



<https://doi.org/10.11646/zootaxa.4434.1.10>

<http://zoobank.org/urn:lsid:zoobank.org:pub:B22116EA-DF00-4C6D-93FB-D40427809537>

To the revision of the genus *Thionia* Stål (Hemiptera, Fulgoroidea, Issidae), with description of new genera and new subtribe

VLADIMIR M. GNEZDILOV

Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, St. Petersburg 199034, Russia.

E-mail: vmgnezdilov@mail.ru, vgnezdilov@zin.ru

Abstract

New subtribe, Oronoquina subtrib. n., is erected for the genus *Oronoqua* Fennah, 1947 in the tribe Thioniini Melichar. New genera, *Fowlerium* gen. n. (type species: *Thionia naso* Fowler, 1905) and *Aplos* gen. n. (type species: *Issus simplex* Germar, 1830) are erected in the subtribe Thioniina Melichar. *Thionia acuta* Doering, 1941 and *T. producta* Van Duzee, 1908 are transferred to *Fowlerium* gen. n. The photos of type specimen of *Issus cinctifrons* Stål, 1854 are examined and compared with original description of *Issus rubrocostatus* Spinola, 1839 (currently *Thionia rubrocostata* (Spinola, 1839)). *I. cinctifrons* is reinstated from synonymy with *I. rubrocostatus* as *Thionia cinctifrons* (Stål, 1854). Diagnosis of *Thionia sensu stricto* is given basing on the characters of *T. cinctifrons*. Generic status of *Cheiloceps* Uhler, 1895 is discussed and confirmed. *Thionia argo* Fennah, 1949, *T. anguillana* Fennah, 1965, *T. borinqueta* Caldwell et Martorell, 1951, and *T. puertoricensis* Caldwell et Martorell, 1951 are transferred to the genus *Cheiloceps* Uhler. Hind wing venation characters of Issidae are discussed.

Key words: taxonomy, morphology, hind wing venation, new subtribe, new genus, new combination, Thioniinae, *Thionia*, *Cheiloceps*, *Oronoqua*, Neotropics

Introduction

Issus cinctifrons was described by C. Stål from Brazil more than 160 years ago (Stål, 1854). Soon after, Stål (1859) erected the genus *Thionia* and listed *I. cinctifrons* as well as *Issus longipennis* Spinola, 1839 as belonging to this new genus. Later on L. Melichar (1906) reviewing the genus *Thionia* Stål provisionally (marked by “?”) placed *I. cinctifrons* in synonymy under *Issus rubrocostatus* Spinola, 1839 (currently *Thionia rubrocostata* (Spinola, 1839)) also known from Brazil (Spinola 1839).

My study of photos of type male of *Issus cinctifrons* Stål, 1854 and comparison the characters of this species with Spinola’s description of *Thionia rubrocostata* (Spinola, 1839) showed that these names have to be associated with different species and accordingly the name *Thionia cinctifrons* (Stål, 1854) is available to use (for further synonymy see Gnezdilov & Dmitriev in press).

Currently the genus *Thionia* Stål, 1859 comprises 72 New World species and it is one of the largest genera of the family Issidae (Gnezdilov 2013). The genus *Cheiloceps* which was erected by P. R. Uhler (1895) for *Cheiloceps musca* Uhler, 1895 described from St. Vincent Island was downgraded by Fennah (1955) to subgenus of *Thionia* Stål. However, as R.G. Fennah (1955: 34) mentioned in his diagnosis of *Cheiloceps*, this group of species is distinguished from typical *Thionia* by peculiar “...elongate strongly tapering distad, decurved, and acute at apex” ovipositor (Fig. 7). In 2004 according to elongate and tapering distad gonoplares *Cheiloceps* was even erroneously placed in the tribe Colpopterini Gnezdilov, 2003 which is now treated as subfamily of the Nogodinidae (Gnezdilov *et al.* 2004; Gnezdilov 2012, 2017a).

Examined structure and venation of hind wing of *Thionia cinctifrons* (Stål) (Fig. 2) are very close to those of *Cheiloceps musca* Uhler (Fennah 1955, fig. 4d) (Figs 4, 9). However all species of the genus *Cheiloceps* are well distinguished by uniform nearly square coryphe and elongate metope with distinct median carina and weak sublateral carinae (Fennah 1965, figs 29, 30). In my opinion these features of head and ovipositor mentioned above

are good enough to treat *Cheiloceps* Uhler, 1895 as a separate genus of the family Issidae (Gnezdilov 2013). Currently this genus comprises 8 species from Puerto Rico and Lesser Antilles including the new combinations proposed below.

From other hand the morphological characters of *Thionia cinctifrons* give the diagnosis of *Thionia sensu stricto* as C. Stål (1859) treated this genus when he described it (for neotype designation for *Issus longipennis* Spinola, 1839—type species of *Thionia* see Gnezdilov & Dmitriev in press) and it is an opportunity to revise the genus *Thionia sensu lato*. Thus my examination of four species known from Canada, USA and Mexico and described or included in *Thionia* after C. Stål showed that they do not belong to *Thionia sensu stricto* and accordingly two new genera are erected here to accommodate them.

