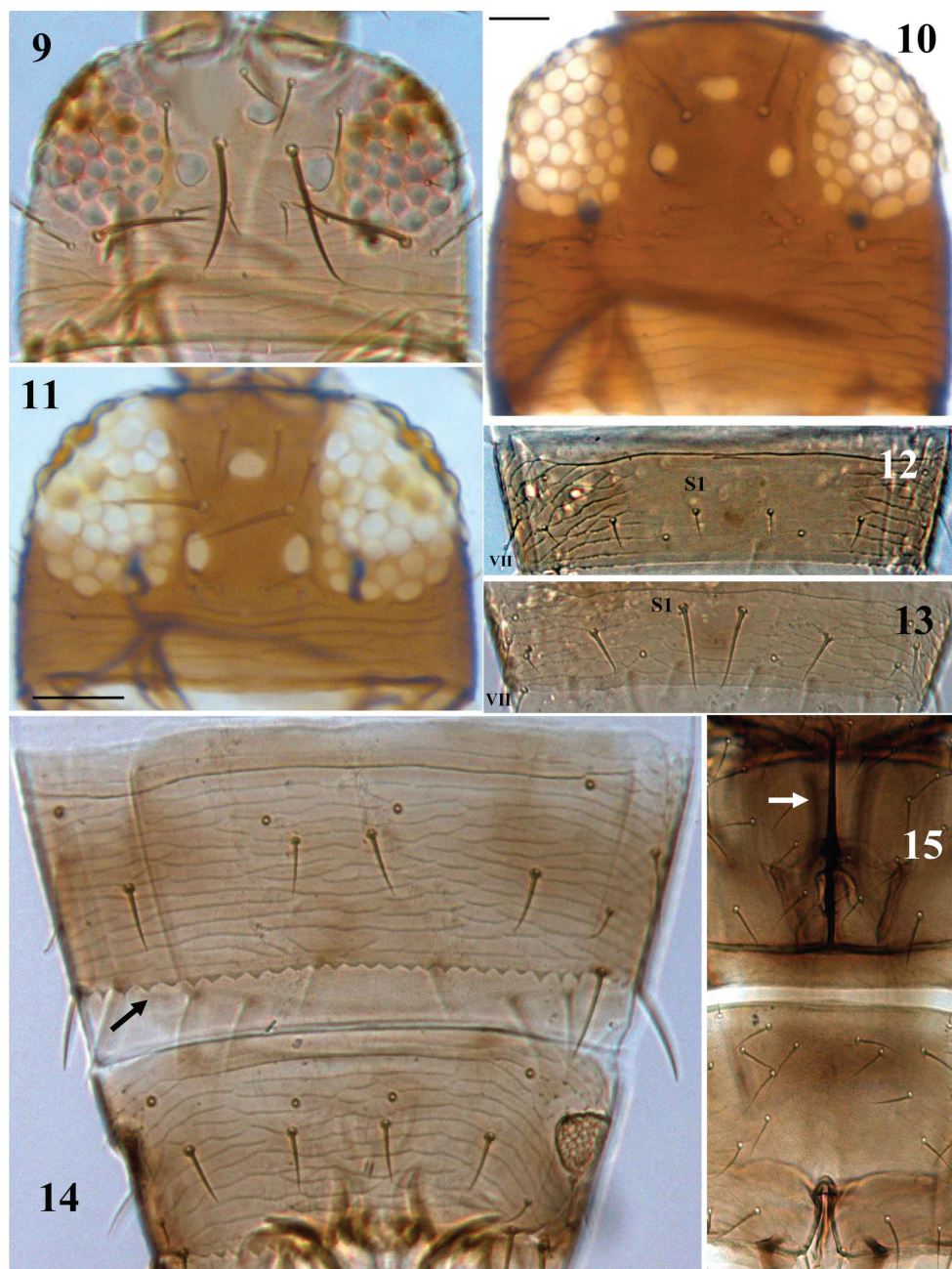
Remarks. This is an Asian leaf-living genus (Pitkin 1977), and now includes 20 species (ThripsWiki 2013). Several of these are widespread around the world, and are considered pests on their host plants. *C. theiperdus* is a pest of tea in Java and Peninsular Malaysia; *C. leeuweni* (Karny), *C. orchidii* (Moulton) and *C. signipennis* (Bagnall) are pests of Bananas in some tropical countries (Kudô 1985, Mound and Marullo 1996); *C. orchidii* is a most widely distributed polyphagous species and is also recorded as a pest of some ornamental plants in greenhouses in Europe and North America (Kudô 1985, Mound and Ng 2009). Species of this genus may be distinguished from other Thripinae by the presence of modified spiracles on abdominal tergite VIII. This genus was reported from Iran by Esmaili (1983), based on an undetermined species (*Chaetanaphothrips* sp.) noted as pest of citrus fruits in Iran.

***Chirothrips* Haliday**

Remarks. Species of this genus breed only in the flowers of grasses and are readily recognized from the shape of the head, pronotum, fore legs and antennae. This genus includes 53 species in the world (ThripsWiki 2013). Six species in *Chirothrips* and two species in *Agrostothrips* Hood have been reported from Iran (Bhatti et al. 2009a) but subsequently Minaei and Mound (2010) considered *Agrostothrips* as a synonym of *Chirothrips* and five species and one species-group (*manicatus* group) have been recognized in this country. A key also to the *Chirothrips* species from Iran was given by Minaei and Mound (2010).

***Chirothrips maximi* Ananthakrishnan**

Remarks. This species is here recorded from Iran for the first time, based on one apterous male. Hamedan province: Hamedan, Qahavand, from *Salvia nemorosa* (Lamiaceae), 20.viii.2010, coll. M. Mirab-balou (in ZJUH). The male of this species is easily distinguished from other species of *Chirothrips* by having small pore plates on abdominal sternite III and IV.



Figures 9–15. Thripinae genera. **9–11** Head, **9** *Frankliniella occidentalis* **10** *Thrips alliorum* **11** *Tenothrips frici*, **12–14** Abdominal tergite VII **12** *Anaphothrips obscurus* **13** *Rubiothrips vitis* **14** *Chirothrips aculeatus*, abdominal tergites VII–VIII, **15** *Megalurothrips distalis*, Meso- and metasterna, showing spinulae.

***Collembolothrips* Priesner**

Remarks. This genus comprises two grass-living species (ThripsWiki 2013) of which *C. mediterraneus* Priesner has been reported from Iran (Bhatti et al. 2009a). It is easily distinguished from other thripine in Iran by the absence of a spinula on both the meso- and metathoracic furca, also the lack of ocelli and wings, and the 2-segmented maxillary palps.

***Drepanothrips* Uzel**

Remarks. This monobasic genus is included in *Scirtothrips* genus-group (Mound and Palmer 1981a; Masumoto and Okajima 2007). *D. reuteri* Uzel is easily recognized from other Iranian genera by precense of the 6-segmented antennae. It is known as a pest of grapes in some areas (Mound et al. 1976; Masumoto 2010).

***Eremiothrips* Priesner**

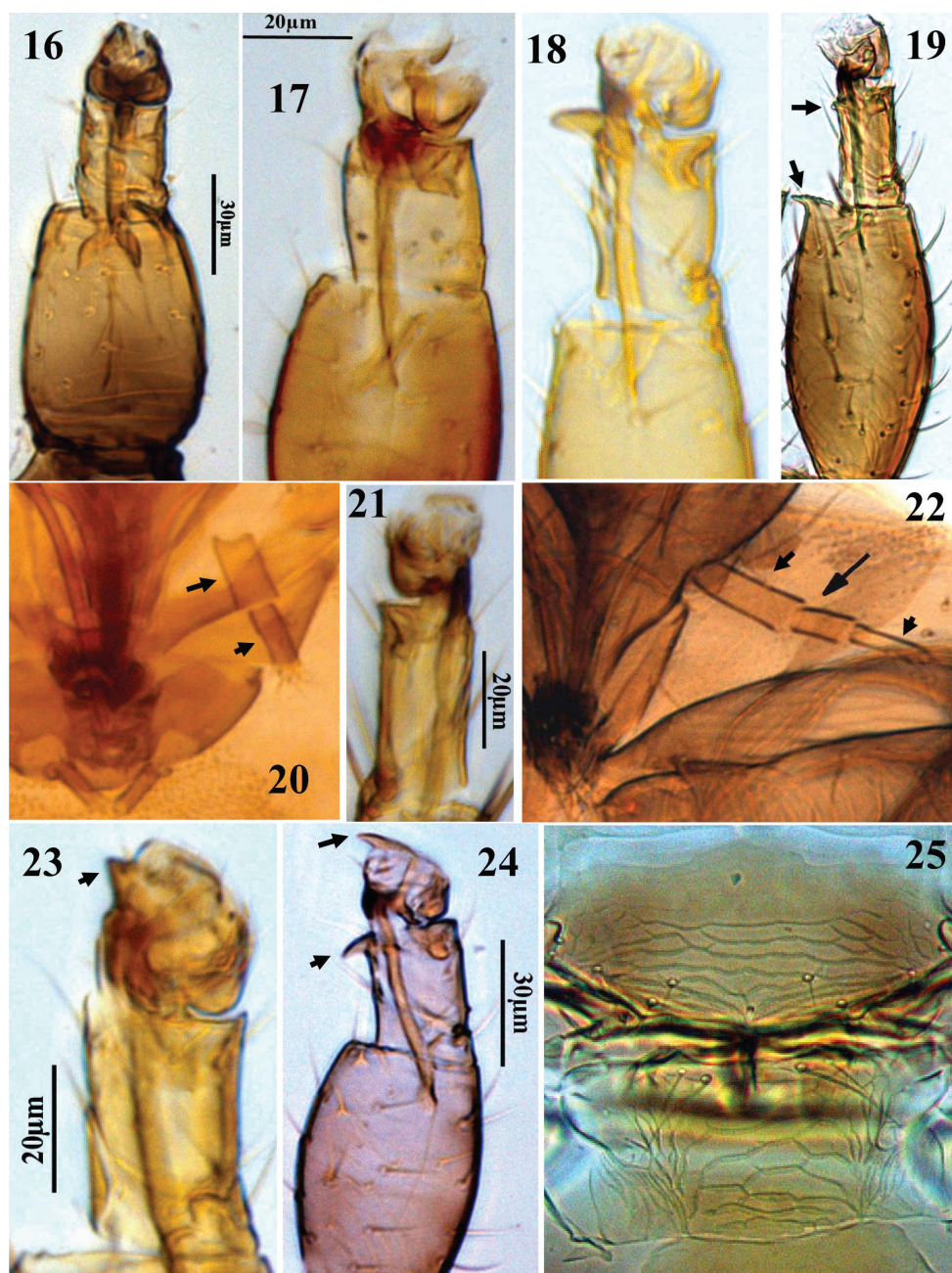
Remarks. This genus with 18 species (ThripsWiki 2013) is included in *Anaphothrips* genus-group (Mound and Masumoto 2009). Bhatti et al. (2003) published a catalogue of the *Eremiothrips* in Iran with key for separating the nine species of this genus. Recognition of species of *Eremiothrips* based on females is extremely difficult, since the general appearance and fine structural details of females are very similar in related species. However, males can be assigned readily to species because of distinctive structural features (Bhatti et al. 2003). In Iran, the genus includes 12 species (Bhatti et al. 2009b, Ramezani et al. 2009, Minaei 2012a) and a key to Iranian *Eremiothrips* based on the male sex is available (Minaei 2012a).

***Euphysothrips* Bagnall**

Remarks. This genus includes two species (ThripsWiki 2013). Both are known from India but *E. minozzii* Bagnall has been reported from Iran (Bhatti et al. 2009a). The fore wing chaetotaxy is unique, with very long setae on the veins (Mound and Ng 2009).

***Exothrips* Priesner**

Remarks. This genus comprises 18 grass feeding species (ThripsWiki 2013), and is represented in Iran by *E. redox* Bhatti (Bhatti et al. 2009a). Bhatti (1975) provided an identification key to 10 species from India, and indicated that these are associated with Poaceae.



Figures 16–25. Thripinae genera. **16–19** Fore tibia and tarsus, **16** *Chirothrips aculeatus* **17** *Limothrips cerealium* **18** *Collembolothrips mediterraneus* **19** *Odontothrips loti*, **20** *Limothrips cerealium*, maxillary palps **21** *Frankliniella occidentalis*, fore tarsus **22** *Megalurothrips distalis*, maxillary palps **23–24** Fore tibia and tarsus **23** *Kakothrips pisivorus* **24** *Sitothrips arabicus* **25** *Bregmatothrips bournieri*, mesonotum and metascutum.

***Ficothrips* Minaei**

Remarks. This genus originally described from Iran with only one species, *F. moundi* (Minaei 2012b). This monobasic genus is superficially similar to *Scolothrips* or *Parascolothrips*. Morphologically, *Ficothrips* is interesting because simultaneously bears two character states that have been evolved rarely in Thripidae: nine antennal segments and several long setae on the pronotum. The species was collected on fig leaves infested by *Eotetranychus hirsti* Pritchard and Baker (Acari, Tetranychidae) and the low density of species suggest that it may be a predator on that mite (Minaei 2012b).

***Florithrips* Bhatti**

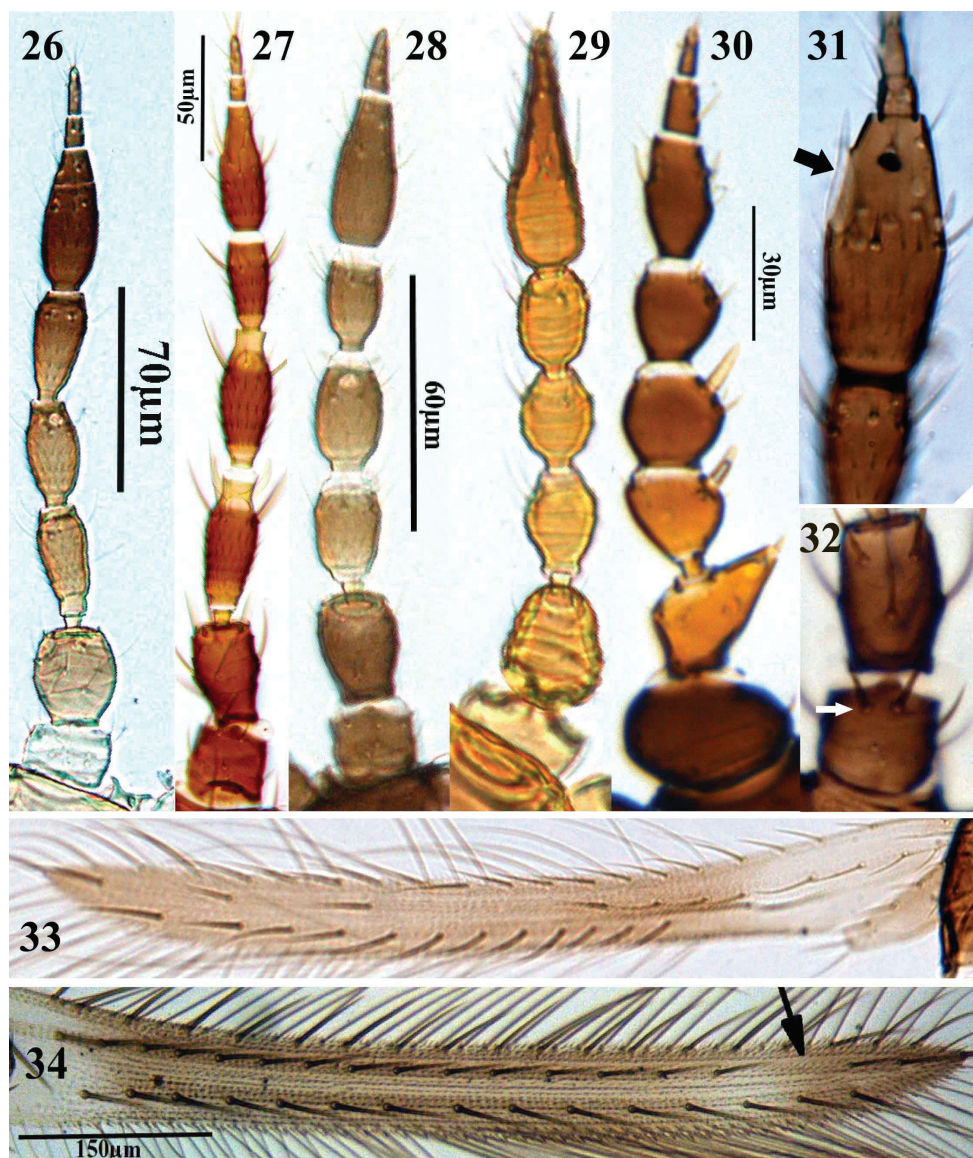
Remarks. This genus includes two species in the world (ThripsWiki 2013), of these *F. traegardhi* was recorded from Iran on the base of a few specimens collected on corn and wheat in Khozestan Province (Ramezani et al. 2012). Leaf damage to cereal crops is recorded for this species (Mound and Kibby 1998).

***Frankliniella* Karny**

Remarks. This is a large genus of about 230 species, 90% of which are from Neotropics (Mound and Marullo 1996), with only five species recorded from Iran (Mirab-balou and Chen 2011a). The genus can be recognized by having ctenidia anterolateral to each spiracle on abdominal tergite VIII, presence of five pairs of long pronotal setae, and a complete setal row on both upper and lower veins of the fore wings (Mound and Marullo 1996). A key to Iranian species is available in Mirab-balou and Chen (2011a). The species of this genus recorded from Iran are most associated with the family Rosaceae (Mirab-balou and Chen 2011a). The reports of two species from Iran have not been accepted (Bhatti and zur Strassen 2009): *F. cephalica* (D.L. Crawford) and *F. tritici* (Fitch).

***Kakothrips* Williams**

Remarks. This genus includes seven species (ThripsWiki 2013), of which three are recorded from Iran (Mirab-balou and Chen 2011a). *Kakothrips* is included in the *Frankliniella* genus-group (Mound and Palmer 1981a; Mirab-balou and Chen 2011a). This genus is distinguished from *Frankliniella* by moderately developed ctenidia laterally on abdominal tergites VI–VII whereas well-developed in *Frankliniella*, and the pronotum lacks a pair of minor setae medially on the posterior margin. In addition, males of *Kakothrips* species have a pair of stout tubercles laterally on tergite VIII, whereas none of the *Frankliniella* species has such structures (Moritz et al. 2001). Zur Strassen (2003a) provided a key to seven species from Europe; and a key to the three species in Iran is available in Mirab-balou and Chen (2011a).



Figures 26–34. Thripinae genera. **26–32** Antennae, **26** *Anaphothrips obscurus* **27** *Pezothrips kellyanus* **28** *Microcephalothrips abdominalis* **29** *Aptinothrips elegans* **30** *Arorathrips mexicanus* **31** *Odontothrips confusus*, sensoria on segment VI **32** *Trichromothrips* sp., dorsal apical setae on segment I **33–34** Fore wing **33** *Taeniothrips insequens* **34** *Megalurothrips distalis*.