In newly proposed classification of the family Issidae Spinola (Wang *et al.* 2016) the last one is divided into three subfamilies with the subfamily Thioniinae Melichar treated as including “...*Thionia* Stål and all Neotropical taxa (such as *Oronoqua* Fennah, 1947) with their hind wing having a A2 vein branched and Pcu and A1 veins free, not partially fused” (Wang *et al.* 2016: 230). However *Thionia cinctifrons* (Stål) redescribed here and been a member of *Thionia sensu stricto*, as well as *Cheiloceps* Uhler and new genera described below are different from *Oronoqua* Fennah in fore and hind wing venations (Figs 2–5, 9–16). These data give me the arguments to treat the tribe Thioniini comprising at least two subtribes—Thioniina Melichar with the genera *Thionia* Stål, *Cheiloceps* Uhler, ***Fowlerium* gen. n.**, and ***Aplos* gen. n.** and a new subtribe with the genus *Oronoqua* Fennah. Thus the diagnosis of the subfamily Thioniinae and the tribe Thioniini Melichar *sensu* Wang *et al.* (2016) should be reduced up to one character—second anal vein (A_2) with two and more branches which was discovered for most of American genera, except *Picumna* Stål, 1864, *Proteinissus* Fowler, 1905, and *Amphiscepa* Germar, 1830 (Gnezdilov 2012 and original data). The taxonomic positions of other New World issid genera except mentioned above are in need of further determination.

Material and methods

Morphological terminology follows Gnezdilov (2003) and Gnezdilov *et al.* (2014), classification of Issidae—Wang *et al.* (2016) with the corrections mentioned above. Wing venation according to Bourgoïn *et al.* (2014) with following modifications for vein abbreviations used for Issidae by Gnezdilov *et al.* (2014) and Gnezdilov & Bartlett (2018): R[number of vein branches], M, CuA, CuP, Pcu, $A_{[\text{ordinal number of vein from anterior wing margin}]}$. According to this scheme radius (R) corresponds with “ScP+R(+MA) and RA, RP” and median (M) corresponds with “MP” of Bourgoïn *et al.* (2014) (Fig. 10).

The specimens examined are deposited in the Naturhistoriska Riksmuseet, Stockholm, Sweden (NHRS), Smithsonian Institution, National Museum of Natural History, Washington, D.C., USA (USNMNH), and Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia (ZIN).

Taxonomy

Family Issidae Spinola, 1839

Subfamily Thioniinae Melichar, 1906

Tribe Thioniini Melichar, 1906

Subtribe Thioniina Melichar, 1906

Type genus: *Thionia* Stål, 1859.

Diagnosis. Fore wings dull, coleopterous, with its apices never overlapping. Hind wings as long as fore wings, 3-lobed, with remigial, remigio-vannal, and anal lobes are almost equal in width; cubital cleft deep (Fig. 2, 4, 9–13). Hindwing vein sequence: apical parts of $CuA_{1,2}$ and CuP are closely situated, with a transverse vein between them,

its apices free; Pcu and $A_{1,1}$ are closely situated (Figs 11–13) or fused medially (Figs 2, 4, 9, 10); A_2 with 2 and more branches. Distal parts of remigial and remigio-vannal lobes with few transverse veins.

Composition. Currently *Thionia* Stål, 1859, *Cheiloceps* Uhler, 1895, *Fowlerium* **gen. n.**, and *Aplos* **gen. n.** Apparently still undescribed species from Miocene Mexican amber illustrated by Grimaldi & Engel (2005, figs 2.25, 2.26) with hind wing venation very close to *Aplos simplex* (Germar, 1830) (Fig. 11) also belongs to this subtribe.

Comparison. Presence of Pcu + $A_{1,1}$ anastomosis in *Thionia sensu stricto* and *Cheiloceps* species makes the subtribe Thioniina close to Oriental tribe Sarimini Wang, Zhang et Bourgoïn, 2016, however, A_2 with two and more branches shows derived condition of American taxa in comparison with Sarimini having A_2 simple. From another side many Sarimini are characterized by fusion and flattening of apical parts of CuA and CuP which is kind of specialization connected with depression of cubital cleft used for tucking of hind wing below fore wing.

Genus *Thionia* Stål, 1859

Thionia Stål, 1859: 321. Type species: *Issus longipennis* Spinola, 1839.

Diagnosis. Metope wide, almost square, with distinct median and sublateral carinae joined at one point on its upper margin which is straight (Fig. 1). Metope and coryphe joined at obtuse angle (in lateral view) (Fig. 3). Coryphe transverse (Fig. 2). Fore wings long and narrow, rounded apically, far surpassing the apex of abdomen. Forewing vein sequence: R 2–3, with first furcation near to basal cell; M 2, furcating before wing middle; CuA 1. Clavus long, open –Pcu+ A_1 runs into apex of clavus. Hind wings well developed, 3-lobed. Hindwing vein sequence: R 2, furcating after wing middle; M 1; CuA 2, furcating apically; CuP 1; Pcu 2, furcating apically and partly fused with $A_{1,1}$ at mid length; A_1 2; A_2 2, furcating at mid length (Fig. 2).

Notes. Thanks to kind help of Dr. Gunvi Lindberg the type specimen of *Issus cinctifrons* Stål, 1854 is located in the collection of Naturhistoriska Riksmuseet in Stockholm (Sweden). This single male perfectly matching with Stål's original description of the species (Stål 1854: 247). In particular *I. cinctifrons* is characterized by wide almost square metope with median carina running from its upper margin to its middle and full sublateral carinae turned to median line above clypeus (Fig. 1). Metope with two rows of yellow spots—traces of larval sensory pits. Fore wings long and narrow, light brown yellowish with green spots besides of claval suture and with longitudinal veins yellow greenish (Figs 2, 3). From other side according to Spinola's description of *Issus rubrocostatus* this species is characterized by metope much longer than wide, without carinae—"Front, plus long que large...sans traces de divisions en trois facettes..." and "Base du front...sans arête médiane." (Spinola 1839: 357). In coloration *I. rubrocostatus* is distinguished by red longitudinal veins of fore wings—"Nervures principales, rouges..." (Spinola 1839). Thus it is clear that M. Spinola and C. Stål described two different species from Brazil.

Thionia cinctifrons (Stål, 1854)

Figures 1–3

Issus cinctifrons Stål, 1854: 247.

Type material. ♂, holotype: "Brasil." // "Typus" [white, printed] // "Typus" [red, printed] // "NHRS-GULI/000053374" (NHRS).

Note. For proposed synonymy of *Issus longipennis* Spinola, 1839 and *I. cinctifrons* Stål, 1854 in accordance with neotype designation see Gnezdilov & Dmitriev (in press).

Genus *Cheiloceps* Uhler, 1895

Cheiloceps Uhler, 1895: 68. Type species: *Cheiloceps musca* Uhler, 1895.

Thionia (*Cheiloceps*): Fennah 1955: 34 (as subgenus).

Diagnosis. Metope elongate, with distinct (sometimes not for the whole length) median carina and sublateral carinae (sometimes weak) (Fennah 1965, fig. 29) (Fig. 6). Median and sublateral carinae joined below upper margin of metope. Coryphe nearly square, often with incomplete median carina (Fennah 1965, fig. 30) (Fig. 4). Second and third segments of rostrum are almost equal in length; third segment narrowing apically (Fig. 17). Fore wings elongate, surpassing abdomen, without hypocostal plate. Forewing vein sequence: R 2–3, with first furcation near to basal cell; M 2, furcating before wing middle; CuA 1. Clavus long, open—Pcu+A₁ runs into apex of clavus (Fennah 1965, fig. 32). Hind wings well developed, 3-lobed, with distinct coupling lobe on its anterior margin (Figs 9, 10). Hindwing vein sequence: R 2, furcating after wing middle; M 1; CuA 2, furcating apically; CuP 1; Pcu 2, furcating apically and partly fused with A_{1,1} at mid length; A₁ 2; A₂ 2–3, firstly furcating at mid length (Figs 4, 5). Hind tibia with 2 lateral spines in distal half. First metatarsomere with a whole row of spines arranged in arc.

Phallobase poorly sclerotized dorso-apically. Aedeagus with often poorly sclerotized ventral hooks, curved and directed ventrocephalad (Fennah 1965, fig. 33). Gonoplags elongate and tapering distad (Figs 4, 7). Female anal tube long and narrow.



FIGURES 1–3. *Thionia cinctifrons* (Stål), holotype. 1—frontal view; 2—dorsal view; 3—lateral view.

***Cheiloceps musca* Uhler, 1895**

Figs 4–8, 9, 17

Type material examined. Cotype, ♀, “St. Vincent, / W.I. / H. H. Smith [white, printed] // *Cheiloceps / musca / Co-type* Uhl. [white, hand written] // Co-Type / № 10203 / U.S.N.M. [red, hand written and printed] // JNZ_AA0412 [white, printed]” (USNMNH).

Other material examined. 1♂, “St. Lucia / West Indies”, “on *Clusia* sp. / Soufriere / Feb. 1939”, “RGFennah / Collector 712”, “Lot № 40-18160” (USNMNH); 1♀, “Dominica / West Indies”, “Ridgefield / 1200 ft. / Jan. 1940”, “RGFennah / Collector 687” (USNMNH).



FIGURES 4–8. *Cheiloceps musca* Uhler, cotype. 4—dorsal view; 5—lateral view; 6—frontal view; 7—ovipositor, lateral view; 8—labels.

***Cheiloceps argo* (Fennah, 1949), comb. n.**

Fig. 10

Thionia argo Fennah, 1949: 60, figs 20–23.

Material examined. 1♀, British Virgin Is., Guana Island, July 1985, Scott E. Miller leg. (ZIN).

***Cheiloceps anguillana* (Fennah, 1965), comb. n.**

Thionia anguillana Fennah, 1965: 104, figs 29–34.

Note. Transferred to the genus according to original description and figures with peculiar ventral aedeagal hooks (Fennah, 1965).

***Cheiloceps borinqueta* (Caldwell et Martorell, 1951), comb. n.**

Thionia borinqueta Caldwell et Martorell, 1951: 251, Pl. 49: 2.

Note. Transferred to the genus according to original description and figures including male genitalia with peculiar ventral aedeagal hooks (Caldwell & Martorell 1951).

***Cheiloceps puertoricensis* (Caldwell et Martorell, 1951), comb. n.**

Thionia puertoricensis Caldwell et Martorell, 1951: 251, Pl. 49: 4.

Note. Transferred to the genus according to original description and figures including male genitalia with peculiar ventral aedeagal hooks (Caldwell & Martorell 1951).