Limothrips Haliday

Remarks. This western Palaearctic genus includes eight species (ThripsWiki 2013), of which four species have been reported from Iran (Bhatti et al. 2009a). Females of this genus can be distinguished easily from other genera of Thripinae by having abdominal tergite X with short, stout, spine-like median setae (zur Strassen 2003a, Masumoto 2010).

Limothrips cerealium Haliday is here recorded from Iran for the first time, based on one apterous female: Azarbaijan-e-Sharghi province: Tabriz, Miyaneh, from harvested wheat, *Triticum aestivum* L. (Poaceae), 26.vi.2009, M. Mirab-balou, (in ZJUH).

This species is distinguished from other species by tarsi 1-segmented, absence of ocelli, and antennal segments III and IV with simple sensoria. This European pest of cereal crops is now widespread throughout the temperate and subtropical areas of the world. Adults are usually macropterous, but apterae have been recorded from Sardinia (Karny 1914) and Corsica (Mound and Palmer 1973), and now from Iran.

Megalurothrips Bagnall

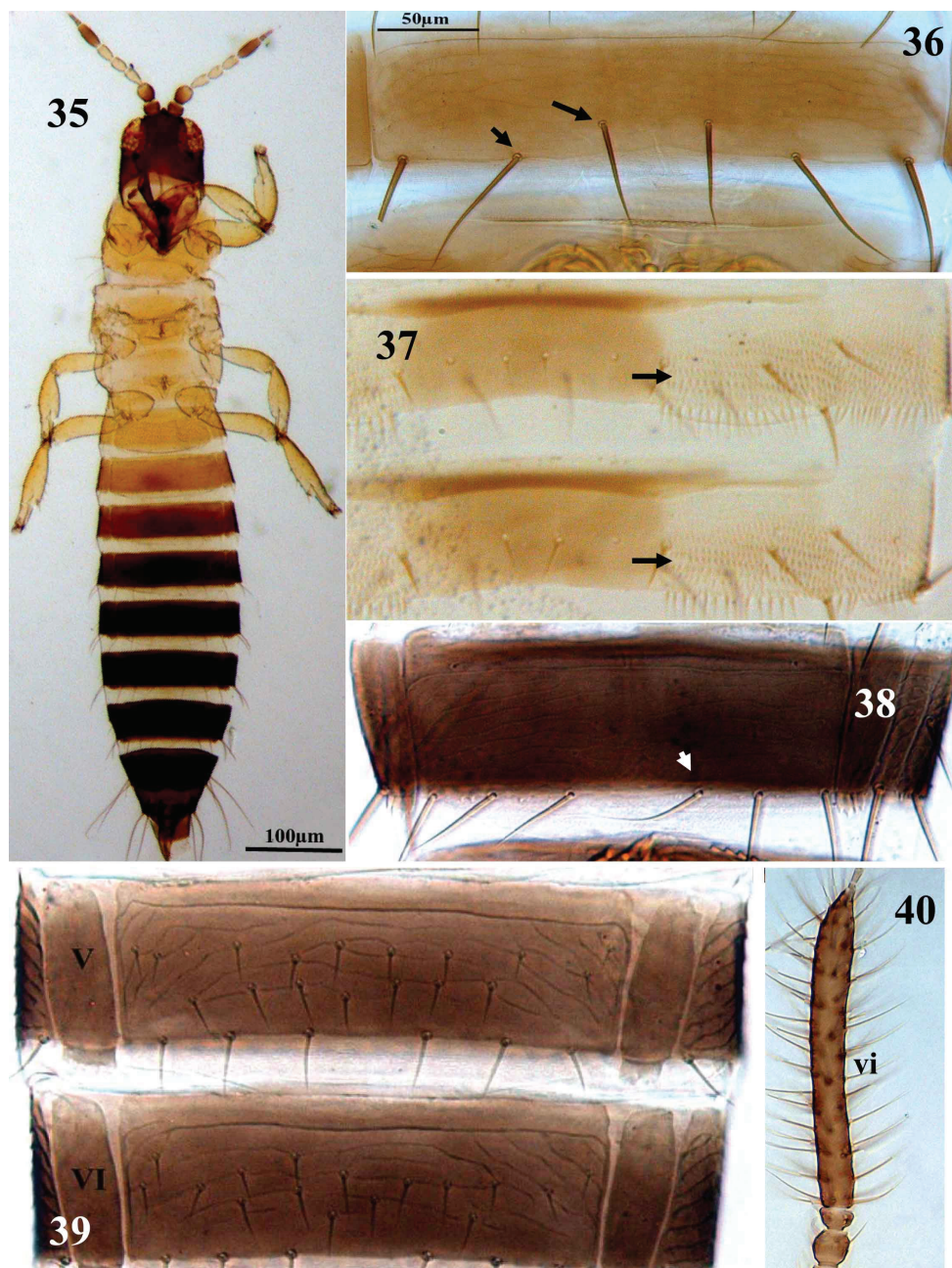
Remarks. Thirteen species are included in this genus (ThripsWiki 2013), all breeding in the flowers of Fabaceae some as pests of cultivated legumes (Masumoto 2010). Recently, *M. distalis* (Karny) was recorded from Iran (Mirab-balou and Chen 2011b). The members of this genus all have a pair of dorso-apical setae on the first antennal segment, and abdominal tergite VIII with many scattered microtrichia anterior to the spiracles (Mound and Ng 2009).

Microcephalothrips Bagnall

Remarks. This monobasic genus is included in *Thrips* genus-group (Mound and Palmer 1981a; Mirab-balou and Chen 2011a), from which it can be distinguished by the key above. *M. abdominalis* lives in the flowers of various Asteraceae, particularly sunflower, *Helianthus annuus* (Palmer 1992; Mound and Marullo 1996). The macropterous morph is common in Iran. Recently one micropterous male was collected on grasses from Ilam Province, and is firstly recorded of micropterous morph for Iran.

Mycterothrips Trybom

Remarks. The 27 known species of *Mycterothrips* (ThripsWiki 2013) are leaf-feeding thrips, and some of them are associated with agricultural crops (Masumoto and Okajima 2006). An identification key to five species from Taiwan was provided by Wang (1999), a key to seven species has been provided by zur Strassen (2003a), and a key to 27 species by Masumoto and Okajima (2006). Up to now, four species have been recorded from Iran, with two new species described recently (Mirab-balou et al. 2011b).



Figures 35–40. Thripinae genera. **35** *Bregmatothrips bournieri*, apterous male **36** *Pezothrips kellyanus*, abdominal sternite VII **37** *Scirtothrips dorsalis*, abdominal tergites V–VI **38** *Frankliniella tenuicornis*; abdominal sternite VII **39** *Microcephalothrips abdominalis*, abdominal sternites V–VI **40** *Mycterothrips consociatus*, antennal segment IV–VIII, male.

***Odontothrips* Amyot & Serville**

Remarks. The 31 species of this genus (ThripsWiki 2013) are typical flower-living thrips, and most are associated with plants of the family Fabaceae. They can cause slight damage to the flowers, but only *O. confusus* is an important pest (Pitkin 1972). *Megalurothrips peculiaris* which sensorium base is similar to *Odontothrips*, and recorded from India and Bangladesh. This genus is included in the *Megalurothrips* genus-group (Mound and Palmer 1981a) and four species have been recorded from Iran (Mirab-balou and Chen 2011b). *O. confusus* Priesner is widely distributed in Iran, and populations are sometimes high on alfalfa, *Medicago sativa*.

***Oxythrips* Uzel**

Remarks. This genus includes 50 species (ThripsWiki 2013), of which five species are known from Iran (Bhatti et al. 2009a). *Oxythrips* is included in *Anaphothrips* genus-group (Mound and Masumoto 2009).

***Parascolothrips* Mound**

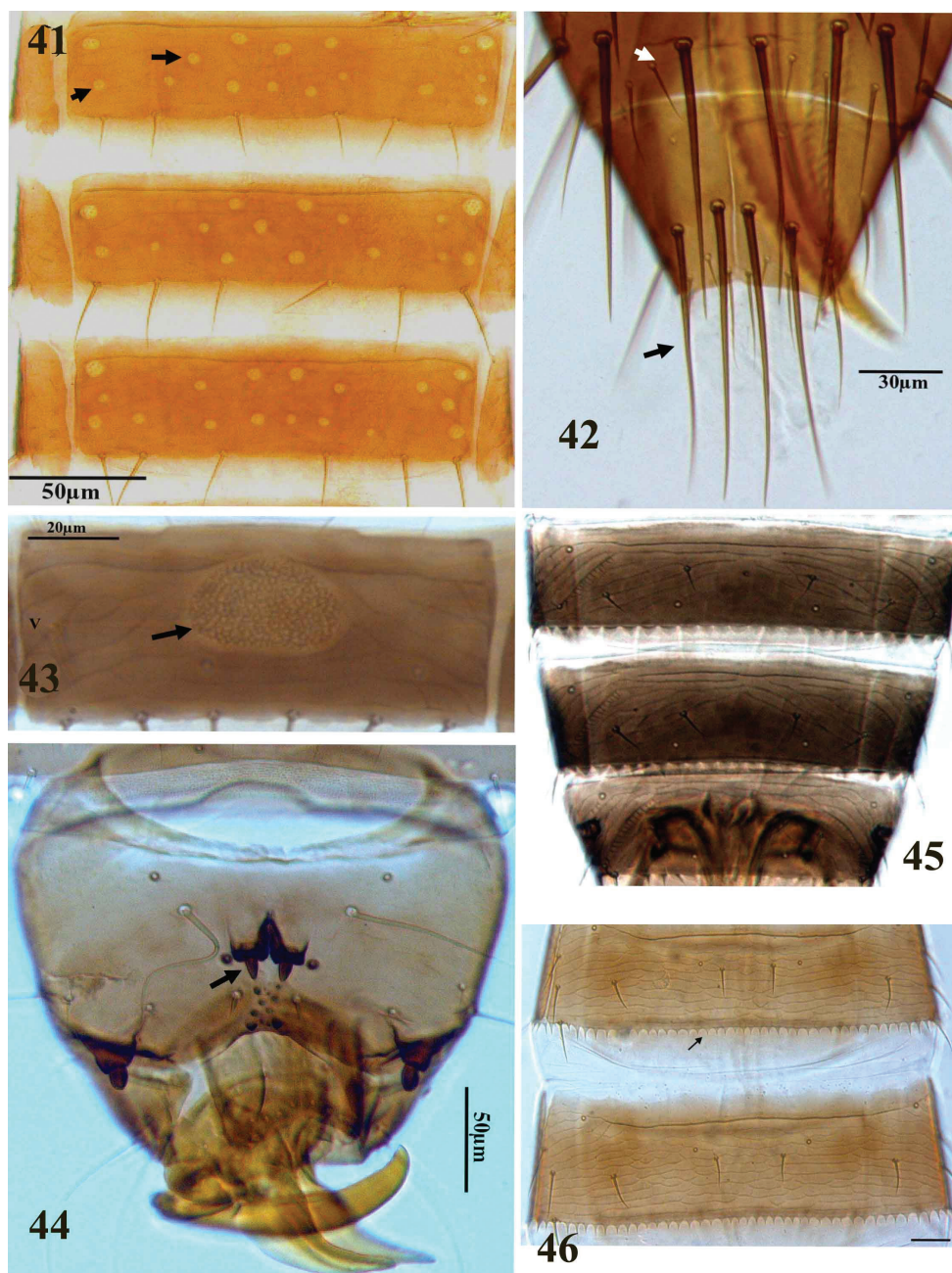
Remarks. This monobasic genus with one predatory species, *P. priesneri* Mound, has been reported from Iraq (Mound 1967, ThripsWiki 2013). Mound (1967) described the species from Iraq with three pairs of posteromarginal setae on sternites II–VI, but in Iranian specimens, there are three pairs of setae on sternite II and four pairs on sternites III–VI.

***Pezothrips* Karny**

Remarks. This genus is placed in the *Megalurothrips* genus-group (Mound and Palmer 1981a; Mirab-balou and Chen 2011b) and currently includes 10 species (Mirab-balou and Tong 2012). Only one species, *P. bactrianus* (Pelikan), has been reported from Iran (Mirab-balou and Chen 2011b).

***Psilothrips* Hood**

Remarks. Included here only from descriptions, this genus includes five species in the world (ThripsWiki 2013) of which *P. bimaculatus* (Priesner) has been reported from Iran (Bhatti et al. 2009a).



Figures 41–46. Thripinae genera. **41** *Pezothrips kellyanus*, pore plates on abdominal sternites V–VII **42** *Pezothrips kellyanus*, abdominal tergite X **43** *Tenothrips frici*, pore plate on abdominal sternite V **44** *Limothrips angulicornis*, short stout setae medially on tubercles on abdominal tergite IX **45** *Microcephalothrips abdominalis*, abdominal tergites VI–VIII **46** *Chirothrips molestus*, abdominal tergites III–IV.

***Rubiothrips* Schliephake**

Remarks. This genus includes seven species (ThripsWiki 2013), and one of these has been recorded from Iran (Bhatti et al. 2009a). The genus is included in the *Anaphothrips* genus-group (Mound and Masumoto 2009), and is distinguished from *Anaphothrips* by having abdominal tergites with median pair of setae (S1) longer than inter-distance (zur Strassen 2003a).

***Scirtothrips* Shull**

Remarks. The genus *Scirtothrips* currently includes 103 species (ThripsWiki 2013), and two of these have been recorded from Iran (Bhatti et al. 2009a). It includes several important pest species (Mound and Palmer 1981b, Mirab-balou et al. 2012b). The report of *S. citri* (Moulton) from Iran has not been accepted (Bhatti and zur Strassen 2009).

***Scolothrips* Hinds**

Remarks. Species of the genus *Scolothrips* are well known as predators of mites on the leaves of plants. The genus is easy to recognize by the presence of six pairs of very long setae on the pronotum, and the fore wings with dark bands, although recognition of species within the genus has remained difficult (Mound 2011b). Currently 16 species are recognized (ThripsWiki 2013), of which three are reported from Iran (Bhatti et al. 2009a); but the report of *S. sexmaculatus* (Pergande) from Iran has not been accepted (Bhatti and zur Strassen 2009).

***Sitothrips* Priesner**

Remarks. This genus includes four species (ThripsWiki 2013) of which *S. arabicus* Priesner has been recorded from Iran (Bhatti et al. 2009a, Mirab-balou and Chen 2011a). This genus is included in the *Frankliniella* genus-group (Mound and Palmer 1981a). It is distinguished from other members of this group by lack of long setae on the anterior margin of the pronotum, the meso- and metathoracic furcae both without a spinula, the maxillary palps 2-segmented, and the fore tarsi with two small teeth (one at the apex of the tarsus, the other at the end of the first segment) (Mirab-balou and Chen 2011a). A key to three species of *Sitothrips* is available in zur Strassen (2003a). In some parts of Iran, like as Golestan province, *S. arabicus* is largely present on wheat and barley (Alavi et al. 2007)

***Sphaeropothrips* Priesner**

Remarks. This monotypic genus includes a single grass-living species, *S. vittipennis* (Bagnall) that was recorded from Iran by Minaei et al. (2007). It is included in *Thrips* genus-group (Mound and Palmer 1981a).

***Stenchaetothrips* Bagnall**

Remarks. This genus includes 35 species (ThripsWiki 2013) and it is associated with the plant family Poaceae. *S. biformis* is widely distributed, and was recorded from Iran by Mirab-balou and Chen (2011a). The genus is included in *Thrips* genus-group (Mound and Palmer 1981a; Mirab-balou and Chen 2011a) and is closely related to *Thrips*, but it can be distinguished by the length of ocellar setae II as in the above key, and the metanotum is generally longitudinally striate (Mound and Ng 2009).

***Stenothrips* Uzel**

Remarks. The only species in this genus, *S. graminum* Uzel, was recorded from Iran by Minaei et al. (2007). It is a member of *Thrips* genus-group (Mound and Palmer 1981a).

***Taeniothrips* Amyot & Serville**

Remarks. This genus includes 25 species in the world (Mound et al. 2012; ThripsWiki 2013). *T. inconsequens* (Uzel) is the only species recorded from Iran (Bhatti et al. 2009a).

***Tamaricothrips* Priesner**

Remarks. Only one species is placed in this genus, is also recorded from Iran (Bhatti et al. 2009a). This species is possibly more widespread in association with *Tamarix* species (zur Strassen 2003a). The genus is included in *Anaphothrips* genus-group (Mound and Masumoto 2009).

***Tenothrips* Bhatti**

Remarks. This genus includes 19 flower-living species in the world (ThripsWiki 2013), of which *T. frici* (Uzel), is widespread around the world in warm temperate areas (Mound and Marullo 1996; Mirab-balou and Tong 2013). Bhatti (2003)

reviewed this genus, listing 19 species. Four species are reported from Iran (Bhatti et al. 2009a), especially on the plant family Asteraceae, and *T. frici* is widely distributed in this country.

Thrips Linnaeus

Remarks. This genus includes about 280 species in the world and is the largest genus in the Thripinae (ThripsWiki 2013), and includes 29 species in Iran (Mirab-balou et al. 2012a; Minaei 2012c). The genus shows extensive diversity in most parts of the world except the Neotropical region, and includes many species of economic importance (Bhatti 1980). Several species of *Thrips* are considered crop pests in various parts of the world, such as *T. angusticeps* Uzel, *T. flavus* Schrank, *T. hawaiiensis* (Morgan), *T. meridionalis* Priesner, and *T. tabaci* Lindeman (Moritz et al. 2001). The latter species is well known as the most important pest of onion crops, greenhouses and ornamental plants in Iran (Mirab-balou and Chen 2011a, Mirab-balou et al. 2012b), and is a vector of some Tospovirus diseases on plants.