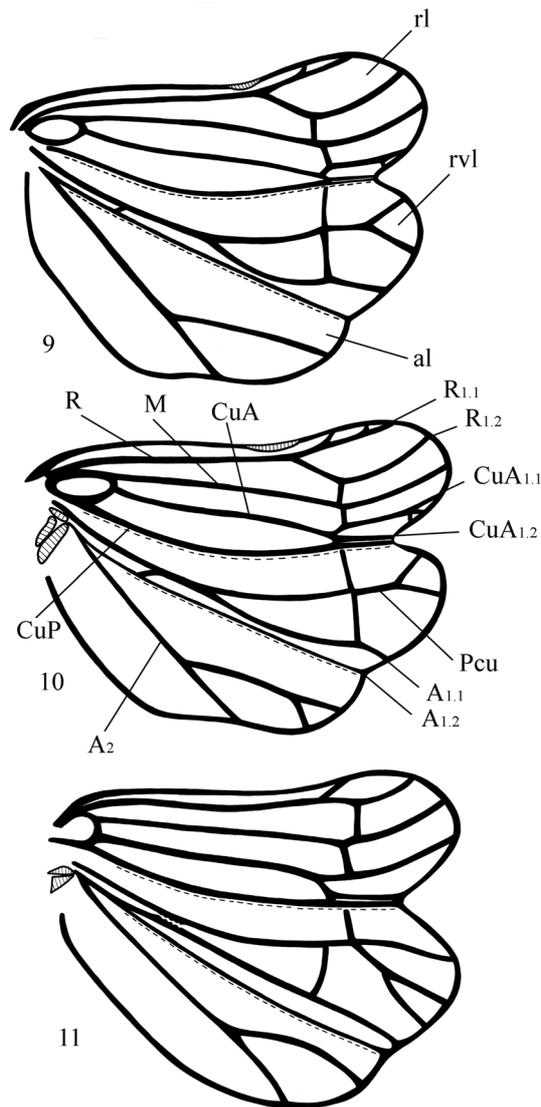
***Fowlerium* gen. n.**

Type species: *Thionia naso* Fowler, 1905.

Diagnosis. Metope elongate, with distinct median and sublateral carinae joined in one point on its upper margin (Doering 1938, Pl. 52: 8, 10). Coryphe elongate, with distinct median carina running from its anterior margin to its middle; anterior margin acutely angulately convex (Doering 1938, Pl. 51: 2, 5). Second and third segments of rostrum are almost equal in length; third segment narrowing apically (Fig. 18). Fore wings elongate, surpassing abdomen, with narrow hypocostal plate. Forewing vein sequence: R 2, furcating near to basal cell; M 2, furcating before wing middle; CuA 1. Clavus long, open—Pcu+A₁ runs into apex of clavus. Pcu fusing A₁ after middle of clavus. Hind wings 3-lobed, with deep cubital and anal clefts and without coupling lobe on its anterior margin. CuA₂ and CuP not fused apically, but connected by several transverse veins (Figs 12, 13). Pcu and A_{1,1} not fused medially, free. Hindwing sequence: R 2 r-m 1 M 1 m-cua 1 CuA 2 cua-cup 2-5 CuP 1 cup-pcu 1 Pcu 3 pcu-a₁ 1 A₁ 2 A₂ 2–4. Hind tibia with 2 lateral spines. First metatarsomere with a whole row of spines arranged in arc. Ventral aedeagal hooks slightly furcating subapically (Doering, 1938, Pl. 55: 1, 7, 8). Ovipositor with rounded gonoplacs. Hind margin of VII sternum with large semicircular process.

Etymology. Genus named in honor of famous British entomologist William Weeks Fowler (1849–1923) who describing *Thionia naso* had doubts on its generic position already (Fowler 1905: 125). Neuter in gender.

Composition. In addition to type species *Thionia producta* Van Duzee, 1908 and *T. acuta* Doering, 1941 also belong to this genus.



FIGURES 9–11. Thioniina, hind wing. 9—*Cheiloceps musca* Uhler; 10—*Cheiloceps argo* (Fennah); 11—*Aplos simplex* (Germar). Abbreviations: rl—remigial lobe; rvl—remigio-vannal lobe; al—anal lobe.

***Fowlerium naso* (Fowler, 1905), comb. n.**

Figs 12, 18

Thionia naso Fowler, 1905: 124, Tab. 12, figs 21, 21a.

Material examined. Mexico: 1♂, 1♀, “Mexico, Pue., Hwy. / 131.5 mi S. Teziutlan / 7500’”, 18 Aug. 1982 C.W. & / L. O’Brien & G. Wibmer”, “on *Alnus / jorulensis*” (ZIN); 1♀, “100 km S Cd Viktoria, 1900 m, El Cielo Reserve, 24.X.1998, D.R. Kasparyan” (ZIN); 1♂, 1♀, “Mexico, Hgo. 33 mi / NE. Jacala, 3700’ / 27.V.1974, C.W. & L. / O’Brien & Marshall” (ZIN).

***Fowlerium acutum* (Doering, 1941), comb. n.**

Thionia acuta Doering, 1941: 214.

Thionia naso: Doering 1938: 463, Pl. 51: 5, Pl. 52: 10, Pl. 53: 4, Pl. 55: 1, Pl. 56: 10.

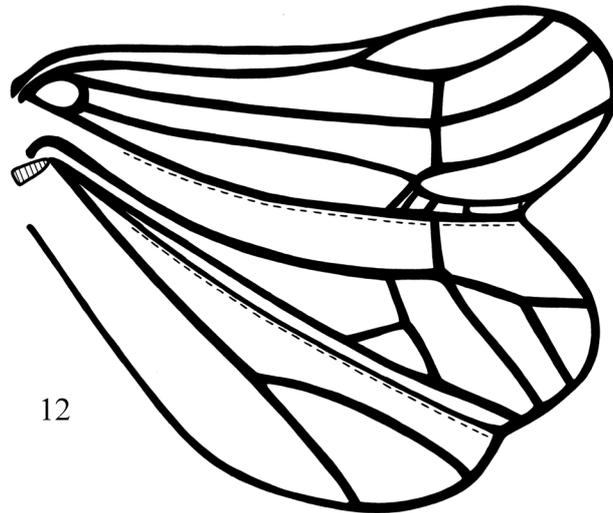
Note. Transferred to the genus according to original description (Doering 1938, 1941).

***Fowlerium productum* (Van Duzee, 1908), comb. n.**

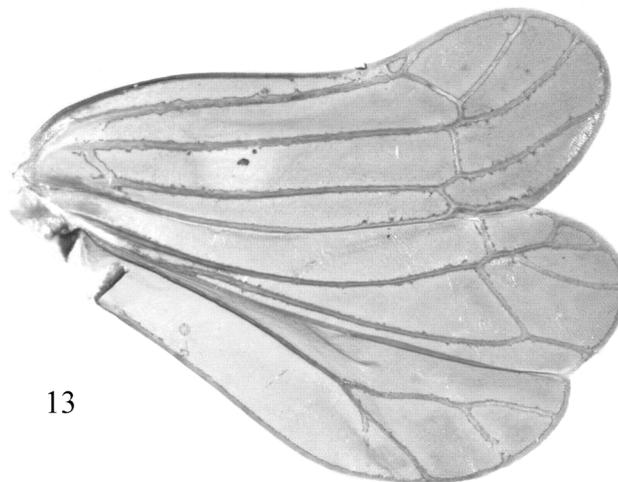
Fig. 13

Thionia producta Van Duzee, 1908: 494.

Material examined. USA: 1♂, “Tex. Big Bend / N. P. 4.VI.1970 / Chisos Basin / C.W. O’Brien” (ZIN); 1♂, 1♀, “Big Bend N.P. / Tex. 5300’ / Green Gulch / 3.VI.1970 // on *Juniperus monosperma* / C.W. O’Brien” (ZIN); 1♀, “Tex. Pine Sprgs / Culberson Co. / night 18.8.1970 / C.W. O’Brien” (ZIN).



12



13

FIGURES 12–13. *Fowlerium* spp., hind wing. 12—*F. naso* (Fowler); 13—*F. productum* (Van Duzee).

***Aplos* gen. n.**

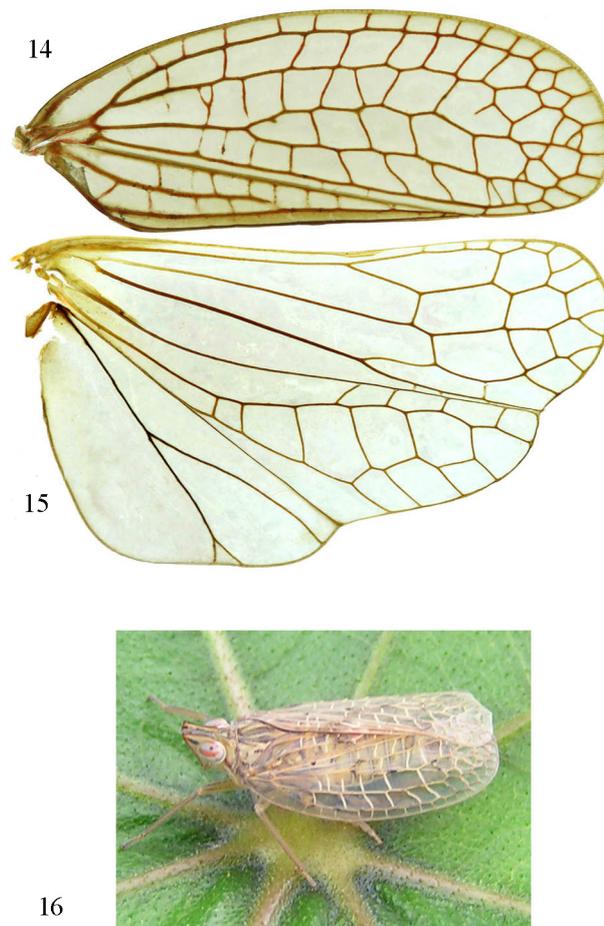
Type species: *Issus simplex* Germar, 1830.

Diagnosis. Metope wide, with distinct median carina running from its upper margin to metopoclypeal suture and very weak sublateral carinae visible only in its upper part and joined median carina below upper margin of metope (Gnezdilov & Poggi 2014, fig. 3); lateral margins convex. Coryphe transverse, 1.5 times as wide as long at midline, with weak incomplete median carina (Gnezdilov & Poggi 2014, fig. 1). Second and third segments of rostrum are almost equal in length; third segment narrowing apically. Fore wings elongate, surpassing abdominal apex, with narrow hypocostal plate. Forewing vein sequence: R 2, furcating very close to basal cell; M 3, first furcation in basal third of the wing, second furcation in apical third; CuA 1 (Gnezdilov & Poggi 2014, fig. 2). Clavus long,

open—Pcu+A₁ runs into apex of clavus. Pcu fusing A₁ after middle of clavus (Gnezdilov & Poggi 2014, fig. 1). Hind wings 3-lobed, with deep cubital cleft and without coupling lobe on its anterior margin (Fig. 11). Hind wing vein sequence: R 2 r-m 1 M 1 m-cua 1 CuA 2 cua-cup 1 CuP 1 cup-pcu 1 Pcu 3 pcu-a₁ 1 A₁ 2 A₂ 2. Hind tibia with 2 lateral spines in its apical half. First metatarsomere with a whole row of spines arranged in arc. Dorso-lateral phallobase lobes fused dorsally, poorly sclerotized apically. Each dorso-lateral phallobase lobe with a large hook-shaped apical process (Doering 1938, Pl. 55: 2).