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Appendix

Checklist of Thripinae known from Iran

Agalmothrips parviceps Priesner
Anaphothrips obscurus (Müller)
Anaphothrips sudanensis Trybom
Aptinothrips elegans Priesner
Aptinothrips rufus (Haliday)
Aptinothrips styliifer Trybom
Bregmatothrips bournieri Pelikan
Chaetanaphothrips sp.
Chirothrips aculeatus Bagnall
Chirothrips africanus Priesner
Chirothrips atricorpus Girault
Chirothrips kurdistanus zur Strassen
Chirothrips manicatus (Haliday)
Chirothrips maximi Ananthakrishnan
Chirothrips meridionalis Bagnall
Chirothrips molestus Priesner
Chirothrips pallidicornis Priesner
Collemboothrips mediterraneus Priesner
Drepanothrips reuteri Uzel
Eremiothrips antilope (Priesner)
Eremiothrips arya (zur Strassen)
Eremiothrips bhattii Minaei
Eremiothrips dubius (Priesner)
Eremiothrips efflatouni (Priesner)
Eremiothrips farsi Bhatti and Telmadarraiy
Eremiothrips shirabudinensis (Jaknontov)
Eremiothrips similis Bhatti
Eremiothrips taghizadehi (zur Strassen)
Eremiothrips tamaricis (zur Strassen)
Eremiothrips varius (Bhatti)
Eremiothrips zurstrasseni Bhatti, Bagheri, and Ramezani
Euphysothrips minozzii Bagnall
Exothrips redox Bhatti
Ficothrips moundi Minaei
Florithrips traegardhi (Trybom)
Frankliniella intonsa (Trybom)
Frankliniella occidentalis (Pergande)
Frankliniella pallida (Uzel)
Frankliniella schultzei (Trybom)

Frankliniella tenuicornis (Uzel)
Kakothrips dentatus Knechtel
Kakothrips pisivorus (Westwood)
Kakothrips priesneri Pelikan
Limothrips angulicornis Jablonowski
Limothrips cerealium Haliday
Limothrips denticornis (Haliday)
Limothrips schmutzi Priesner
Limothrips transcaucasicus Savenko
Megalurothrips distalis (Karny)
Microcephalothrips abdominalis (Crawford)
Mycterothrips consociatus (Targioni-Tozzetti)
Mycterothrips hamedaniensis Mirab-balou, Shi and Chen
Mycterothrips latus (Bagnall)
Mycterothrips salicis (Reuter)
Mycterothrips tschirkunae (Yakhontov)
Mycterothrips weii Mirab-balou, Shi and Chen
Odontothrips confusus Priesner
Odontothrips meliloti Priesner
Odontothrips loti (Haliday)
Odontothrips phlomidinus Priesner
Oxythrips claripennis Priesner
Oxythrips halidayi Bagnall
Oxythrips retamae (Priesner)
Oxythrips ulmifoliorum (Haliday)
Oxythrips wiltshirei Priesner
Parascolothrips priesneri Mound
Pezothrips bactrianus (Pelikan)
Psilothrips bimaculatus (Priesner)
Rubiothrips vitis (Priesner)
Scirtothrips citri (Moulton)
Scirtothrips mangiferae Priesner
Scolothrips latipennis Priesner
Scolothrips longicornis Priesner
Scolothrips rhagebianus Priesner
Sitothrips arabicus Priesner
Sphaeropothrips vittipennis (Bagnall)
Stenchaetothrips biformis (Bagnall)
Stenothrips graminum Uzel
Taeniothrips inconsequens (Uzel)
Tamaricothrips tamaricis (Bagnall)
Tenothrips discolor (Karny)
Tenothrips frici (Uzel)

Tenothrips latoides (Pelikán)
Tenothrips reichardti (Priesner)
Thrips alavii Mirab-balou, Tong and Chen
Thrips alliorum (Priesner)
Thrips angusticeps Uzel
Thrips atratus Haliday
Thrips australis (Bagnall)
Thrips coloratus Schmutz
Thrips dubius Priesner
Thrips euphorbiae Knechtel
Thrips flavus Schrank
Thrips fraudulentus (Priesner)
Thrips fuscipennis Haliday
Thrips hawaiiensis (Morgan)
Thrips iranicus Yakhontov
Thrips major Uzel
Thrips mareoticus (Priesner)
Thrips meridionalis (Priesner)
Thrips minutissimus Linnaeus
Thrips nigropilosus Uzel
Thrips pelikani Schliephake
Thrips physapus Linnaeus
Thrips pillichii Priesner
Thrips pistaciae Yakhontov
Thrips simplex (Morison)
Thrips tabaci Lindeman
Thrips trehernei Priesner
Thrips trybomi (Karny)
Thrips verbasci (Priesner)
Thrips vuilleti (Bagnall)
Thrips vulgatissimus Haliday

New data on the genus *Derops* Sharp (Coleoptera, Staphylinidae, Tachyporinae) from China with description of two new species

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Abstract

Two new Chinese species of *Derops* are described: *D. hainanus* **sp. n.** from Hainan and *D. yunnanus* **sp. n.** from Yunnan. Females of *D. punctipennis* Schülke and *D. schillhammeri* Schülke are described for the first time and new provinces records of *D. smetanai* Schülke and *D. dingshanus* Watanabe are reported. The key to Chinese species of *Derops* published by Schülke 2003 is modified to include the new species.

Keywords

Coleoptera, Staphylinidae, *Derops*, new species, key, China

Introduction

The genus *Derops* Sharp, 1889, is a small genus with 17 species in the world. Most of them are known from east and south-east Asia (Russian Far East, Korea, Japan, China, Vietnam, India) and a single species occurs in the eastern United States. Presently, ten species have been recorded in China, named *Derops longicornis* Sharp, 1889,

Derops coreanus Watababe, 1969, *Derops lisae* Smetana, 1995, *Derops dingshanus* Watanabe, 1999, *Derops vietmanicus* Watanabe, 1996, *Derops nitidipennis* Schülke, 2000, *Derops smetanai* Schülke, 2003, *Derops schillhammeri* Schülke, 2003, *Derops rougemonti* Schülke, 2003, and *Derops punctipennis* Schülke, 2003. During our ongoing study on the genus *Derops*, two new species are recognized, the females of *D. punctipennis* Schülke and *D. schillhammeri* Schülke are discovered for the first time, and Zhejiang and Chongqing are new provinces records for *D. smetanai* Schülke and *D. dingshanus* Watanabe respectively.

Material and methods

All measurements are given in millimeters. The following abbreviations are used in the text:

BL – The length of the body from front margin of head to the apex of the abdomen; **FL** – The length of the body from front margin of head to elytra end; **HL** – The length of the head from the clypeal anterior margin to the head base; **HW** – The maximum width of the head with eyes; **PL** – The length of the pronotum along the midline; **PW** – The maximum width of the pronotum; **EL** – The length of the elytra from the apex of the scutellum to the elytral posterior margin; **EW** – The maximum width of the elytra; **SL** – The length of elytra suture; **ED** – The diameter of eyes in longitudinal direction from lateral; **TL** – The longitudinal length of temple.

The specimens were collected from the leaf litter along the mountain stream by sifting. For examination of the male genital organ, the abdominal segments were detached from the body after softening in hot water. The aedeagus and other dissected parts were mounted in Euparal (Chroma Gesellschaft Schmidt, Koengen, Germany) on plastic slides. Photos of sexual characters were taken by a Canon G9 camera attached to an Olympus SZX 16 stereoscope.

The types are deposited in the Insect Collection of Shanghai Normal University, Shanghai, China (SNUC).

Descriptions

Derops hainanus Zhao & Li, sp. n.

urn:lsid:zoobank.org:act:15DFD8A0-9861-4B0B-9F7E-90DA74BAEEBA

http://species-id.net/wiki/Derops_hainanus

Figs 1A, 2

Type locality. Hainan Prov., China

Type material. (1 ♂). HOLOTYPE: ♂, labeled ‘China: Hainan Prov. / Changjiang County / Bawangling Nature Reserve / 11.iv.2010, alt. 1,000 m / Zi-Wei Yin leg.’.

Description. Measurements and ratios. BL: 4.23; FL: 2.89; HL: 0.46; HW: 0.78; PL: 0.85; PW: 0.93; EL: 1.59; EW: 1.13; SL: 1.31; ED: 0.37; TL: 0.17; HW/HL:

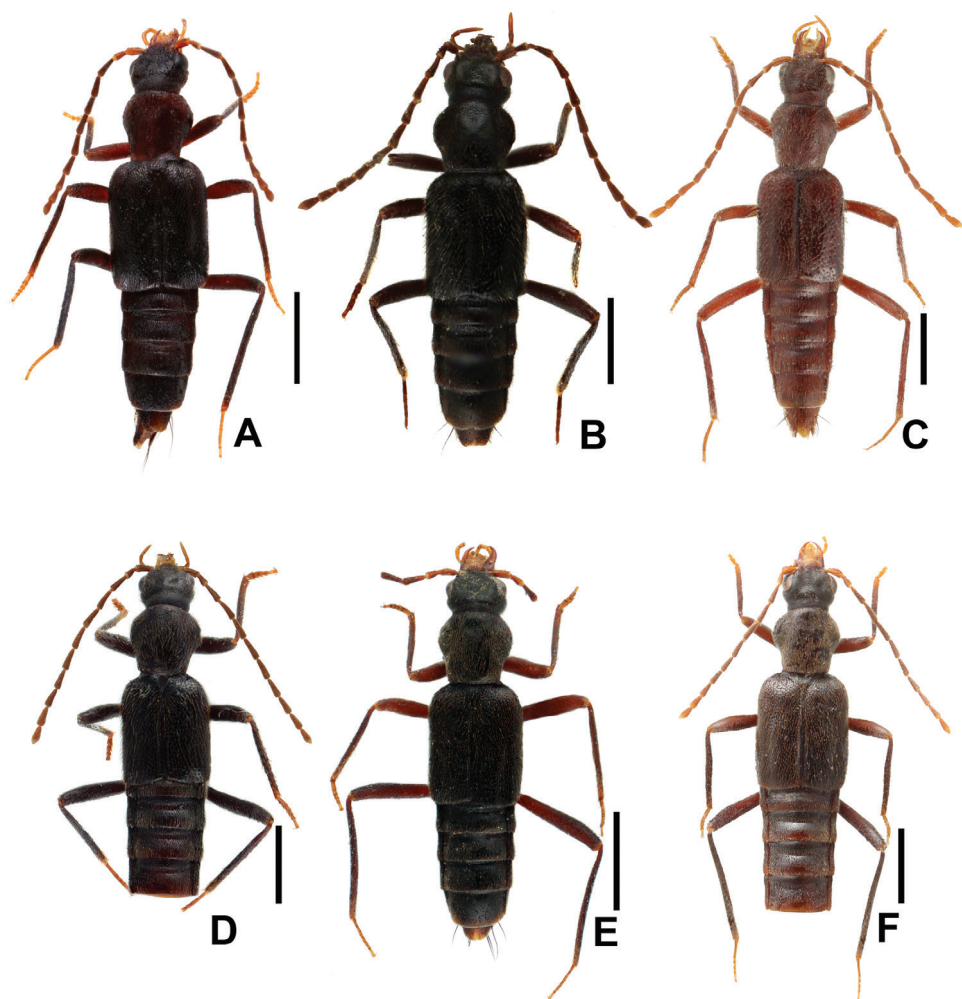


Figure 1. Habitus of *Derops* spp., **A** *D. hainanus* Zhao & Li, sp. n. **B** *D. yunnanus* Zhao & Li, sp. n. **C** *D. punctipennis* Schülke **D** *D. schillhammeri* Schülke **E** *D. smetanai* Schülke; **F** *D. dingshanus* Watanabe. Scale bars: 1.0 mm.

1.70; PW/PL: 1.09; EL/EW: 1.41; PW/HW: 1.19; EL/PL: 1.87; EW/PW: 1.22; ED/TL: 2.18.

This species is assigned to *Derops longicornis* group based on the following characteristics: elytra finely and densely punctured, not or little shiny; male sternite VII deep emarginated on the posterior margin, two additional granules fields next to the posterior margin with short, strong and blunt seta.

Body (Fig. 1A). Uniformly reddish black to reddish brown and moderately shining; mouthparts including maxillary and labial palpi, apical two and first two antennal segments, tarsi yellowish brown; pronotum, the rest of antennae and legs except for tarsi

reddish brown; elytra light to dark brunneous. Body narrowly elongate, subparallel-sided and somewhat convex; sides of abdomen gradually narrowed from base to apex.

Head distinctly transverse and impressed, broader across eyes than long (HW/HL: 1.70), with shining punctures moderately coarse and dense, without microsculpture, and surface covered with short, sparse, fine yellowish brown pubescence, but almost deprived of pubescence close to neck. Eyes relatively large (ED/TL: 2.18) and slightly prominent laterad, postocular region gently arcuate and loosely contracted at neck. Antenna filiform and almost extending to the middle of elytra, all the segments with pubescence slightly dilated apicad, 1st segment robust, 2nd the shortest and as twice as broad, 3rd to 6th equal in both broad and distinctly longer than broad, 7th to 8th equal in both length and width, 9th to 10th equal in width, and 9th longer than 10th, 11th distinctly longer and narrower than 10th, excavated at the apex.

Pronotum obcordate and convex, slightly transverse (PW/PL: 1.09), distinctly broader than head (PW/HW: 1.19); expanded laterally in anterior one fifth, arcuate in anterior two-fifths and almost straight in posterior three-fifths, anterior angles bluntly angulate and invisible from above; posterior ones rectangular. surface on both sides with punctate as head, most interspaces between punctures somewhat less than diameters of punctures, covered with sparse, fine, moderately long, yellowish brown pubescence all over, without sculpture; providing with a shallow depression at the middle.

Elytra oblong, visibly longer than broad (EL/EW: 1.41), obviously longer (EL/PL: 1.87) and somewhat broader (EW/PW: 1.22) than pronotum; lateral sides nearly parallel, posterior margin emarginate at the middle, posterior angles broadly rounded; surface densely, fine punctate, more sparser than head and elytra, transverse distances between punctures mostly twice than diameters of punctures, and shorter pubescence than pronotum, without sculpture, possessing two shallow and longitudinal depressions, along suture and lateral side respectively; epipleura each bearing a fine longitudinal keel, which is abbreviated behind shoulder. Scutellum small and ligulate.

Abdomen subcylindrical, gradually tapering towards apex; 4th to 7th tergite each transversely depressed along the base, punctation relatively coarse before the depression; each superficially with densely short fine pubescence.

Male. Sternite VII (Fig. 2A) deeply, wide, almost “U” shaped medio-apical emargination, depth approximately two-sevenths of the length, and armed with six short blackish seta and a long, black seta on each side of the emargination; with field of about 15 granules on each side of emargination. Tergite VIII (Fig. 2B) with shallow medio-apical emargination and with two long, strong, black setae at each lateral margin apical third. Sternite VIII (Fig. 2C) wide and very deep, blunt triangular emargination at the middle of posterior margin, depth about two-fifths of the length, surface with two long, strong, black seta at each lateral margin. Genital organ (Fig. 2D, E) long oval, slightly sclerotized; with median lobe no longer than lateral lobes combined; viewed dorsally, lateral lobes elongate, symmetrical, evenly narrowed to obtuse apices; viewed laterally, lateral lobes hardly bent ventrally, apical portion slightly barbed.

Female. Unknown.

Distribution. China: Hainan Prov.

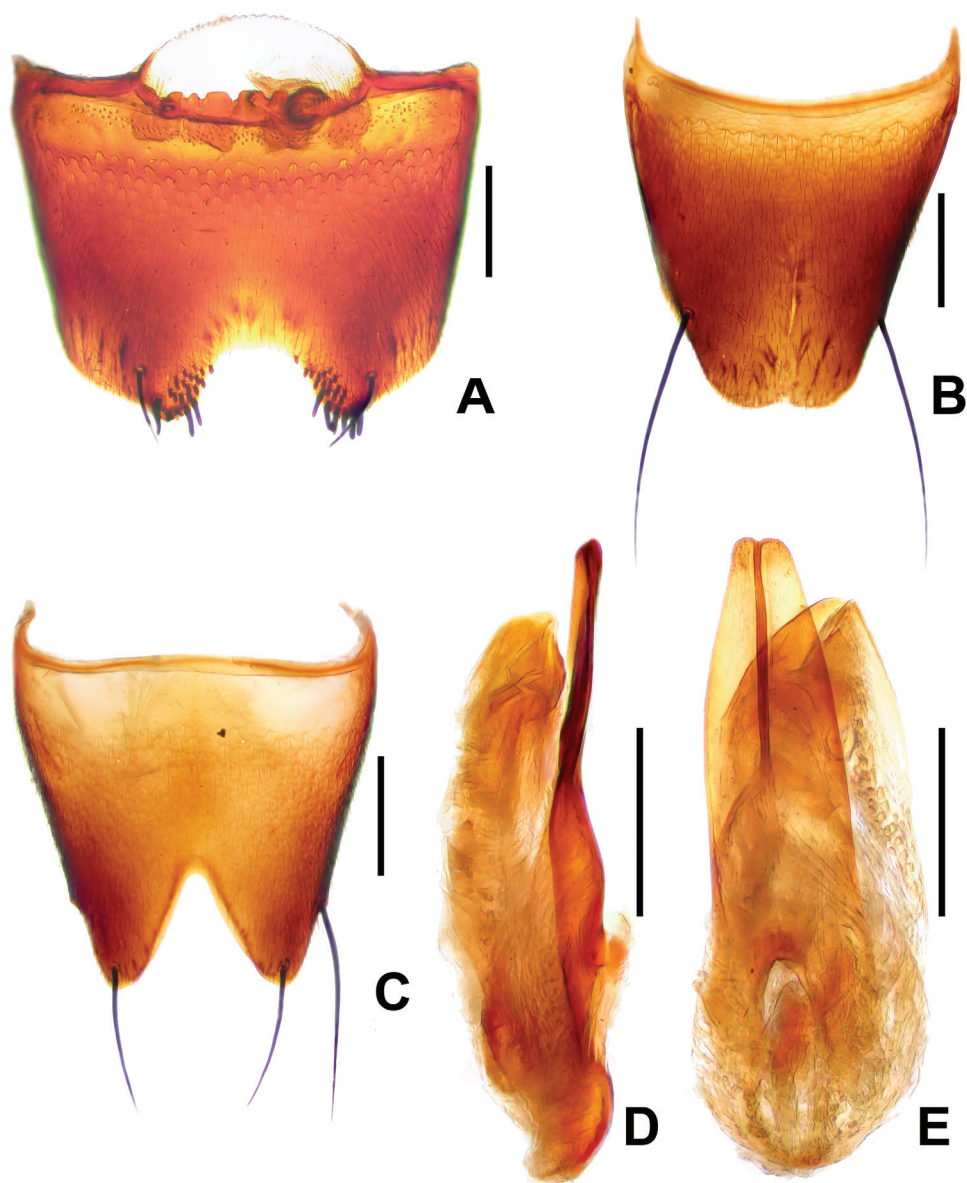


Figure 2. *D. hainanus* Zhao & Li, sp. n. **A** male sternite VII **B** male tergite VIII **C** male sternite VIII **D** aedeagus in lateral view **E** aedeagus in ventral view. Scale bars: **A–C** and **F–G**: 0.2 mm; **D–E**: 0.25 mm.

Etymology. The name of the new species is derived from that of the type locality.

Remarks. The new species may be readily distinguished from the rest species of *Derops longicornis* group by the following characteristics: male sternite VII field of not exceeding the half of medio-apical emargination depth, while in other species exceeding the half of medio-apical emargination depth, and even extended to emargination apex.

***Derops yunnanus* Zhao & Li, sp. n.**

urn:lsid:zoobank.org:act:E67A0382-5FDF-444E-B866-16D56D606E93

http://species-id.net/wiki/Derops_yunnanus

Figs 1B, 3

Type locality. Yunnan Prov., China**Type material.** (6 ♂♂, 2 ♀♀). HOLOTYPE: ♂, labelled 'China: Yunnan Prov. / Xianggelila County / Hutiaoxia Nature Reserve / Jinxing Village / 22.iv.2005, alt. 2,300 m / Hao Huang leg.'; PARATYPES: 4 ♂♂, 2 ♀♀, same label data as holotype; 1 ♂, same, but '22.iv.2005.'**Description.** Measurements and ratios. BL: 4.34–4.50; FL: 2.84–3.11; HL: 0.45–0.46; HW: 0.72–0.83; PL: 0.85–0.89; PW: 0.93–0.95; EL: 1.39–1.50; EW: 1.22–1.33; SL: 1.06–1.22; ED: 0.28–0.31; TL: 0.11–0.15; HW/HL: 1.60–1.84; PW/PL: 1.07–1.09; EL/EW: 1.13–1.17; PW/HW: 1.14–1.32; EL/PL: 1.56–1.69; EW/PW: 1.28–1.40; ED/TL: 2.07–2.55.