Etymology. Generic name derived from Greek “Ἀπλός” (simple). Masculine in gender.

Composition. Apparently *Thionia bullata* (Say, 1830) (originally *Flata bullata* Say, 1830) also belongs to this genus according to the structure of phallobase bearing hook-shaped apical process, however, this species differs from the type species by furcating subapically ventral aedeagal hooks (Doering 1938, Pl. 55: 10) and distinct sublateral carinae of metope (Bartlett *et al.* 2014, fig. 86D). The correct taxonomic position of this species needs to be confirmed.



FIGURES 14–16. *Oronoqua ibisca* Gnezdilov, Bonfils, Aberlenc et Basset. 14—fore wing; 15—hind wing; 16—total view (after Gnezdilov *et al.* 2010). Total length of the specimen—14 mm.

***Aplos simplex* (Germar, 1830), comb. n.**

Fig. 11

Issus simplex Germar, 1830: 51.

Thionia simplex: Melichar 1906: 273.

Material examined. 1♂, Italy, Lombardia, 20 km N of Milan, Maresso, 6.IX.2014, F. Poggi leg. (ZIN).

Supplementary description. Male pygofer with almost straight hind margin, except slightly protruding medially. Ventral phallobase lobe long and wide, narrowing apically. Apical aedeagal processes not narrowing

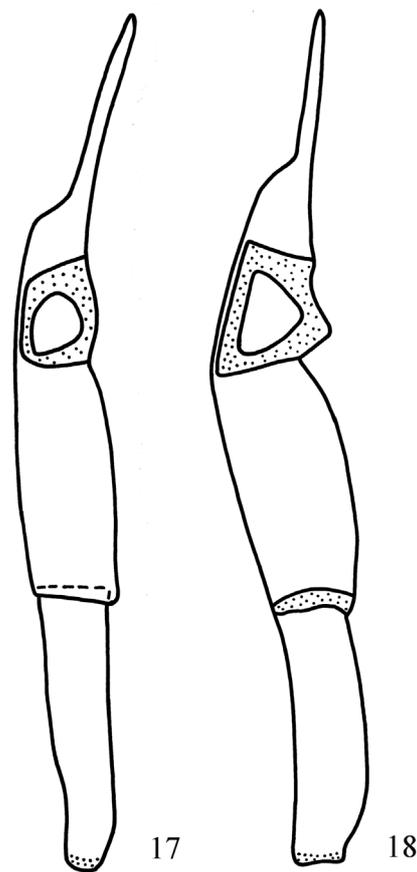
apically, truncate, well visible above upper margin of phallobase. Ventral aedeagal hooks arising in apical third of aedeagus, long, simple apically, directed to aedeagal base. Style massive, with almost straight hind margin, caudo-dorsal angle right. Capitulum of style long and narrow, narrowing apically (in dorsal view); lateral tooth wide; apical tooth small. Anal tube long and narrow, narrowed medially and widely rounded apically (in dorsal view), flat (in lateral view). Anal column short.

Subtribe *Oronoquina* subtrib. n.

Type genus: *Oronoqua* Fennah, 1947

Diagnosis. Fore wings elongate, opaque, with its apices overlapping and with many transverse veins between longitudinal veins (Figs 14, 16). Forewing vein sequence: R 2, furcating near to basal cell; M 2–3, furcating before wing middle; CuA 1. Clavus long, open –Pcu+A₁ runs into apex of clavus. Pcu fusing A₁ at middle of clavus. Hind wings as long as fore wings, 3-lobed, with remigial, remigio-vannal, and anal lobes wide; cubital cleft weak (Fig. 15). Hindwing vein sequence: apical parts of CuA_{1,2} and CuP are closely situated, with several transverse veins between them, not fused; Pcu and A_{1,1} not fused, with several transverse veins between them; A₂ 3. Distal parts of R, M, CuA, CuP, Pcu, and A_{1,1} with many transverse veins between them.

Composition. The genus *Oronoqua* Fennah with two species known from Guyana, French Guiana, and Panama (Gnezdilov *et al.* 2010).



FIGURES 17–18. Thioniina, rostrum in lateral view. 17—*Cheiloceps musca* Uhler; 18—*Fowlerium naso* (Fowler).

Thioniini incertae sedis

All other species still currently placed in the genus *Thionia* are provisionally placed in *Thioniini incertae sedis* awaiting for their new generic placement.

Discussion

The genera *Picumna* Stål, 1864, *Proteinissus* Fowler, 1905, and *Amphiscepa* Germar, 1830 differ from most of American genera examined up to now according to hind wing venation (Gnezdilov 2012; Gnezdilov & Bartlett 2018 and original data) by simple second anal vein (A_2 1) which is a character of Old World Issidae. Molecular study of the family by Wang *et al.* (2016) showed isolated position of *Picumna* from Thioniinae and its placement near to Hemisphaeriinae. However if *Picumna* and *Proteinissus* have 3-lobed hind wings with anal lobe of vannus well developed, *Amphiscepa* has almost one-lobed hind wing with anal lobe of vannus rudimentary. Apparently the simplification of second anal vein in *Amphiscepa* is connected with reduction of anal lobe. Finally the genus *Ulixes* Stål, 1862 has one-lobed hind wing with anal lobe of vannus reduced. Thus the taxonomic position of these genera is still unclear and needs further morphological and molecular studies.

Hind wing anastomosis between Pcu and $A_{1,1}$ known in Neotropical, Oriental, and Australian issid taxa is unstable character and apparently may appear and disappear independently in different taxa during the evolution of the group. This condition is very characteristic for Oriental and Australian taxa, however, already in the tribe Parahiraciini *Nisoprincessa palawana* Gnezdilov, 2017 has long anastomosis (Gnezdilov 2017b, fig. 13), *Scantinius bruchoides* (Walker, 1858)—short anastomosis (Gnezdilov 2012, fig. 3), and the genera *Thabenula* Gnezdilov, Soulier-Perkins et Bourgoïn, 2011 and *Flavina* Stål, 1862 have the veins Pcu and $A_{1,1}$ free and just connected by several transverse veins (Gnezdilov *et al.* 2011, fig. 18C; Zhang *et al.* 2010, figs 23, 33). In this row of Parahiraciini taxa the genera *Scantinius* Stål, 1866 and *Nisoprincessa* Gnezdilov, 2017 are characterized by primitive hind wing structure as their wing 3-lobed with well developed anal lobe already rudimentary in other taxa with bilobed wings like *Thabenula* and *Flavina* (Gnezdilov & Wilson 2007, fig. 5). Finally in Neotropical ditypical genus *Waorania* Gnezdilov et Bartlett, 2018 one species with short anastomosis (Pcu + $A_{1,1}$) and another species—with Pcu and $A_{1,1}$ free (Gnezdilov & Bartlett 2018, figs 12, 25). These examples demonstrating that fusion or separation of postcubital and first anal veins of hind wings are easy happened in different groups and probably in both directions in accordance to functional needs.

Two new genera described above are marking beginning of revision of *Thionia sensu lato* which have to be continued by reexamination of all species currently included in this genus which is important for study of New World Issidae biodiversity and taxonomy.

Acknowledgements

I thank Dr. Gunvi Lindberg (NHRS, Stockholm, Sweden) for the photos of holotype of *Issus cinctifrons*, Dr. Lois O'Brien (Arizona, USA) and Dr. Stuart McKamey (USNMNH, Washington, USA) for provided me with the species of *Cheiloceps* and *Aplos*, Dr. Philippe Cuenoud (Geneva, Switzerland) and Dr. Yves Basset (Panama, Panama) for the photo of *Oronoqua ibisca*, Dr. Jamie N. Zahniser and Ms. Daniella T. Garcia (USDA-APHIS-PPQ, Washington, USA) for the photos of cotype of *Cheiloceps musca*, and Prof. Dr. Thierry Bourgoïn (Paris, France) for his valuable comments on the manuscript. My study is performed in the frame of the state research project AAAA-A17-117030310210-3 and supported by the Russian Foundation for Basic Research (grant № 18-04-00065).

References

- Bartlett, C.R., O'Brien, L.B. & Wilson, S.W. (2014) A review of the planthoppers (Hemiptera: Fulgoroidea) of the United States. *Memoires of the American Entomological Society*, 50, 1–187.
- Bourgoïn, T., Wang, R.R., Asche, M., Hoch, H., Soulier-Perkins A., Stroiński, A., Yap, S. & Szwedó, J. (2014) From micropterism to hyperpterism: recognition strategy and standardized homology-driven terminology of the forewing venation patterns in planthoppers (Hemiptera: Fulgoromorpha). *Zoomorphology*, 134, 63–77. <https://doi.org/10.1007/s00435-014-0243-6>
- Caldwell, J.S. & Martorell, L.F. (1951) [dated 1950]. Review of the Auchenorynchous [sic] Homoptera of Puerto Rico. Part 2. The Fulgoroidea except Kinnaridae. *Journal of Agriculture of University of Puerto Rico*, 34 (2), 133–269.
- Doering, K.C. (1938) A contribution to the taxonomy of the subfamily Issinae in America north of Mexico (Fulgoridae, Homoptera). Part 2. *The University of Kansas Science Bulletin*, 25 (20), 447–575.