This species is assigned to *Derops nitidipennis* group based on its distinctive rough and extensive puncturing; male sternite VII is emarginate just flat at the posterior margin, the additional fields consist of long, apically pointed peg-like setae.

Body (Fig. 1B). Uniformly piceous-black to black and moderately shining; mouth-parts including maxillary and labial palpi, antennal segments and tarsi reddish brown. Body narrowly elongate, subparallel-sided and somewhat convex; sides of abdomen gradually narrowed from base to apex.

Head distinctly transverse and impressed, broader across eyes than long (HW/HL: 1.60–1.84), with shining punctures moderately coarse and dense, without microsculpture, and surface covered with long brown pubescence and almost glossy near neck. Eyes relatively large (ED/TL: 2.07–2.55) and prominent laterad, postocular region gently arcuate and loosely contracted at neck. Antenna filiform and exceeding the middle of elytra, all the segments with pubescence slightly dilated apicad, 1st segment longest, 2nd the shortest and as twice as broad, 1st to 4th equal in both broad and distinctly longer than broad, 5th to 9th equal in both length and width and length more than three times the width, 10th to 11th equal in both length and width and length at most twice the width, 11th excavated at the apex.

Pronotum obcordate and convex, slightly transverse (PW/PL: 1.07–1.09), distinctly broader than head (PW/HW: 1.14–1.32); expanded laterally widest in anterior one-third, arcuate in anterior two-thirds and almost straight in posterior third, anterior angles bluntly angulate and invisible from above; posterior ones almost rectangular. surface on both sides with shining moderately coarse and sparser punctate than those of head, most interspaces between punctures somewhat less than half of diameters of punctures, covered with sparse, fine, yellowish brown pubescence all over, without sculpture; providing with a shallow depression at the middle of anterior margin.

Elytra oblong, slightly longer than broad (EL/EW: 1.13–1.17), obviously longer (EL/PL: 1.56–1.69) and somewhat broader (EW/PW: 1.28–1.40) than pronotum; lateral sides nearly parallel, posterior margin emarginate at the middle, posterior angles broad-

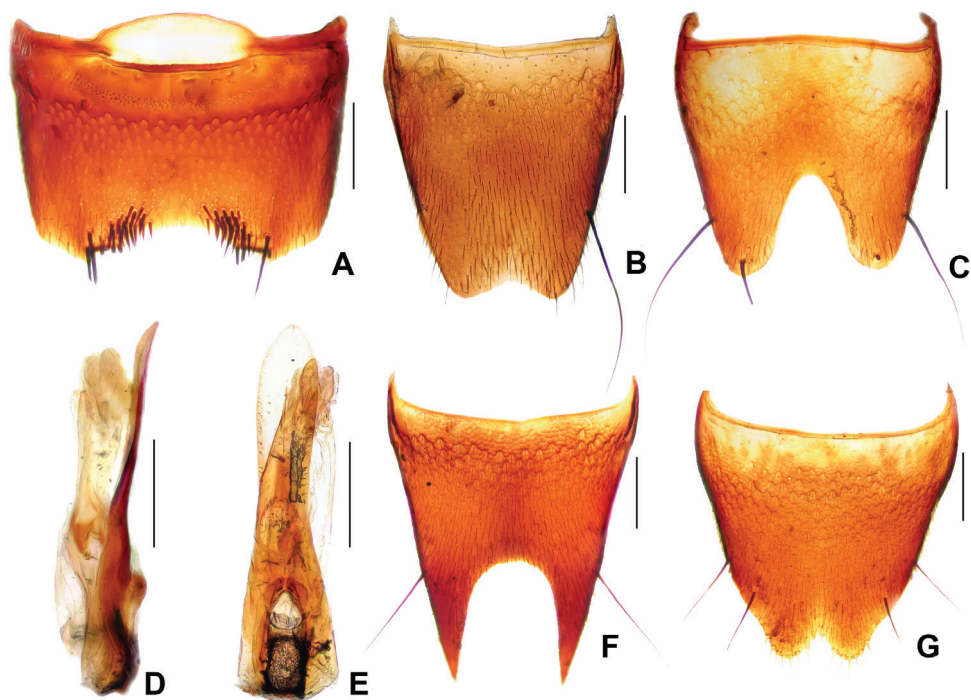


Figure 3. *D. yunnanus* Zhao & Li, sp. n. **A** male sternite VII **B** male tergite VIII **C** male sternite VIII **D** aedeagus in lateral view **E** aedeagus in ventral view **F** female tergite VIII **G** female sternite VIII. Scale bars: **A–C** and **F–G**: 0.2 mm; **D–E**: 0.25 mm.

ly rounded; surface densely, coarse punctate, more sparser, but shallower than head and elytra, transverse distances between punctures mostly one to 2.5 times than diameters of punctures, and longer pubescence than pronotum, without sculpture, possessing two shallow and longitudinal depressions, one on each side of suture and the other on each lateral side; epipleura each bearing a fine longitudinal keel, which is abbreviated behind shoulder. Scutellum small and ligulate, and with dense, yellowish brown pubescence.

Abdomen subcylindrical, gradually tapering towards apex; 4th to 7th tergite each transversely depressed along the base, surface uneven depression, and providing with moderately coarse and dense punctation before depression, fine and shining punctation after depression; each superficially with dense, short and fine pubescence.

Male. Sternite VII (Fig. 3A) shallow, wide medio-apical emargination, and armed with six short rigid blackish cilia and a long, black seta on each side of the emargination; with field of about 20 apically acute peg-like setae on each side of emargination. Tergite VIII (Fig. 3B) with shallow medio-apical emargination and with two long, strong, black setae at each lateral margin two-thirds. Sternite VIII (Fig. 3C) wide and very deep, blunt triangular emargination at the middle of posterior margin, emargination almost extending to the middle, surface with two long, strong, black seta at each lateral margin. Genital organ (Fig. 3D,E) long oval, slightly sclerotized, median lobe shorter than lateral

lobes combined; lateral lobes elongate, symmetrical, expand in one half and narrowed to obtuse apices; viewed laterally, lateral lobes hardly bent ventrally, apical portion slender.

Female. Tergite VIII (Fig. 3F) deep, broadly, “U” shaped excised at the middle of posterior margin, one very long black seta at each lateral margin at about apical four-sevenths, almost extending the middle of tergite. Sternite VIII (Fig. 3G) broadly emarginate at the middle of posterior margin and fringed with seven yellowish pubescence at the latero-posterior parts, and respectively with two long, strong, black setae at each lateral margin in apical three-fifths and four-fifths.

Distribution. China: Yunnan Prov.

Etymology. The specific name is derived from “Yunnan”, the province of the type locality.

Remarks. The new species is similar to *D. shuckburghae* Rougemont described from Thailand, but it may be readily distinguished from the latter one by the following characteristics: head larger and relatively broader with HW/HL: 1.60–1.84 (1.54 in *D. shuckburghae*); elytra shorter than pronotum with EL/PL: 1.56–1.69 (1.72 in *D. shuckburghae*), and punctation larger and denser, transverse distances between punctures mostly one to 2.5 times than diameters of punctures (transverse distances 2 to 3 times greater than diameters of punctures in *D. shuckburghae*); male sternite VII with field of about 20 apically acute peg-like setae on each side of medio-apical emargination (only 6–7 peg-like setae in *D. shuckburghae*); aedeagus lateral lobes symmetrical, expand in one half and narrowed to obtuse apices (slightly asymmetrical, evenly narrowed to obtuse apices in *D. shuckburghae*); female tergite VIII excised broader in anterior, almost extending the middle of tergite (excised narrower in anterior, clearly not extending the middle of tergite in *D. shuckburghae*).

Derops punctipennis Schülke, 2003

http://species-id.net/wiki/Derops_punctipennis

Figs 1C, 4

Derops punctipennis Schülke 2003: 471.

Specimens examined. (4 ♂♂, 5 ♀♀). 2 ♂♂, 2 ♀♀, labelled ‘China: Zhejiang Prov. / Anji County / Mt. Longwangshan / 24.iv.2006, alt. 300–500 m / Liang Tang leg.’; 1 ♂, 1 ♀, labelled ‘China: Zhejiang Prov. / Linan City / Qingliangfeng Nature Reserve / 10.v.2005, alt. 1,080 m / Li-Long Zhu & Jin-Wen Li leg.’; 1 ♀, same, but ‘9.v.2005, alt. 1,050–1,070 m’; 1 ♂, 1 ♀, labeled ‘China: Zhejiang Prov. / Xianju County / Danzhu Village / 2.vi.2006, alt. 450–600 m / Jin-Wen Li & Shan-Jia Shen leg.’.

Description. Measurements. BL: 4.56–6.06; FL: 2.98–3.39.

Female. Tergite VIII (Fig. 4F) with wide and very deep, acute triangular medio-apical emargination, one very long, strong, black seta at apical margin at each side of medio-apical emargination. Sternite VIII (Fig. 4G) broadly emarginate at the middle of posterior margin and bearing six or seven yellowish cilia at the latero-posterior parts.

Distribution. China: Fujian, Zhejiang.

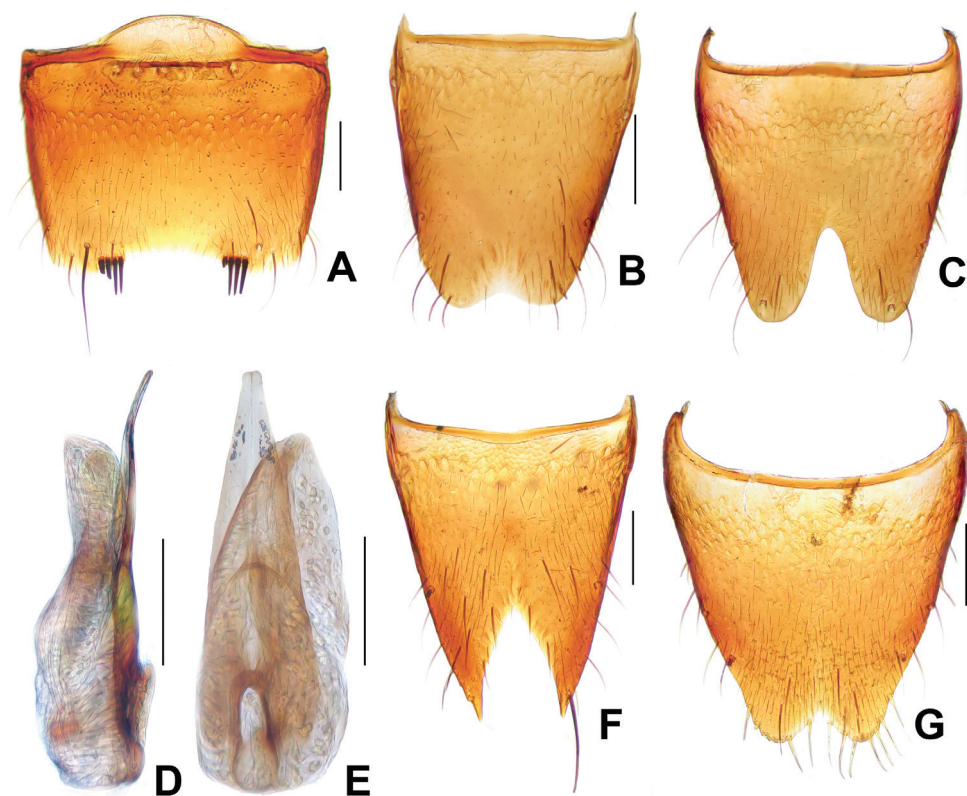


Figure 4. *D. punctipennis* Schülke. **A** male sternite VII **B** male tergite VIII **C** male sternite VIII **D** aedeagus in lateral view **E** aedeagus in ventral view **F** female tergite VIII **G** female sternite VIII. Scale bars: A–C and F–G: 0.2 mm; D–E: 0.25 mm.

Remarks. The species was previously described based on male specimens from Fujian Prov., and this is the first record of its female. It is very similar to *D. smetanai* Schülke, from Fujian (Schülke 2003: 467, figs 1–9). Males may be readily distinguished by the shape of sternite VII emargination and by evenly narrowed, slightly bend to obtuse apices of aedeagus lateral lobes. Females may be easily distinguished by the shape of tergite VIII emargination.

***Derops schillhammeri* Schülke, 2003**

http://species-id.net/wiki/Derops_schillhammeri

Figs 1D, 5

Derops schillhammeri Schülke 2003: 470.

Specimens examined. (6 ♂♂, 3 ♀♀). 3 ♂♂, 1 ♀, labeled 'China: Hubei Prov. / Wufeng County, / Houhe Nature Reserve / 29.iv.2004, alt. 1,000 m / Li-Zhen Li leg.'; 1 ♀,

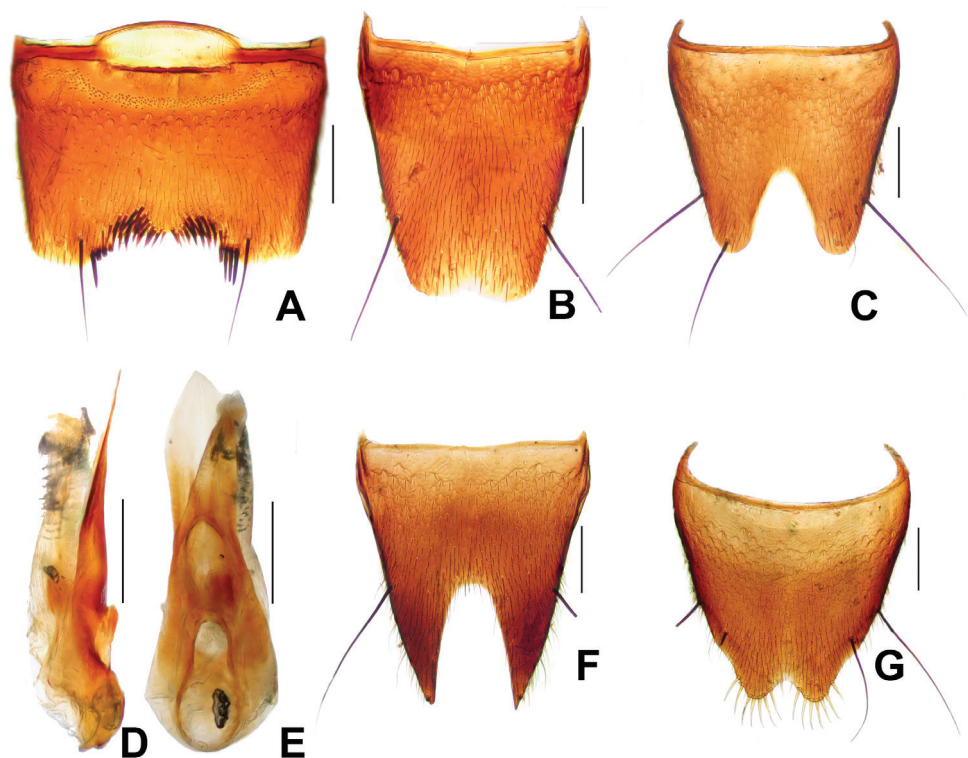


Figure 5. *D. schillhammeri* Schülke. **A** male sternite VII **B** male tergite VIII **C** male sternite VIII **D** aedeagus in lateral view **E** aedeagus in ventral view **F** female tergite VIII; **G** female sternite VIII. Scale bars: **A–C** and **F–G**: 0.2 mm; **D–E**: 0.25 mm.

same, but ‘30. iv.2004.’; 3 ♂♂, 1 ♀, labelled ‘China: Zhejiang Prov. / Xianju County / Danzhu Village / 2.vi.2006, alt. 450–600 m / Jin-Wen Li & Shan-Jia Shen leg.’.

Description. Measurements. BL: 4.95–5.56; FL: 2.77–3.28.

Female. Tergite VIII (Fig. 5F) with wide and very deep, almost “U” shaped medio-apical emargination, one very long, strong, black seta at the middle of each lateral margin of emargination. Sternite VIII (Fig. 5G) broadly emarginate at the middle of posterior margin and provided with seven or eight yellowish cilia at the latero-posterior parts, and with two long, strong, black setae at each lateral margin in apical third.

Distribution. China: Hubei, Jiangxi, Zhejiang.

Remarks. The species was previously described based on male specimens from Jiangxi Prov., and this is the first record of its female. The male of *D. schillhammeri* Schülke previously known from Jiangxi Prov., China. It is very similar to *D. shuckburghae* Rougemont, from Thailand (Rougemont 2003: 998–999, plate 1, 2 (figs 1, 3–6, 8)). Females may be easily distinguished by the depth of tergite VIII emargination almost half of itself and not very broad apices.

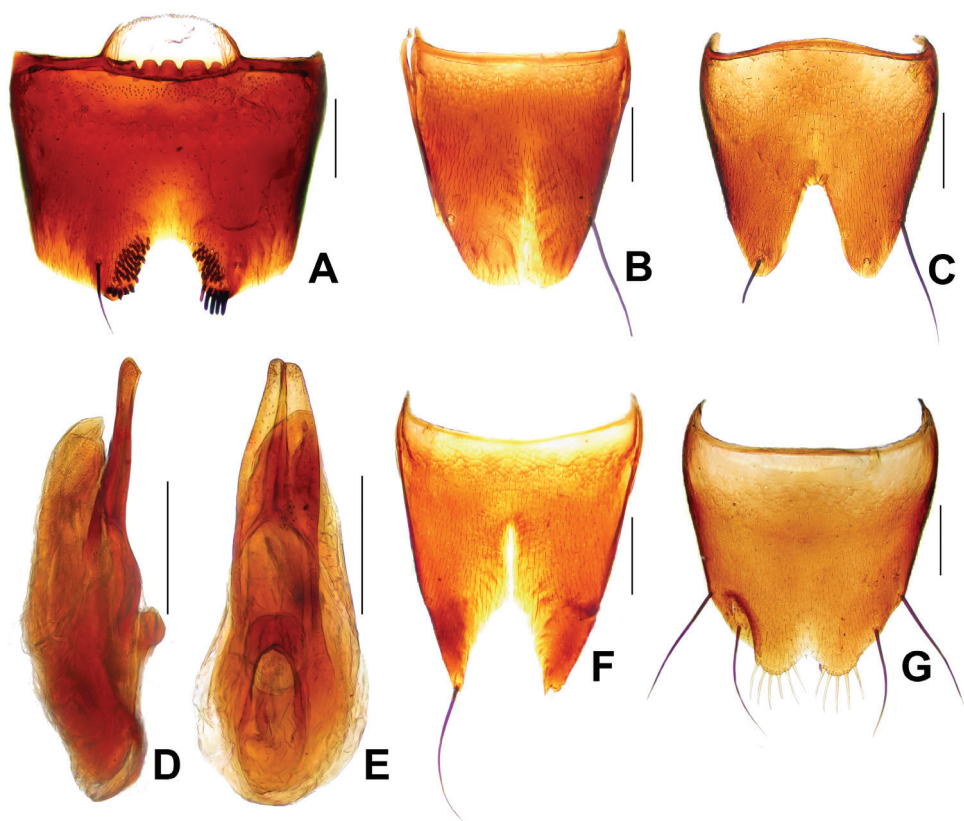


Figure 6. *D. smetanai* Schülke. **A** male sternite VII **B** male tergite VIII **C** male sternite VIII **D** aedeagus in lateral view **E** aedeagus in ventral view **F** female tergite VIII; **G** female sternite VIII. Scale bars: **A–C** and **F–G**: 0.2 mm; **D–E**: 0.25 mm.

***Derops smetanai* Schülke, 2003**

http://species-id.net/wiki/Derops_smetanai

Figs 1E, 6

Derops smetanai Schülke 2003: 467.

Specimens examined. (15 ♂♂, 14 ♀♀). 10 ♂♂, 11 ♀♀, labeled ‘China: Zhejiang Prov. / Xianju County / Danzhu Village / 2.vi.2006, alt. 450–600 m / Jin-Wen Li & Shan-Jia Shen leg.’; 1 ♂, labeled ‘China: Zhejiang Prov. / Panan County / Dapanshan Nature Reserve / 7.vi.2006, alt. 550–700 m / Jin-Wen Li & Shan-Jia Shen leg.’; 1 ♂, 1 ♀, labelled ‘China: Zhejiang Prov. / Xianju County / Shangjing Village / 3.vi.2006, alt. 450–650 m / Jin-Wen Li & Shan-Jia Shen leg.’; 1 ♂, labeled ‘China: Zhejiang Prov. / Taishun County / Wuyanling Nature Reserve / 10.v.2004, alt. 700–850 m / Jia-Yao Hu, Liang Tang & Li-Long Zhu leg.’; 1 ♀, labeled ‘China: Zhejiang Prov. /

Qingyuan County / Baishanzu Nature Reserve / 4.v.2004, alt. 1,050 m / Jia-Yao Hu, Liang Tang & Li-Long Zhu leg.’; 1 ♂, 1 ♀, same, but ‘5. v.2004, alt. 1,200–1,360 m.’; 1 ♂, labeled ‘China: Zhejiang Prov. / Kaihua County / Mt. Gutianshan Nature Reserve / 5–7.v.2005, alt. 800–900 m / Li-Long Zhu & Jin-Wen Li leg.’.

Measurements. BL: 4.23–5.00; FL: 2.78–3.17.

Distribution. China: Jiangxi, Zhejiang.

Remarks. The species is firstly recorded in Zhejiang.

Derops dingshanus Watanabe, 1999

http://species-id.net/wiki/Derops_dingshanus

Figs 1F, 7

Derops dingshanus Watanabe 1999: 253; Schülke 2000: 915; Zheng 2002: 38.

Derops puetzi Schülke 1999: 345; Schülke 2003: 466.

Specimens examined. (16 ♂♂, 21 ♀♀). 3 ♂♂, 2 ♀♀, labeled ‘China: Zhejiang Prov. / Panan County / Dapanshan Nature Reserve / 7.vi.2006, alt. 550–700 m / Jin-Wen Li & Shan-Jia Shen leg.’; 1 ♂, 1 ♀ labeled ‘China: Zhejiang Prov. / Xianju County / Shangjing Village / 3.vi.2006, alt. 450–650 m / Jin-Wen Li & Shan-Jia Shen leg.’; 2 ♂♂, 4 ♀♀ labeled ‘China: Zhejiang Prov. / Linan County / Mt. Tianmu / 11–15. vi.2006, alt. 300–400 m / Jia-Yao Hu & Liang Tang leg.’; 1 ♂, 1 ♀, labeled ‘China: Zhejiang Prov. / Linan County / East Mt. Tianmu / 13.iv.2011, alt. 1,050–1,150 m / Zhong Peng & Jian-qing Zhu leg.’; 6 ♂♂, 6 ♀♀, labeled ‘China: Jiangsu Prov. / Nanjing City / Mt. Zijin / 14.v.2006, alt. 400 m / Liang Tang leg.’; 1 ♂, labeled ‘China: Zhejiang Prov. / Zhuji City / Wuxie / 19.iii.2005, alt. 300–400 m / Liang Tang leg.’; 1 ♂, labeled ‘China: Jiangxi Prov. / Mt. Sanqingshan National Park / 4.v.2005, alt. 700–1,000 m / Jia-Yao Hu & Liang Tang leg.’; 1 ♂, labeled ‘China: Chongqing City. / Chengkou County / Mt. Dabashan / 4. iv.2008, alt. 1,830 m / Hao Huang & Wang Xu leg.’; 2 ♀♀, labeled ‘China: Zhejiang Prov. / Anji County / Mt. Longwangshan / 24.iv.2006, alt. 300–500 m / Liang Tang leg.’; 1 ♀, labeled ‘China: Zhejiang Prov. / Wenzhou City / Mt. Yandangshan / 9.v.2006, alt. 50–150 m / Jin-Wen Li & Shan-Jia Shen leg.’; 1 ♀, labeled ‘China: Zhejiang Prov. / Ningbo City / Mt. Xishan / 3.iv.2013, alt. 200 m / Jian-Qing Zhu leg.’; 1 ♀, labeled ‘China: Zhejiang Prov. / Kaihua County / Mt. Gutianshan Nature Reserve / 5–7.v.2005, alt. 800–900 m / Li-Long Zhu & Jin-Wen Li leg.’; 1 ♀, labeled ‘China: Zhejiang Prov. / Zhuji City / Caota Town Nature Reserve / 20. xi. 2011, alt. 100 m / Tie-Xiong Zhao leg.’; 1 ♀, labeled ‘China: Guizhou Prov. / Suiyang County / Kuankuoshui Nature Reserve / 11.viii.2010, alt. 1,400 m / Zi-Wei Yin & Ting Feng leg.’.

Measurements. BL: 4.50–5.06; FL: 2.90–3.22.

Distribution. China: Chongqing, Guizhou, Jiangsu, Shaanxi, Sichuan, Zhejiang.

Remarks. The species is firstly recorded in Chongqing.

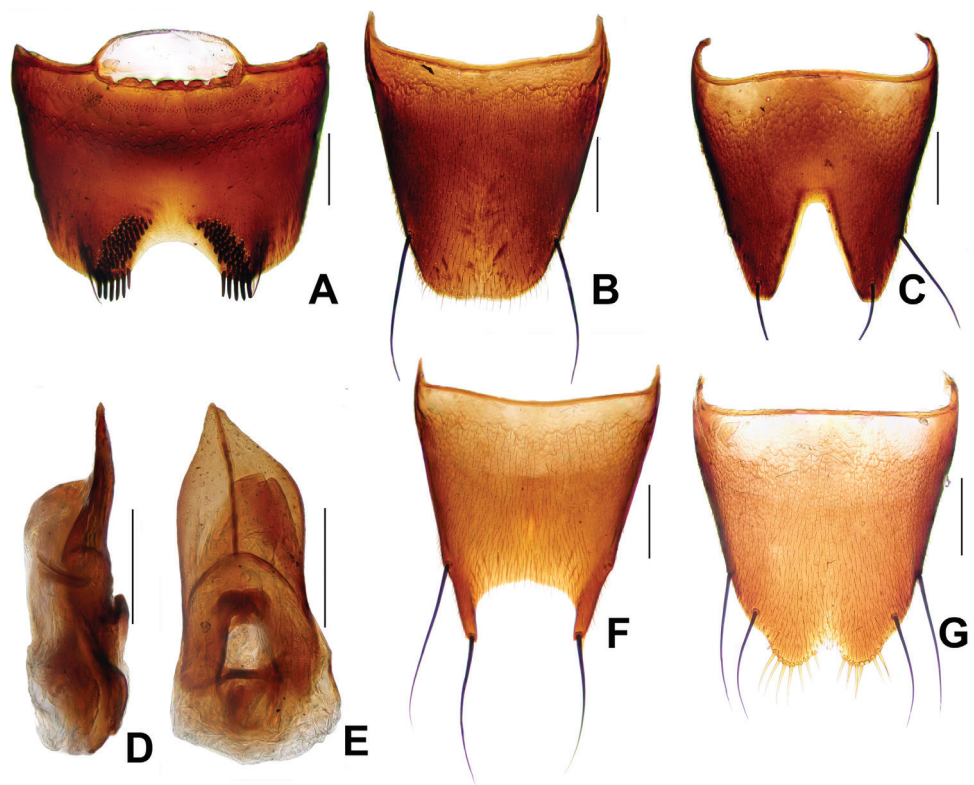


Figure 7. *D. dingshanus* Watanabe. **A** male sternite VII **B** male tergite VIII **C** male sternite VIII **D** aedeagus in lateral view **E** aedeagus in ventral view **F** female tergite VIII **G** female sternite VIII. Scale bars: A–C and F–G: 0.2 mm; D–E: 0.25 mm.

The recently published key of Chinese *Derops* (Schülke, 2003) should be modified as following to accommodate the new species:

- 5 Eyes larger, more than twice as long as the temples. Aedeagus with slender, apically slightly tapered parameres **5a**
- Eyes small, less than twice as long as the temples. Aedeagus with very slender or broad, apically pointed parameres. Female tergite VIII much broader and deeper excised, side parts very narrow and apically pointed..... **6**
- 5a Elytra punctures larger and denser, transverse distances between punctures mostly one to 2.5 times than diameters of punctures. Male sternite VII with field of about 20 apically acute peg-like setae on each side of emargination. Aedeagus lateral lobes symmetrical, expand in one half and narrowed to obtuse apices. China: Yunnan ***D. yunnanus* sp. n.**
- Elytra punctures smaller and sparser, transverse distances 2 to 3 times greater than diameters of punctures. Male sternite VII with field of only 6–7 peg-like

- setae on each side of emargination. Aedeagus lateral lobes slightly asymmetrical, evenly narrowed to obtuse apices. Thailand..... ***D. shuckburghae* Rougemont**
- 7 Very large and robust species, pronotum broader (PW > 1.00 mm). Male sternite VII with posterior margin bristles, without elongate field (fig. 14). Aedeagus (fig. 16) large (> 1 mm) with long parallel parameres. China: Fujian ***D. rougemonti* Schülke**
- Slightly smaller species, pronotum narrower (PW < 1.00 mm). Male sternite VII with elongate field. Aedeagus small (< 1.00 mm)..... **7a**
- 7a Male sternite VII (fig. 2B) granules field not exceeding the half of medio-apical emargination depth. Female unknown. China: Hainan ***D. hainanus* sp. n.**
- Male sternite VII granules field exceeding the half of medio-apical emargination depth..... **8**

Acknowledgements

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The larva of *Drusus vinconi* Sipahiler, 1992 (Trichoptera, Limnephilidae, Drusinae)

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Abstract

This paper describes the previously unknown larva of *Drusus vinconi* Sipahiler, 1992. Information on the morphology of the 5th larval instar is given, and the most important diagnostic features are illustrated. In the context of existing identification keys the larva of *D. vinconi* keys together with *D. annulatus* (Stephens, 1837), *D. biguttatus* (Pictet, 1834), *D. ingridae* Sipahiler, 1993, *Hadimina torosensis* Sipahiler, 2002 and *Leptodrusus budtzi* (Ulmer, 1913). These species differ in the contours of the pronotum in lateral view, the presence/absence of the pronotal transverse groove, the shape of the median notch of the pronotum (in anterior view), pronotal sculpturing, presence/absence of the lateral carina of the head capsule, the number of proximo-dorsal setae on the mid- and hind femora, where the lateral fringe starts on the abdomen, and in geographic distribution. With respect to zoogeography, *Drusus vinconi* is a (micro-) endemic of the Western Pyrenees. The species prefers stony substratum in springs and springbrooks of the montane and subalpine region (Graf et al. 2008; Sipahiler 1992, 1993). As a grazer, the larvae of *D. vinconi* feed on biofilm and epilithic algae.

Keywords

Drusus vinconi, 5th instar larva, description, identification, distribution

Introduction

Extant Drusinae currently comprise 99 species. Thirty species are reported from the Alpine chain, another 34 species are known from the Balkan Peninsula (including many endemics). A total of 17 species have been described from south and southwestern Europe (Apennine, Iberia, Corsica, Pyrenees, southern France), and 18 species and 2 subspecies are known from Asia Minor and the Caucasus (Graf et al. 2008; Ivanov 2011; Malicky 2004, 2005; Oláh 2010, 2011; Sipahiler 2005;). However, the larvae of only 41 species (41%) have been described so far and included in keys (Botosaneanu 1959; Décamps and Pujol 1975; Despax 1927; Graf et al. 2011; Kučinić et al. 2008, 2010, 2011a, b; Moretti & Pirisinu 1981; Moretti, 1983; Previšić et al. 2009; Sipahiler 2002; Szczesny 1978; Vieira-Lanero 2000; Vieira-Lanero et al. 2005; Waringer et al. 2008; Waringer & Graf 2011). To improve our knowledge of larval Drusinae taxonomy, we provide the description of the larva of *Drusus vinconi* Sipahiler, 1992 based on larval material collected in the Département Pyrénées-Atlantiques of the French Midi-Pyrénées region.

Material and methods

Hand nets were used to collect larvae and adults of *Drusus vinconi* in and beside a small stream about 7 km SW of the ski area Arette La Pierre Saint Martin, Département Pyrénées-Atlantiques, Midi-Pyrénées, France (42°57'17.67"N, 0°49'26.91"W) on 23 July 2012 (leg. W. Graf). The material was preserved in 90% ethanol. A Nikon SMZ 1500 binocular microscope with DS-Fi1 camera and NIS-elements D 3.1 image stacking software for combining 8–50 frames in one focused image were used to study and photograph the larvae.

Species affiliation was enabled by the fact that putative *Drusus vinconi* larvae were collected close to their *locus typicus* where the only other Drusinae larvae present, *D. discolor* (Rambur, 1842), are clearly different from the species in question by their dense hair cover on head and pronotum. In addition, adults of both sexes of *D. vinconi* were collected at the same sites as the unknown larvae.

Deposition of voucher specimens: 2 5th instar larvae of *D. vinconi* are deposited in the collection of J. Waringer (Vienna, Austria) and 2 5th instar larvae and 1 male and 1 female in the collection of W. Graf (Vienna, Austria). Comparative material of other Drusinae included the following: *Drusus annulatus* (Stephens, 1837), 9 5th instar larvae; *Drusus biguttatus* (Pictet, 1834), 5 5th instar larvae; *Drusus ingridae* Sipahiler, 1993, 1 5th instar larva; *Leptodrusus budtzi* (Ulmer, 1913), 1 5th instar larva (all taxa: collection of J. Waringer, Vienna, Austria).

Results

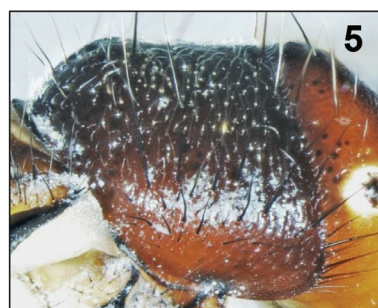
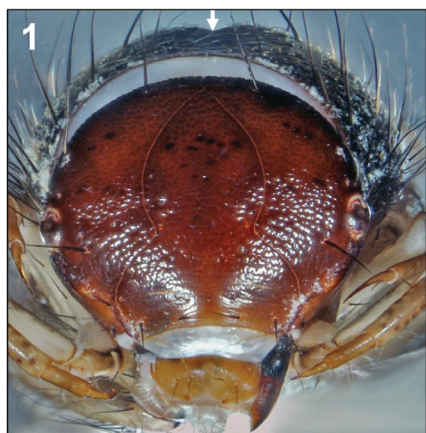
Description of the 5th instar larva of *Drusus vinconi*

Biometry. Body length of 5th instar larvae ranging from 9.7 to 10.8 mm, head width from 1.76 to 1.90 mm ($n = 2$).

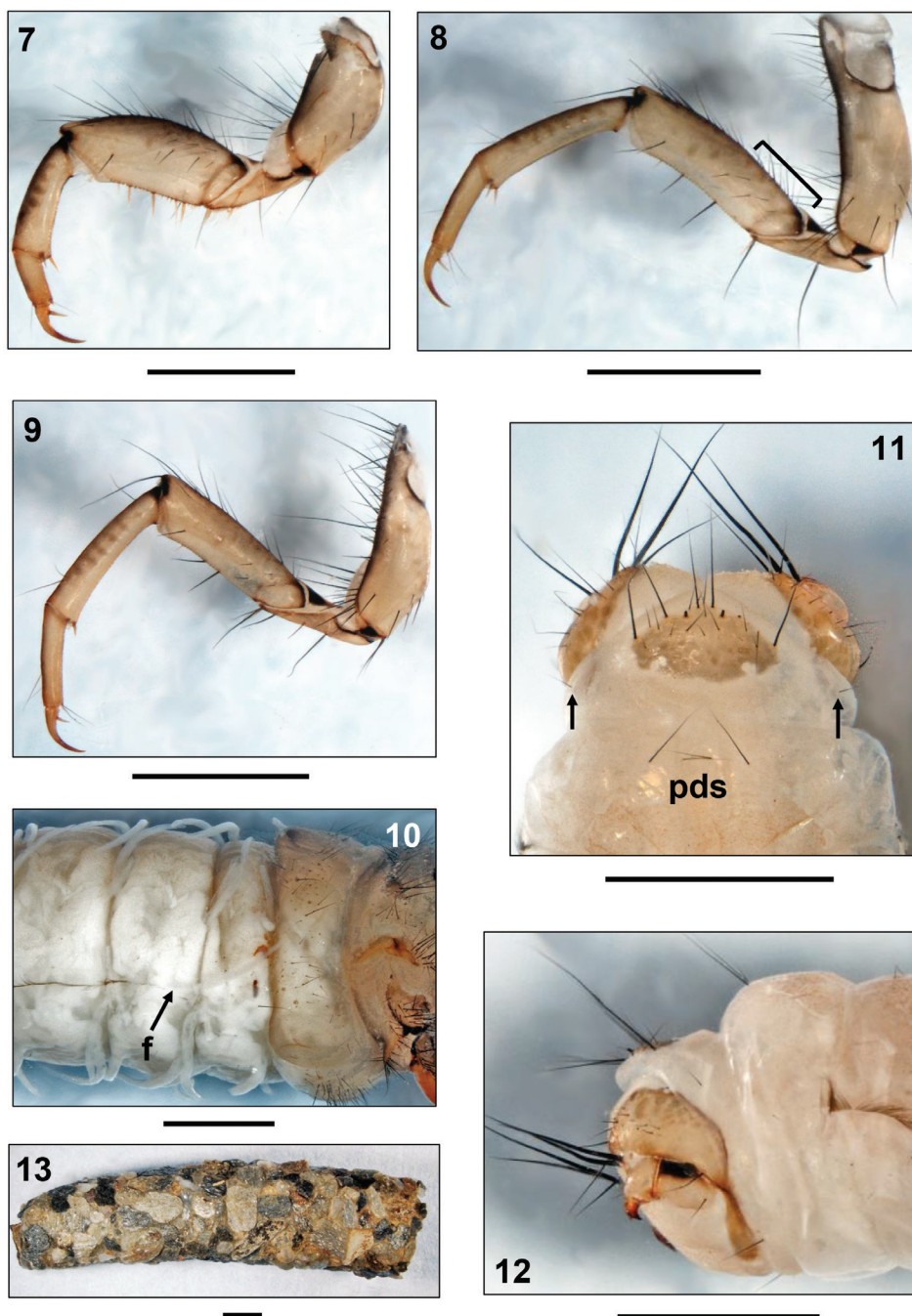
Head. Head capsule coarsely granulated, almost circular in shape, hypognathous (Figs 1, 3), dorsally chestnut to black brown, with blackish muscle attachment spots. Ventral parietalia sections, submentum, maxillolabial sclerites and pre-mandibular areas yellowish (Figs 2, 3). Eyes surrounded by whitish ring (Fig. 3). In lateral view, head capsule bearing carina which extends from anterior eye margin to anterior corner of frontoclypeus (Fig. 3, black arrow). Complete set of 18 pairs of primary setae on head capsule (nomenclature *sensu* Wiggins 1998); no additional spines or spinule areas as known from other Drusinae larvae (e.g., *Ecclisopteryx* spp., *Drusus trifidus* McLachlan, 1868, most of the *D. bosnicus* group except *D. ramae* Marinković-Gospodnetić, 1971) present. Frontoclypeus bell-shaped, with narrow median constriction (Fig. 1). Antennae located dorsally on central section of lateral carinae (Fig. 3), each consisting of 1 short cylindrical base and 1 prominent lateral seta. On each parietal, 10 dorsal and 2 ventral primary setae present (Figs 1, 3). Each side of frontoclypeus bearing 6 primary setae, 3 of them along anterior border. Labrum yellowish brown, anterolateral margins with setal brush and primary setae 1–3; dorsally, setation consisting of primary setae 4–6 (Fig. 1). Yellow ventral apotome funnel-shaped with postgenal suture reaching approximately 29% of apotome length (Fig. 2). Black brown mandibles (sometimes brownish on distal half; Fig. 3) spoon-shaped, lacking terminal teeth along edges as well as ridges in central concavity (Figs 1, 3).

Thorax. Pronotum chestnut brown and very coarsely granulated, with adjacent series of granuli creating ribbed structures (Figs 3, 4). Posterior margin thickened and darkly striped; no pronotal transverse groove at end of anterior 3rd (Fig. 5). In lateral view, dorsal profile of pronotum low, with posterior 2/3rds being evenly rounded (Fig. 5). Along anterior pronotal border 2 setal rows present, including: i) dense fringe of short, curved, fine, yellow setae, ii) continuous row of widely-spaced long, straight, dark setae meeting at pronotal midline (Figs 1, 3, 4, 5). Each pronotal half bearing in total 35–45 dark setae of varying lengths. In addition, pronotal surface covered by high number of tiny, pale, curved, recumbent setae (Fig. 5); no spines as present in other Drusinae (e.g., *D. trifidus*). Prosternite inconspicuous, pentangular in shape, pale yellow, with light brown posterior border. Prosternal horn present (Fig. 3).

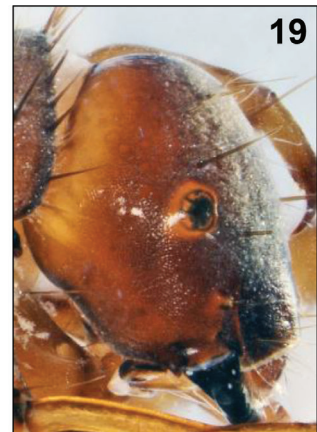
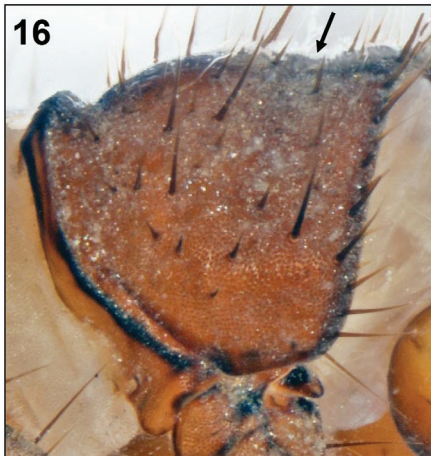
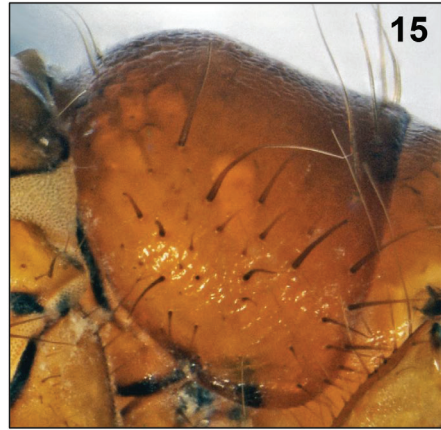
Mesonotum completely covered by 2 yellow brown to dark brown sclerites with anterolateral sections bearing darkest coloration. Median to dark brown muscle attachment spots present, lateral and posterior margins darkly sclerotized (Fig. 4). Counts for mesonotal setae (nomenclature *sensu* Wiggins 1998): anterior setal group *sa*1: 8–15,



Figures 1–6. *Drusus vinconi* Sipahiler, 1992, 5th instar larva. **1** Head, dorsal view (arrow: median notch) **2** Head, ventral view **3** Head and prothorax, right lateral view (arrow: lateral carina) **4** Head, thorax and abdominal segment I, dorsal view **5** Pronotum, right lateral view **6** Abdominal sternum I, ventral view. Scale bars: 1 mm.



Figures 7–13. *Drusus vinconi* Sipahiler, 1992, 5th instar larva. **7** Right fore leg, anterior view **8** Right mid leg, anterior view (bracket: proximodorsal setae) **9** Right hind leg, anterior view **10** Metathorax and 1st 4 abdominal segments, right lateral view (f: start of lateral fringe at segment III) **11** Abdominal segments VIII-IX, dorsal view (arrows: posterolateral setae; pds: posterodorsal setae) **12** Apex of abdomen, right lateral view **13** Larval case, right lateral view. Scale bars: 1 mm.



Figures 14–19. 14–16 Pronota of 5th instar larvae, right lateral views. 14 *Drusus annulatus* (Stephens, 1837) (arrow: dorsal profile angled) 15 *Drusus biguttatus* (Pictet, 1834) 16 *Leptodrusus budtzi* (Ulmer, 1913) (arrow: transverse groove) 17 *D. biguttatus*, head of 5th instar larva, frontal view. 18–19 *L. budtzi*, 5th instar larva 18 Left midleg, posterior view (arrow: proximodorsal seta) 19 Head, right lateral view. Scale bars: 1 mm.

posterior group *sa2*: 25–30, lateral group *sa3*: 30–35 (Fig. 4). In addition, small number of tiny, pale, curved, recumbent setae present.

Metanotum partially covered by 3 pairs of yellowish grey sclerites (Fig. 4). Anterior metanotal sclerites (sclerites of setal area 1, *sa1*, *sensu* Wiggins 1998) very large, ovoid, tapering laterally. Medially, the 2 sclerites strongly divergent, widely spaced; their median separation nearly as high as their length along the longitudinal body axis (Fig. 4). Posteromedian sclerites (sclerites of setal area 2, *sa2*, *sensu* Wiggins 1998) small, triangular, with approximately 20 setae per sclerite, framing row of setae (Fig. 4). Lateral sclerites (sclerites of setal area 3, *sa3*, *sensu* Wiggins 1998) with approximately 25–30 setae concentrated in cranial section (Fig. 10). Groups of setae present between *sa2* and *sa3* (Fig. 4).

Legs light brown with numerous setae on coxae, trochanters, and femora; tibiae and tarsi sparsely setose. Femora with several proximodorsal setae (e.g. Fig. 8, black bracket), and with setation on anterior and posterior faces; fore femora with 4, mid and hind femora with 3 yellow ventral-edge setae; no minute spines along ventral edges present. Foreleg coxa, femur and tibia wider than those of mid- and hind legs. Fore and mid trochanters with setae only on proximal sections; fore trochanters additionally with distal ventral trochanteral brush. Mid- and hind tibiae with dorsal setae only on distal 3rd (Figs 8, 9).

Abdomen. Abdominal segment I with 1 dorsal and 2 lateral fleshy protuberances (Figs 4, 10). Continuous transverse row of setae present anterior of dorsal protuberance (comprising fused setal areas *sa1*, *sa2*, *sa3*, *sensu* Wiggins 1998), stretching laterally from dorsal sections of lateral protuberances; posterior of dorsal protuberance, another row of setae present (Fig. 4). All these setae with small basal sclerites. Lateral protuberances without posterior sclerites (Fig. 10). Anterior of each lateral protuberance a continuous band of anterolateral setae connected to each dorsal and ventral *sa3* setal group (Fig. 10). Abdominal sternum I with fused setal areas *sa1*, *sa2* and *sa3*, creating continuous field of setae, therein occurs pair of central large basal sclerites with irregular borders and small number of randomly distributed basal sclerites of smaller diameter (Fig. 6). Abdominal dorsum VIII with 2 long and 2 short posterodorsal setae (pds) (Fig. 11 pds); only 1 posterolateral seta present on each half of abdominal dorsum IX (Fig. 11, arrows). Abdominal dorsum IX bearing beige pentangular sclerite with 8 long and several short setae (Fig. 11). Beige anal prolegs are of limnephilid type with medium brown anal claws, each with 1 small accessory hook (Fig. 12).

All gills as single filaments (Fig. 10). Dorsal gills present at most from abdominal segments II–VII (presegmental positions). Ventral gills present from segment II (presegmental) to segment VII (postsegmental). In lateral row, gills present on segments II–III only (ventrolateral position). Lateral fringe extends from anterior border of segment III (Fig. 10 f) to middle of segment VIII.

Case. Larval case 8.5–12.1 mm long ($n=2$), curved, conical (width at anterior opening 2.9–3.2 mm, at posterior opening 1.9–2.2 mm), consisting of mineral particles (sand grains of mixed size; Fig. 13).

Morphological separation of 5th instar larvae of *Drusus vinconi* from other European Trichoptera

Within the framework of the larval key by Waringer and Graf (2011), *Drusinae* larvae are separated from other Trichoptera species by the following features:

- sclerites present on pro-, meso- and metanota; mesotum completely covered by 2 sclerites in close contact separated by a straight suture; metanotum incompletely sclerotized by 6 sclerites (Fig. 4);
- prosternal horn present (Fig. 3);
- fleshy protuberances at abdominal segment I present dorsally and ventrally (Figs 4, 10);
- gills consisting of single filaments only (Fig. 10);
- transverse groove lacking at the anterior 3rd of the pronotum (Fig. 5) except in *Leptodrusus budtzi* (Fig. 16).

Within the subfamily Drusinae, *D. vinconi* is characterised by the following set of morphological details:

- mandibles spoon-shaped (Figs 1, 3);
- head capsule without additional spines or spinules (Fig. 1);
- anterior-row setae present near dorsal pronotal midline (Figs 1, 3);
- dorsal gills present (Fig. 10);
- dorsal edge setae restricted to distal 3rd of mid and hind tibiae (Figs 8, 9);
- basal sclerites of setae on abdominal sternum I separated (Fig. 6);
- pronotum evenly rounded (Fig. 5).

At this position in the key, *Drusus vinconi* appears together with *D. annulatus*, *D. biguttatus* (Pictet, 1834), *D. ingridae*, *Hadimina torosensis* Sipahiler, 2002 and *Leptodrusus budtzi*. These species are easily distinguished by differences in dorsal profile, presence/absence of the lateral carina on the head capsule, number of proximo-dorsal setae on mid- and hind femora, origin of abdominal lateral fringe, and geographic distribution (Table 1).

Discussion

Drusus vinconi is a (micro-)endemic of the Western Pyrenees. Its *locus typicus* is situated at the ruisseau de Chousse, a tributary of the Vert d'Arette, near the Serre de Benou, at 1300 m a.s.l. At this site *D. discolor* was the only other Drusinae species. Larvae of *D. discolor* are clearly different from *D. vinconi* larvae by their dense hair cover on the head and pronotum.

Table 1. Synopsis of characters separating the currently known Drusinae larvae (5th instars) which share the following morphomatrix: spoon-shaped mandibles; lack of additional head spines or spinules; anterior-row setae present near dorsal pronotal midline; dorsal gills present; dorsal edge setae restricted to distal third of mid and hind tibiae; basal sclerites of setae at first abdominal sternum separated; pronotum evenly rounded. Data for *Hadimina torosensis* were taken from Sipahiler (2002).

Species / character	Dorsal outline of pronotum (lateral view)	Pronotal transverse groove at end of anterior 3 rd present?	Pronotum with median notch (anterior view)?	Pronotal sculpturing / cover of procumbent pale setae	Head capsule with lateral carina?	More than one proximo-dorsal seta on mid-and hind femora?	Start of lateral fringe	Distribution
<i>Drusus annulatus</i>	angled (Fig. 14)	no	no	coarsely granulated / sparse	yes	yes	first third III	widespread
<i>Drusus biguttatus</i>	evenly rounded, high profile (Fig. 15)	no	no (Fig. 17)	coarsely granulated / sparse	yes	yes	last third II	widespread
<i>Drusus ingradae</i>	evenly rounded, low profile	no	no	coarsely granulated / sparse	yes	yes	first third III	Pyrenees, Massif Central
<i>Drusus vinconi</i>	evenly rounded, low profile (Fig. 5)	no (Fig. 5)	yes (Fig. 1)	coarsely granulated / dense	yes (Fig. 3)	yes (Figs. 8, 9)	first third III (Fig. 10)	Pyrenees
<i>Hadimina torosensis</i>	evenly rounded, high profile	no	?	? / ?	yes	yes	first third II	Asia Minor
<i>Leptodrusus budtzi</i>	evenly rounded, low profile (Fig. 16)	yes (Fig. 16)	no	finely granulated / sparse (Fig. 16)	no (Fig. 19)	no (Fig. 18)	last third II	Corsica, Sardinia, Mallorca

Adults of *D. vinconi* are morphologically close to *D. monticola* McLachlan, 1876. Differences exist in the structure of the male intermediate appendages which are triangular, and in the preanal appendages which are long and ovoid in *D. vinconi*. The female is characterised by a very short median scale (Sipahiler 1992).

The species was abundant in a small, stony stream near the ski area Arette La Pierre St Martin in the Département Pyrénées-Atlantiques of the Midi-Pyrénées region, France. *Drusus vinconi* is a rheophilic species inhabiting springs and spring-brooks where it can be observed on the surface of boulders and large stones (Graf et al. 2008). According to its mouthpart anatomy, *D. vinconi* is a grazer, feeding exclusively on epilithic algae and biofilm. Records exist from montane and subalpine sites situated well above 800 m a.s.l. (Sipahiler 1992, 1993). Adults fly in June and July.

Acknowledgements

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A new species of *Scelidopetalon* Delkeskamp (Coleoptera, Erotylidae) from China with a key to world species of the genus

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Abstract

A new species *Scelidopetalon biwenxuani* sp. n. is described from China, representing the first occurrence of the genus in Hainan province. A key to the world species of this genus is provided.

Keywords

Coleoptera, Erotylidae, *Scelidopetalon*, *Pseudamblyopus* identification key, new record genus, new species, China

Introduction

The subfamily Erotylinae includes colorful fungus-feeding beetles commonly called “pleasing fungus beetles”. They are worldwide in distribution with over 2500 described species. In general, species of the tribe Tritomini are characterized by an antennal club of 3 to 5 antennomeres, dilated maxillary palpi, closed procoxal cavities (with prosternal-proepimeral suture located at the midpoint posterior to the procoxae), meso-metasternal suture having a broadened dicondylic connection, and pseudotetramerous tarsi (tarsomere IV small and hidden by an expanded tarsomere III). Larvae and adults feed on larger basidiomycete fungi (e.g. mushrooms, polypore or bracket fungi, etc.).

The name “pleasing fungus beetle” is likely derived from the large size and colorful patterns of many species.

While examining Burmese specimens of *Amblyopus* Lacordaire, Gorham (1896) established *Petaloscelis* based on its small and finely faceted eyes (Fig. 1), which are large and coarsely faceted in *Amblyopus* (Fig. 2). Arrow (1925, 1926) described four additional species in *Petaloscelis*. While examining the African species, Arrow (1945) noted that Gorham confused African species with an Indian species and considered *Petaloscelis* a synonym of *Amblyscelis* Gorham. Delkeskamp (1957) thought *Petaloscelis* and *Amblyscelis* were distinct based on eye characters as mentioned above and on differences in tibial dilation. Because the name *Petaloscelis* Gorham was a junior homonym of *Petaloscelis* Bergoth (see Chûjô and Chûjô 1990), Delkeskamp (1957) proposed the name *Scelidopetalon* for the species of *Petaloscelis* Gorham with *Petaloscelis instabilis* Gorham, 1896, as the type.

Araki (1941) described *Pseudamblyopus* for the Japanese species *Amblyopus palmipes* Lewis. Araki noted *Pseudamblyopus* is easily distinguished from *Amblyopus* by the small and finely faceted eyes and mentioned this genus differs from *Petaloscelis* in the antennal club structure. But neither Arrow nor Delkeskamp were aware of Araki’s work. Thus, *Scelidopetalon* and *Pseudamblyopus* were both separated from *Amblyopus* based on the same characters.

Because no specimens of *Pseudamblyopus* are available for study, we are not treating *Scelidopetalon* as a synonym to *Pseudamblyopus*. This should be considered in future revisionary work.

Previously, a total of six species have been reported for *Scelidopetalon* and two species for *Pseudamblyopus* worldwide.

Scelidopetalon instabilis (Gorham 1896) (Burma, Viet-Nam)

Scelidopetalon similis (Arrow 1925) (Assam Valley)

Scelidopetalon varicolor (Arrow 1925) (India)

Scelidopetalon solidus (Arrow 1925) (India)

Scelidopetalon fasciatus (Arrow 1926) (Sumatra, N. Borneo)

Scelidopetalon arrowi Delkeskamp (1957) (Singapore)

Pseudamblyopus palmipes (Lewis 1889) (Japan)

Pseudamblyopus similis (Lewis 1887) (Far East, Japan)

In this work, one new species of *Scelidopetalon* is described and illustrated: *Scelidopetalon biwenxuani* sp. n. from Hainan Province, China.

Material and methods

To examine the genitalia, the abdominal segments were detached from the body after softening in hot water. The genitalia, together with other dissected parts, were mounted in Euparal (Chroma Gesellschaft Schmidt, Koengen, Germany) on plastic slides. Photos of sexual characters were taken with a FUJIFILM X10 camera attached to an

Olympus SZX 16 stereoscope; habitus photos were taken with a Canon macro photo lens MP-E 65 mm attached to a Canon EOS7D camera.

The specimen treated in this study is deposited in the following public collection:

SNUC Department of Biology, Shanghai Normal University, P. R. China

Taxonomy

Scelidopetalon Delkeskamp and *Pseudamblyopus* Araki

Diagnosis. These two genera can be distinguished from other Tritomini genera by eyes small and finely faceted (Fig. 1). Tibiae (Fig. 8) triangular, with the extremities very broad and hollowed for the tarsi. Prosternal lines of prosternum (Fig. 7) short, not extending in front of procoxal cavities. These three characters have not existed together in other genera of Tritomini. The distinct difference between species of these two genera is antennal club structure. Most species of *Scelidopetalon* with antennomere XI much broader than long, one species of *Scelidopetalon* and all the species of *Pseudodamblyopus* with antennomere XI almost as long as broad.

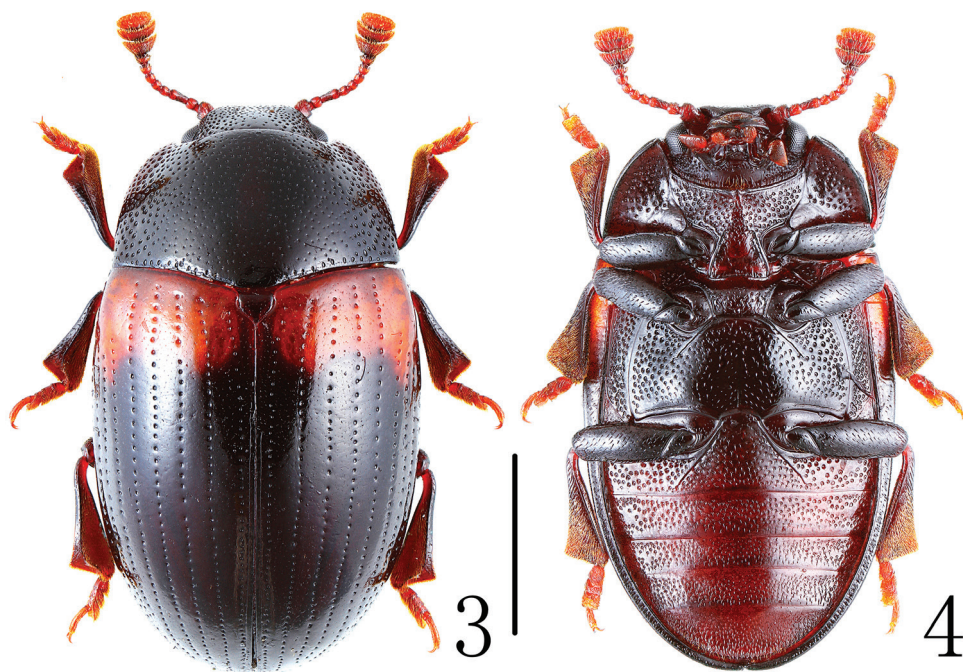
Key to world species of genus *Scelidopetalon* and *Pseudamblyopus*

Parts of the following key were taken from Arrow (1925).

- | | | |
|---|--|---|
| 1 | Antennomere XI almost as long as broad | 2 |
| – | Antennomere XI much broader than long | 4 |
| 2 | Pronotum yellow, elytra with rather indefinite reddish patch at base | |
| | <i>Scelidopetalon varicolor</i> (Arrow) | |
| – | Pronotum orange, elytra without rather indefinite reddish patch at base..... | 3 |
| 3 | Legs black | <i>Pseudamblyopus palmipes</i> (Lewis) |
| – | Legs brown | <i>Pseudamblyopus similis</i> (Lewis) |
| 4 | Elytra with markings..... | 5 |
| – | Elytra without markings | 8 |
| 5 | Pronotum black..... | <i>Scelidopetalon biwenxuani</i> Dai & Zhao, sp. n. |
| – | Pronotum orange to red..... | 6 |
| 6 | Pronotum with a black median line..... | <i>Scelidopetalon fasciatus</i> (Arrow) |
| – | Pronotum without a black median line..... | 7 |
| 7 | Pronotum with black spots, elytra with X-shaped orange markings..... | |
| | <i>Scelidopetalon instabilis</i> (Gorham) | |
| – | Pronotum without black spots, elytra with orange markings not X-shaped ... | |
| | <i>Scelidopetalon arrowi</i> Delkeskamp | |
| 8 | Dark above | <i>Scelidopetalon similis</i> (Arrow) |
| – | Pale above and beneath..... | <i>Scelidopetalon solidus</i> (Arrow) |



Figures 1–2. Head of **1** *Scelidopetalon biwenxuani* and **2** *Amblyopus vittatus* in dorsal view. Scale = 0.5 mm.



Figures 3–4. Habitus of *Scelidopetalon biwenxuani* in dorsal and ventral view. Scale = 2 mm.

***Scelidopetalon biwenxuani* Dai & Zhao, sp. n.**

urn:lsid:zoobank.org:act:B6AA8AE6-86AE-4B7D-A172-CC01ED471933

http://species-id.net/wiki/Scelidopetalon_biwenxuani

Figs 1, 3–4, 5–9

Type material. Holotype: CHINA: Hainan Prov.: 1♀, Jianfengling N.R., Mingfeng-gu Valley, 18°44'N, 108°50'E, alt. 1000 m, 15.V.2011, Bi Wen-Xuan leg. (SNUC).

Description. Body (Fig. 3, 4) oval, convex, shining; length: 6.50 mm; width: 3.79 mm. Body black; legs, palpi and antennae reddish-brown. Elytron black, with red at basal third.

Head (Fig. 1) width between eyes = 5.5 times eye diameter in dorsal view; punctation coarse, separated by 0.5–1.0 puncture diameters laterally and 2–4 puncture diameters medially; stridulatory files not evident. Antennae (Fig. 5) short, not extending behind posterior border of pronotum; antennomere III about 2.0 times as long as IV; antennomeres IV to VIII short; antennomeres IX to XI broad and transverse; relative lengths of antennomeres II–XI: 9.0: 14.0: 7.0: 7.0: 7.0: 7.0: 6.5: 9.0: 9.0: 8.0. Maxillary terminal palpomeres trapezoidal, 1.67 times wider than long. Mentum broad with anterior projection, almost pentagonal, 1.75 times wider than long.

Pronotum transverse, convex above, widest at base (pl/pw = 0.70); anterior angles weakly projecting; lateral margins gently curved toward eyes. Pronotum distinctly punctured medially, finely and closely punctured laterally.

Prosternum (Fig. 7) strongly punctured, the front margin is produced to a short point in the middle, prosternal lines short, not extending in front of procoxal cavities; Mesosternum coarsely punctured. Metasternum coarsely punctured at the sides and almost smooth in the middle, with distinct coxal lines. Abdomen fairly strongly and closely, its sides coarsely, punctured, with distinct coxal lines on first ventrite nearly attaining posterior margin.

Scutellum pentagonal, finely and sparsely punctured.

Legs short, tibiae triangular, with the extremities very broad and hollowed for the tarsi.

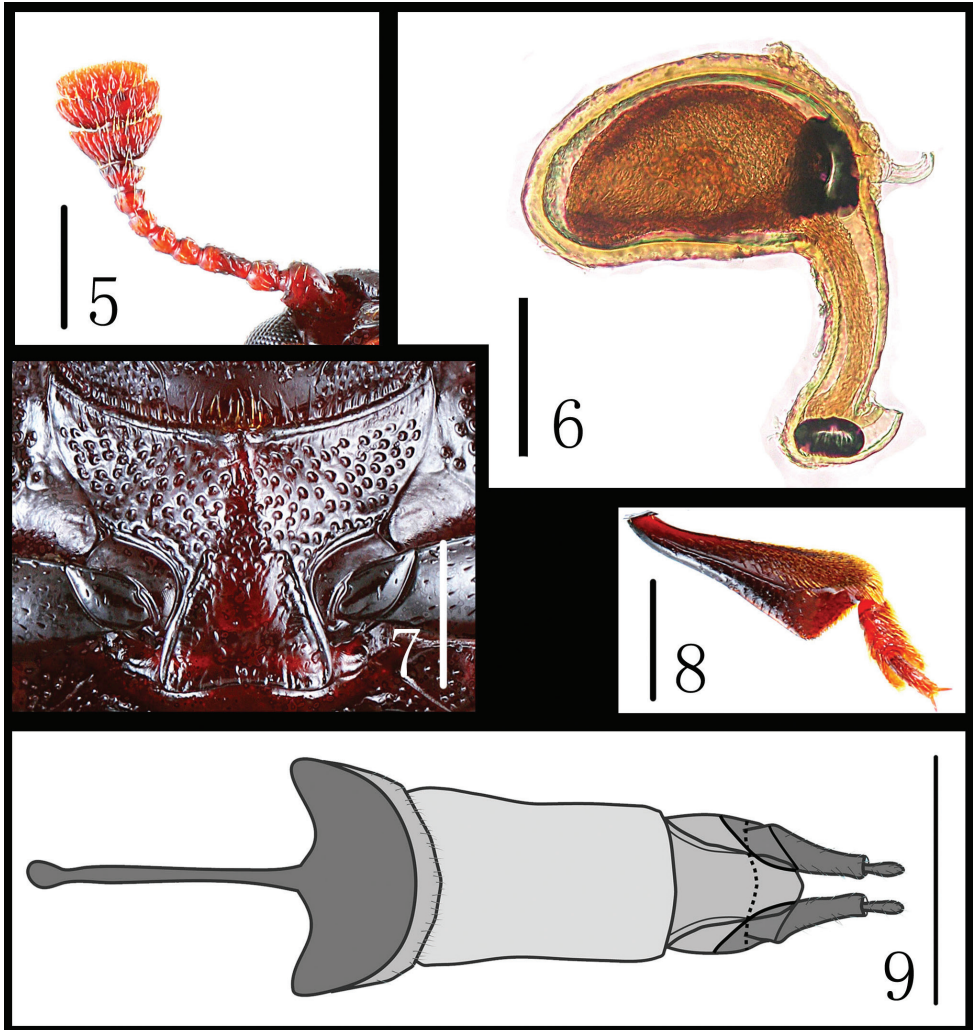
Elytra widest at middle, then gradually narrowing to apex; each with 9 punctate lines.

Female genitalia (Fig. 9) with gonostyli fringed apically with some elongate setae; female spermatheca (Fig. 6) with capsule almost egg-shaped.

Distribution. China (Hainan Province).

Diagnosis. The new species can be distinguished from other species in this genus by the black pronotum and red markings of the elytra.

Etymology. This species is named in honor of Mr. Wen-Xuan Bi, collector of the new species.



Figures 5–9. *Scelidopetalon biwenxuani*. **5** antenna **6** spermatheca **7** prosternum **8** tibia and tarsus **9** female genitalia. Scales = 0.5 mm (**5**, **7**, **9**), Scales = 0.1 mm (**6**), Scales = 1.0 mm (**9**).

Acknowledgements

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Types of species of Apionidae (Coleoptera) described by Carl Peter Thunberg (1743–1828) with description of a new genus

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Abstract

The type specimens of species of Apionidae described by Carl Peter Thunberg are reviewed and lecto- and paralectotypes are designated for *Apion craccae* Thunberg, 1813, *Apion limbatum* Thunberg, 1813, *Apion punctigerum* Thunberg, 1815 and *Apion astragali* Thunberg, 1815. A new genus *Thunbergapion* (type species *Apion limbatum* Thunberg, 1813) is described, figured and placed in the tribe Aplemonini Kissinger, 1968. The new combination *Thunbergapion limbatum* (Thunberg, 1813) is proposed. A key to the known South African genera of the tribe is given. The following new synonymies are established: *Oxystoma craccae* (Linnaeus, 1767) = *Apion craccae* Thunberg, 1813 **syn. n.**, *Ischnopterapion* (*Ischnopterapion*) *loti* (Kirby, 1808) = *Apion punctigerum* Thunberg, 1815, **syn. n.**, and *Pseudoprotapion astragali* (Paykull, 1800) = *Apion astragali* Thunberg, 1815, **syn. n.**

Keywords

Weevils, *Thunbergapion*, *Apion*, Carl Peter Thunberg, new genus, new combination, new synonymies, morphology, systematics, key

Introduction

Carl Peter Thunberg (*1743, †1828) was a Swedish botanist and entomologist and disciple of Carolus Linnaeus. He stayed in South Africa from 16 April 1772 to 2 March 1775, when he sailed to Batavia. During his stay in the Cape Colony of the Dutch East India Company (now South Africa) he undertook several short excursions and three long trips beyond the hinterland to collect animals and plants. He visited the colony again during his return journey to Europe, from 27 April to 15 May 1778 (Forbes 1986; Muller and Rookmaaker 1992).

As a result of his trips, Thunberg (1813) presented a list of hitherto known weevil species from the Cape of Good Hope area. He added short diagnoses and references to those previously described. The genera and species treated are summarised in Table 1. None of the new species have been treated in later regional or worldwide catalogues, although they were included in Sherborn's *Index Animalium*. The new species were:

Apion craccae (p. 382)

A. limbatum (p. 382)

Curculio papillaris (p. 384)

C. gibbosus (p. 388) (non Gmelin, 1790, nec Paykull, 1792)

C. analis (p. 389) (non Olivier, 1790)

C. felinus (p. 390)

C. cyaneus (p. 390) (non Linnaeus, 1758, nec Herbst, 1795, nec Weber, 1801)

C. elongatus (p. 390) (non Fabricius, 1775, nec Goeze, 1777, nec Paykull, 1792)

C. cinctus (p. 391) (non Drury, 1782, nec Geoffroy, 1785, nec Rossi, 1790, nec Paykull, 1792, nec Olivier, 1807)

C. octoguttatus (p. 391)

C. zebrae (p. 392)

C. margaritaceus (p. 393).

The descriptions of these species are insufficient to allow their proper placement to genus. Those described under *Apion* will be treated below, after studying their type specimens. Those described under *Curculio* may merit a separate study, although it appears from the descriptions that probably the first four and the last two may belong to the Cyclominae (Cyclomini, Hipporhinini). As can be seen from the list above, five of these available names are potentially valid but five are permanently invalid because of primary homonymy.

Thunberg (1815) published another revision of the genera and species of weevils known to him (including Bruchinae), giving descriptions for all of the genera (new were *Amblycerus*, *Chyphus*, *Platyrynychus* and *Temnocerus*), enumerating the species belonging to each genus and describing, apparently as new, 29 species. Of these, three were new species attributed to the genus *Apion*, namely *A. sanguineum*, *A. punctigerum* and *A. astragali*. Contrary to the species included in his previous article, these have usually been included in the catalogues of Coleoptera and are well known, at least by name. A summary of the genera and species treated is included in Table 2.

Table 1. Genera and number of species treated in Thunberg (1813), and new species described therein. Names as given originally.

Genus	Total species	New species
<i>Cordyle</i>	2	0
<i>Lixus</i>	4	0
<i>Rhynchaenus</i>	12	0
<i>Apion</i>	2	2
<i>Curculio</i>	32	10
<i>Brachycerus</i>	32	0
<i>Platyrhynchus</i>	1	0
<i>Attelabus</i>	4	0
<i>Rhinomacer</i>	1	0

Table 2. Genera and number of species treated in Thunberg (1815), and new species described therein. Names as given originally.

Genus	Total species	New species
<i>Cordyle</i>	12	3
<i>Ramphus</i>	12	1
<i>Lixus</i>	13	2
<i>Rynchaenus</i>	116	8
<i>Rynchites</i>	12	3
<i>Apion</i>	12	3
<i>Brentus</i>	4	0
<i>Curculio</i>	99	4
<i>Cossonus</i>	2	0
<i>Hyselinus</i>	14	0
<i>Antribus</i>	5	0
<i>Amblycerus</i>	8	3
<i>Platyrhynchus</i>	2	1
<i>Temnocerus</i>	2	0
<i>Brachycerus</i>	29	0
<i>Chyphus</i>	1	0
<i>Attelabus</i>	3	1
<i>Bruchus</i>	12	0
<i>Rhinomacer</i>	2	0

Material and methods

Type specimens of Thunberg's collection were received from the Zoological Museum of Uppsala University (Sweden). The specimens were studied under a binocular Leica Wild MZ8 microscope and photographed with an Olympus C7070WZ camera mounted on the same microscope or on a photographic frame Kaiser RA1. Microscope slides were studied and photographed with the same camera mounted on a Leitz Diaplan microscope, and some details were drawn by using a drawing tube. Extended focus images were generated using the software CombineZP. The programs Adobe Illustrator CS5.0 and Adobe Photoshop CS5.0 were used for image postproduction and mounting.

Dissection methods and nomenclature of genitalia follow Alonso-Zarazaga (1990). Genitalia and terminalia have been placed in a drop of DMHF on an acetate card accompanying the specimen for long term conservation (Steedman 1958; Bameul 1990).

Labels are described as they were copied by the curators, since they were retained in the drawers. These labels are red and read “Uppsala Univ. Zool. Mus. / Thunberg-saml. nr. # / *Genus species* / ## TYP.” In the treatment for each species, only the data represented by the marks # and ## are given. Specimens designated as lectotypes are labelled as such, with white labels bordered and printed in red: (PARA)LECTOTYPUS / *Genus* / *species* / Thunberg, 181(3-5) / Alonso-Zarazaga des. 2013. Each specimen was also provided with white identification labels printed in black.

Taxonomy

Apion craccae Thunberg, 1813: 382

http://species-id.net/wiki/Apion_craccae

Original description. *A. craccae*: nigrum opacum, elytris striatis. *.

Magnitudine pulicis, globosum, nigrum, opacum, omnino simile *A. craccae*, europaeo.

Material studied. I have received four specimens from the collection Thunberg: 539, Mus.Thunb. Pierced midway with a long thin pin without head, abdomen glued to a white card below.

1188, Cap. Pierced low with a short thick pin with head.

1189, Sv. Pierced midway with a long thin pin with head. The abbreviation “Sv.” stands for “Svecia” [= Sweden].

15075, no data. Pierced midway with a long thin pin with head.

The specimen with the number 1188 has a further label reading “Cap” and is here designated as lectotype and labelled accordingly. Although the specimens with the numbers 539, 1189 and 15075 are pinned in a similar manner, they cannot be considered as syntypes as their label data do not conform with the original locality, Cape Province, as it can be inferred from the title of the article. However, all four specimens belong to the same species, the European *Oxystoma craccae* (Linnaeus, 1767). *Apion craccae* Thunberg, 1813 is thus a new synonym of the name of Linnaeus’ species. It is almost certain that the locality on the lectotype is a mistake.

Apion limbatum Thunberg, 1813: 382

http://species-id.net/wiki/Apion_limbatum

Figs 1–2, 6–11

Original description. *A. limbatum*: cinereo-fuscum, elytrorum sutura basi margin-eque externo albidis.

Magnitudo minoris pediculi; totum glabrum, cinereo-coerulescens.



Figures 1–5. Type specimens in Thunberg’s collection **1** *Apion limbatum* Thunberg, 1813, lectotype male, dorsal view **2** *Apion limbatum* Thunberg, 1813, lectotype male, lateral view **3** *Apion astragali* Thunberg, 1815, lectotype male, dorsolateral view **4** *Apion punctigerum* Thunberg, 1815, lectotype, dorsolateral view **5** *Apion sanguineum* Thunberg, 1815, syntype, dorsal view.

Elytra striata sutura basi margineque externo albo.

Pedes inermes.

Material studied. One male specimen, glued to a pin 20.4 mm long and 0.59 mm in diameter with the following data: 1293, Cap. The original Thunberg labels, which I have not seen, read: “*Apion*” (genus label) and “*limbatum*. Cap.” (species label). It is here designated as the lectotype of this species. The specimen is severely damaged, the abdomen is broken and separated from the body and the elytra are open, but fortunately all legs and antennae are entire. I have been able to recover the abdomen and prepare the remainder of the ventrites, terminalia and genitalia in a drop of DMHF (water- or ethanol-soluble resin) on an acetate card. Study of the specimen showed it to be a member of an hitherto undescribed genus, which is described below.

***Apion sanguineum* Thunberg, 1815: 118**

Fig. 5

Note. This species is represented by a single pinned specimen belonging, as usually accepted, to the genus *Tanaos*. I refrain from redescribing it here, since a revision of *Tanaos* is in preparation by my good colleague and friend Dr. Marek Wanat (Wrocław, Poland).

***Apion punctigerum* Thunberg, 1815: 118**http://species-id.net/wiki/Apion_punctigerum

Fig 4

Original description. *A. punctigerum*: niger, elytris nigris, striatis.

Habitat in Smolandia Sveciae.

Magnitudine pediculi totus opacus, niger.

Elytra gibba, striata, atra.

Material studied. I have received three specimens, as follows: one divided into three parts and glued onto a square white card, this on a short thin pin with head, with data: 543a, Mus. Thunb.; one headless, worn, pinned high on a long thin pin with head, with data: 543b, Mus. Thunb.; and a third glued to a rectangular label, this on a short thick pin with head, with data: 1191, Smol. The first specimen is a female of *Aspidapion radiolus* (Marsham, 1802), the second a female of either *Ceratapion gibbirostre* (Gyllenhal, 1813) or *C. carduorum* (Kirby, 1808), and the third is an etiolated (probably female) specimen of *Ischnoptera-pion* (*Ischnoptera-pion*) *loti* (Kirby, 1808). The first two are coloured brightly, with the elytra more or less metallic, and do not fit Thunberg's description. The third fits Thunberg's description, although the body colour has become brownish, and is labelled with the type locality, Smolandia (= Småland, Sweden). I hereby designate this specimen as the lectotype of *Apion punctigerum* Thunberg, 1815, and its name becomes a new synonym of that of *I. loti*.

***Apion astragali* Thunberg, 1815: 118**http://species-id.net/wiki/Apion_astragali

Fig. 3

Original description. *A. Astragali*: caerulescens nitidus, elytris striatis.

Habitat in Vestrogothia Sveciae.

Totus supra nitens, caerulescens; subtus magis niger magnitudine pediculi.

Elytra gibba, striata.

Material studied. I have received three specimens with red type labels as above, carrying the numbers 1206, 1289 and 1290. Only specimen nr. 1289 has an additional label reading "Vestrog.". This specimen, pinned high on a long pin with head, is

a female *Pseudoprotapion astragali* (Paykull, 1800) and is here designated as lectotype. This allows establishment of the following new synonymy: *Pseudoprotapion astragali* (Paykull, 1800) = *Apion astragali* Thunberg, 1815. Specimen 1206 is a male of the same species and is designated as paralectotype. However, specimen 1290 does not fit the original description and is not considered to represent a syntype, not being bright bluish as the others but dull bronze-black. It is a female of *Aspidapion radiolus* (Marsham, 1802). Thunberg's original species label of this specimen carries a question mark and the letter β , in contrast with the other two, which carry the letter α .

***Thunbergapion* Alonso-Zarazaga, gen. n.**

urn:lsid:zoobank.org:act:EAAA82B8-0D85-462D-8659-E2F4A1D2FA47

<http://species-id.net/wiki/Thunbergapion>

Figs 1–2, 6–11

Type species. *Apion limbatum* Thunberg, 1813. Gender neuter.

Description. With the characters of tribe Aplemonini Kissinger, 1968, as detailed by Alonso-Zarazaga (1990: 88).

Integument. Colour black, elytra with a faint leaden-bluish glint.

Vestiture subsquamose, scales elliptical to lanceolate, in one ordered row on each interstria, sometimes row disordered in the middle of some interstriae. Pronotal vestiture centripetal.

Rostrum $1.28 \times$ as long as pronotum, sparsely squamose in basal third, almost glabrous in apical two thirds, in dorsal view sides slightly convergent to mesorostrum, tubiform from mesorostrum to apex, $5.2 \times$ as long as wide at apex, mesorostrum not dilated, punctures dense and large at base, becoming progressively less dense and smaller towards apex, integument scarcely microreticulate, bright; in side view straight at basal half, weakly deflexed and curved in apical half. Scrobes weakly sulciform.

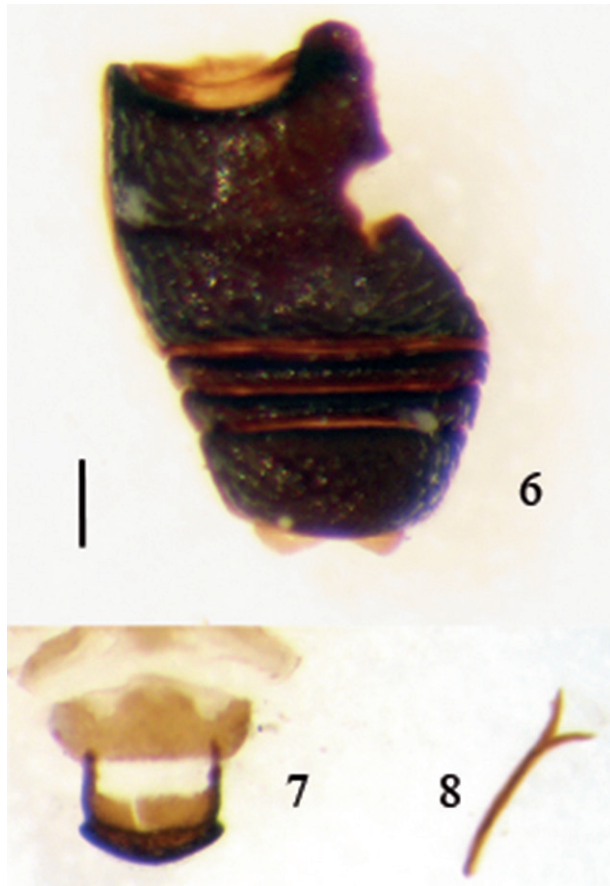
Head short, separated from occiput by a dorsal transversal depression, forehead little narrower than rostral apex, with two irregular lines of scale-bearing punctures near inner margin of eyes and a central oblong-elliptical, moderately deep fovea. Eyes slightly oblong, moderately convex. Temples very short, ca. $\frac{1}{4}$ length of eye.

Antennae inserted at basal 0.33 of rostrum. Scapes moderately long, $1.33 \times$ as long as mesorostral width. Clubs elongate, fusiform, $2.6 \times$ as long as wide, sutures visible.

Pronotum moderately transverse, $0.90 \times$ as long as wide, maximum width near middle, weakly narrowed towards base, more strongly so towards apex. Basal flange absent. Prescutellar fovea obsolete, reduced to a very weak oblong depression near base, not longer than a puncture. Base straight.

Scutellum small, subtriangular, glabrous, impunctate.

Elytra oval-elongate, ca. $1.6 \times$ as long as wide (a more precise measure impossible due to the condition of the specimen), widest at middle, humeral calli moderately developed. Striae at apex joining 1+2+9, 3+4, 5+6, 7+8, 2nd not extended outwards, at base 1st shortened before scutellum. No specialized setae.



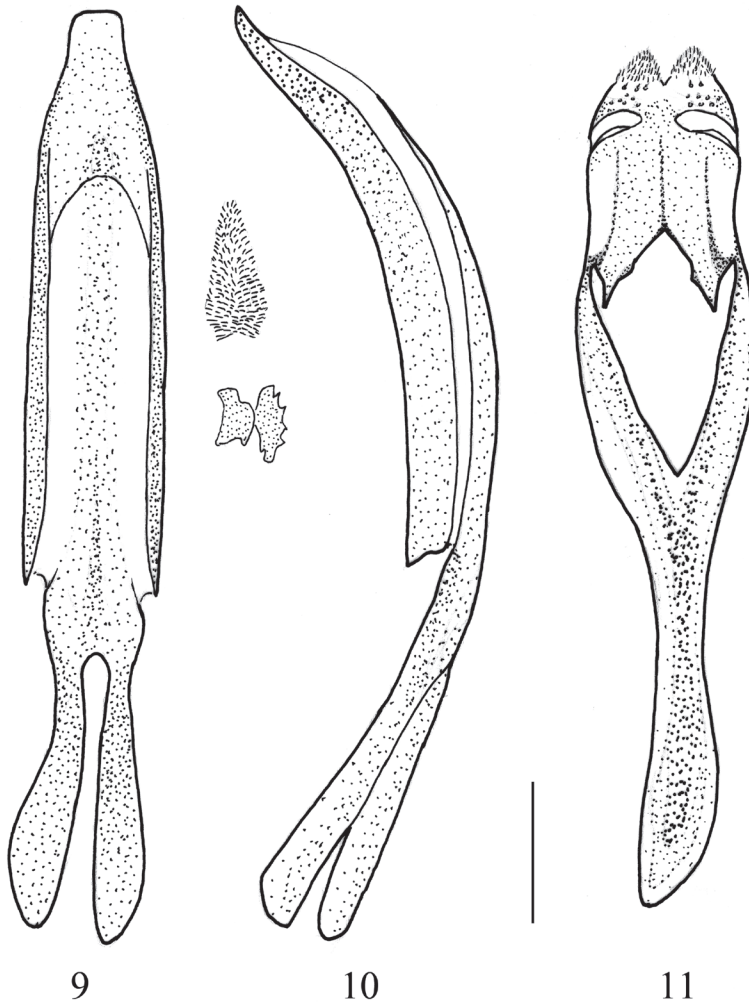
Figures 6–8. *Thunbergapion limbatum* (Thunberg, 1813) **6** Abdominal sternites, ventral view **7** Male pygidium, dorsal view **8** Male ninth sternite (spiculum gastrale). Scale: 100 μ m.

Ventral areas. Mesocoxae tangent. Median apophysis of mesoventrite triangular, short, median apophysis of metaventrite rather narrow and elongate, tuberculiform. Anterior metasternal rim fine. Abdomen (Fig 6) strongly and densely punctate, punctures moderately deep, scales not condensed, finer than on disc of metaventrite. First abdominal ventrite ca. $1.8 \times$ as long as 2^{nd} , this as long as 5^{th} . Suture I marked. Fifth ventrite subtruncate at apex.

Pygidium (Fig 7) of apionine type, with apical flange weakly and widely notched medially.

Legs. Tibiae unarmed. Tarsi robust, 1^{st} protarsomere $1.11 \times$ as long as wide, 2^{nd} transverse, $0.73 \times$ as long as wide, $0.8 \times$ as long as 1^{st} , 3^{rd} $0.69 \times$ as long as wide, deeply bilobed, onychium $3.24 \times$ as long as wide, surpassing lobes of 3^{rd} tarsomere by $0.54 \times$ its own length. No tarsomere ventrally spined. Claws weakly incrassate at base, not toothed.

Genitalia and terminalia: Tegmen (Fig 11) with parameroid lobes shorter than dorsal portion of ring, apically subtriangular, with short apical membranous micro-



Figures 9–11. *Thunbergapion limbatum* (Thunberg, 1813) **9** Penis, dorsal view, inner sac armature figured outside **10** Penis, lateral view **11** Tegmen, dorsal view. Scale: 100 μ m.

setose area, basal sclerotized area with some irregularly arranged short macrochaetae and sensilla. Fenestrae separated, curved. Prostegium fused to free ring, with a deep triangular notch and one basal tooth on each side, the teeth with a small inner prominence. Linea arquata obsolete. Free ring and manubrium flattened. Penis (Figs 9–10) weakly compressed, apex of pedon prominent as a trapezoidal truncate plate in dorsal view, in side view gently curved with the apex weakly recurved. Internal sac with apical spicules uniform, ca. 10 μ m long, rather condensed in a subtriangular patch, medially with two pieces apparently formed by conglomerate teeth, ca. 80 μ m long, and basally with some sparse minute spicules and asperities. Spiculum gastrale (Fig 8) Y-shaped, slightly asymmetrically curved, manubrium ca. 2.5 \times as long as arms.

Note. This description is based only on the male sex, the female is presently unknown.

Material examined. The lectotype male of *Apion limbatum* Thunberg, 1813, as mentioned above.

Etymology. This genus is named after Carl Peter Thunberg, the illustrious Swedish naturalist and almost certainly the collector of the type species, during his travels in present-day South Africa.

***Thunbergapion limbatum* (Thunberg, 1813), comb. n.**

http://species-id.net/wiki/Thunbergapion_limbatum

Description of lectotype. *Measurements* (in μm): Body length (not including head and rostrum): 1834. Rostrum: length: 628; width (apical): 120, (mesorostral): 126. Distance from antennal insertions to base: 209. Forehead: width: 107. Eyes: length: 168. Scapes: length: 168; maximum width: 26. Desmomerites 1–7 (length \times width): 52×26 , 31×21 , 31×21 , 31×21 , 31×21 , 21×21 , 21×21 . Clubs (length \times width): 178×68 . Pronotum: length: 492; width (apical): 429, (maximal): 544, (basal): 492. Elytra: length: 1342; joint width (at humeri): 650, (maximal): 900 (last two gross estimations due to open elytra).

Vestiture of upperside consisting of short, lanceolate to elliptical white scales, ca. $30 \times 10 \mu\text{m}$ on pronotum, sparse, not or hardly surpassing margins of punctures, those on elytral interstriae similar, usually touching one another in the row, rarely overlapping, forming duplicate irregular rows in some parts along the interstriae, those of striae smaller, about half the size of the interstitial ones, not touching; elytral scales condensed on the basal third of scutellar interstriae and on basal two thirds of the costal interstriae; ventral scales finer and longer (ca. $50 \times 7 \mu\text{m}$), condensed on mesoventrite and mesopleural sclerites and on sides of metaventrite and metanepisternum, except the strikingly bare anterolateral angles of metaventrite, sparser on metasternal disc.

Antennae dark piceous brown, shortly setose. Funicles subcylindrical, rather compact.

Pronotum with large superficial punctures ca. $30 \mu\text{m}$ in diameter, separated by ca. $10 \mu\text{m}$, integument weakly microreticulate, shining.

Elytra with striae about half as wide as interstriae.

Wings. Macropterous.

Legs robust, profemora $2.34 \times$ as long as wide, protibiae straight, widening towards apex, $5.35 \times$ as long as wide.

Discussion

The new genus *Thunbergapion* belongs to the tribe Aplemonini Kissinger, 1968 by the presence of a male pygidium of the normal apionine type, the abdominal ventrites similarly punctate, the manubrium of the spiculum gastrale much longer than the arms,

the absence of a specialized seta on the middle of the 7th interstriae, the deeply notched prostegium with one tooth on each side, fused to the free ring, the elytral striae 1, 2 and 9 not more impressed at apex than on disc, and the tangent mesocoxae. The simple claws and the almost straight rostrum are also common features in this tribe.

Peculiar characters of this genus are the squamose vestiture, condensed on the sutural and marginal interstriae and on the meso- and metapleurites, the long, almost straight rostrum, the fusiform antennal clubs and the two strongly dentate median pieces of the internal sac.

This genus seems to include also at least two other undescribed species from the same area (Marek Wanat, pers. comm.) and may constitute an endemic element.

Using the key to the genera of the Palearctic region (Alonso-Zarazaga 1990, p. 88 and ff.), which includes all the known genera of Aplemonini except the Mexican *Femtapion* Kissinger, 1991, doubtfully a member (Alonso-Zarazaga and Wanat in press), *Thunbergapion* agrees with the characters of couplet 3 and runs to either *Pseudoperapion* Wagner, 1930 or *Pseudostenapion* Wagner, 1930. It differs from both these genera by the squamose vestiture (piliform in the others), the longer rostrum (shorter than pronotum in the others), the narrower forehead compared with the rostral apex (much wider than apex in the others), the scapes longer than the mesorostral width (0.5–0.7 × as long in the others), the longer, fusiform clubs (ca. 1.9 × as long as wide and oboval in the others), the male pygidium with rim margin weakly notched (angulate in the others), the obsolete linea arquata of tegmen (well marked in the others) and the two medial toothed structures of the internal sac (only small teeth, spicules or asperities in the others).

Thunbergapion additionally differs from *Pseudostenapion* by its shorter, plumper form (elongate in *Pseudostenapion*), the moderately shiny integument (matt in *Pseudostenapion*), the punctate pronotum (smooth and shining in *Pseudostenapion*) and the transverse pronotum (oblong in *Pseudostenapion*); the tegmen in both genera is very similar in general and the penis shows a prominent apical knob in *Pseudostenapion*.

From *Pseudoperapion* *Thunbergapion* additionally differs by its longer 2nd abdominal ventrite (very short in *Pseudoperapion*), the transverse 2nd tarsomere (isodiametric in *Pseudoperapion*) and the shorter manubrium (ca. 7 × as long as arms in *Pseudoperapion*); the apex of the penis is slightly recurved in both genera, but its general shape is rather cylindrical and elongate in *Pseudoperapion*. *Thunbergapion* also shares with *Pseudoperapion* the condensed vestiture in some ventral areas.

Because of its elongate rostrum, *Thunbergapion* shows some similarity also to *Cistapion*, a Mediterranean endemite and probably a relict. The genital structures are very similar in both genera, except for the presence in *Cistapion* of long macrochaetae on the parameroid lobes of the tegmen and a well marked linea arquata. In addition, the temones of the penis are very short in this genus (less than half the length of the pedon), which is not the case in *Thunbergapion*.

The species of *Pseudostenapion* and *Pseudoperapion* are stenophagous on species of the plant genus *Hypericum* L. (Hypericaceae), and it is possible that *Thunbergapion limbatum* also lives on plants of this genus (there are six species in the Cape Province).

In South Africa, three genera of the tribe Aplemonini are present: *Aplemonus* Schoenherr, 1847, *Perapion* Wagner, 1907 and *Thunbergapion* gen. n. These genera can be distinguished using the following simple key:

- 1 Claws toothed. Elytra strongly convex behind middle, anteriorly concave in side view. Host: *Zizyphus* spp. (Rhamnaceae) ***Aplemonus***
- Claws simple or slightly incrassate at base. Elytra uniformly and weakly convex in side view **2**
- 2 Antennal clubs oboval. Metasternal apophysis shortly triangular. Antennal scapes at most as long as mesorostral width. Vestiture piliform. Host: *Emex* spp. (Polygonaceae) ***Perapion***
- Antennal clubs fusiform. Metasternal apophysis narrow and elongate, tuberculiform. Antennal scapes 1.33 × as long as mesorostral width. Vestiture squamose. Host unknown ***Thunbergapion***

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