- Doering, K.C. (1941) A contribution to the taxonomy of the subfamily Issinae in America north of Mexico (Fulgoroidea, Homoptera). Part 4. *The University of Kansas Science Bulletin*, 27 (10), 185–233.
- Fennah, R.G. (1955) Lanternflies of the family Issidae of the Lesser Antilles (Homoptera: Fulgoroidea). *Proceedings of United States National Museum*, 105 (3350), 23–47.
<https://doi.org/10.5479/si.00963801.105-3350.23>
- Fennah, R.G. (1965) New species of Fulgoroidea (Homoptera) from the West Indies. *Transactions of the Royal Entomological Society of London*, 117, 95–126.
<https://doi.org/10.1111/j.1365-2311.1965.tb00048.x>
- Fowler, W.W. (1905) Family Issidae. Order Rhynchota. Suborder Hemiptera-Homoptera. Insecta (Continued). *Biologia Centrali-Americana; contributions to the knowledge of the fauna and flora of Mexico and Central America*, 1, 113–129.
- Germar, E.F. (1830) Species Cicadarium enumeratae et sub genera distributae. *Entomologisches Archiv*, 2 (2), 1–57.
- Gnezdilov, V.M. (2003) Review of the family Issidae (Homoptera, Cicadina) of the European fauna, with notes on the structure of ovipositor in planthoppers. *Chteniya pamyati N.A.Kholodkovskogo (Meetings in memory of N.A. Cholodkovsky)*, St. Petersburg, 56 (1), 1–145. [in Russian with English summary]
- Gnezdilov, V.M. (2012) Revision of the tribe Colpopterini Gnezdilov, 2003 (Homoptera, Fulgoroidea, Nogodinidae). *Entomologicheskoe obozrenie*, 91 (4), 757–774, 4 photo plates. [English translation published in *Entomological Review*, 93 (3), 337–353]
<https://doi.org/10.1134/S0013873813030081>
- Gnezdilov, V.M. (2013) Modern classification and the distribution of the family Issidae Spinola (Homoptera, Auchenorrhyncha, Fulgoroidea). *Entomologicheskoe obozrenie*, 92 (4), 724–738. English translation published in *Entomological Review*, 94 (5), 687–697.
<https://doi.org/10.1134/S0013873814050054>
- Gnezdilov, V.M. (2017a) Notes on higher classification of the family Nogodinidae (Hemiptera: Auchenorrhyncha: Fulgoroidea), with description of new tribe and new species. *Far Eastern Entomologist*, 347, 1–21.
<https://doi.org/10.25221/fee.347.1>
- Gnezdilov, V.M. (2017b) New genus and species of the tribe Parahiraciini (Hemiptera, Fulgoroidea, Issidae) from the Philippines and Vietnam. *Acta Zoologica Academiae Scientiarum Hungaricae*, 63 (4), 429–442.
<https://doi.org/10.17109/AZH.63.4.429.2017>
- Gnezdilov, V.M. & Bartlett, C.R. (2018) New genus and two new species of the family Issidae (Hemiptera, Auchenorrhyncha: Fulgoroidea) from Amazonian Ecuador. *Proceedings of the Entomological Society of Washington*, 120 (1), 62–75.
<https://doi.org/10.4289/0013-8797.120.1.62>
- Gnezdilov, V.M., Drosopoulos, S. & Wilson, M.R. (2004) New data on taxonomy and distribution of some Fulgoroidea (Homoptera, Cicadina). *Zoosystematica Rossica*, 12 (2), 217–223.
- Gnezdilov, V.M., Bonfils, J., Aberlenc, H.-P. & Basset, Y. (2010) Review of the Neotropical genus *Oronoqua* Fennah, 1947 (Insecta, Hemiptera, Issidae). *Zoosystema*, 32 (2), 247–257.
<https://doi.org/10.5252/z2010n2a3>
- Gnezdilov, V.M. & Poggi, F. (2014) First record of Nearctic issid planthopper *Thionia simplex* (Hemiptera: Fulgoroidea: Issidae) from Europe. *Zoosystematica Rossica*, 23 (2), 238–241.
- Gnezdilov, V.M., Soulier-Perkins, A. & Bourgoïn, T. (2011) Fieber's original drawings and their corresponding types for the family Issidae (Hemiptera, Fulgoromorpha) in the Muséum national d'Histoire naturelle of Paris, France. *Zootaxa*, 2806, 24–34.
- Gnezdilov, V.M., Holzinger, W.E. & Wilson, M.R. (2014) The Western Palaearctic Issidae (Hemiptera, Fulgoroidea): an illustrated checklist and key to genera and subgenera. *Proceedings of the Zoological Institute RAS*, 318 (Supplement 1), 1–124. Available from: http://www.zin.ru/journals/trudyzin/doc/vol_318_s1/TZ_318_1_Supplement_Gnezdilov.pdf (Accessed 13 Jun. 2018)
- Gnezdilov, V.M. & Wilson, M.R. (2007) Review of the genus *Scantinius* Stål with notes on the tribe Parahiraciini Cheng & Yang (Hemiptera: Auchenorrhyncha: Fulgoroidea: Issidae). *Arthropod Systematics & Phylogeny*, 65 (1), 101–108.
- Gnezdilov, V.M. & Dmitriev, D.A. Proposed designation of a neotype for *Issus longipennis* Spinola, 1839, the type species of *Thionia* Stål, 1859 (Hemiptera: Auchenorrhyncha: Fulgoroidea: Issidae). *Zoosystematica Rossica*, 27 (1). [in press]
- Grimaldi, D. & Engel, M.S. (2005) *Evolution of the insects*. Cambridge University Press, Cambridge, 775 pp.
- Melichar, L. 1906. Monographie der Issiden (Homoptera). *Abhandlungen der K. K. Zoologisch-botanischen Gesellschaft in Wien*, 3 (4), 1–327.
- Say, T. (1830) Descriptions of new North American hemipterous insects, belonging to the first family of the section Homoptera of Latreille. *Journal of the Academy of Natural Sciences of Philadelphia*, 6, 235–244.
- Spinola, M. (1839) Sur les Fulgorelles, sous-tribu de la tribu des Cicadaïres, ordre des Rhyngotes. Suite. *Annales de la Société Entomologique de France*, 8, 339–454.
- Stål, C. (1854) Nya Hemiptera. *Öfversigt af Kongliga Svenska Vetenskaps-Akademiens Förhandlingar*. Stockholm, 11, 231–255.
- Stål, C. (1859) Novae quaedam Fulgorinorum formae speciesque insigniores. *Berliner Entomologische Zeitschrift*. Berlin, 3, 313–327.
<https://doi.org/10.1002/mmnd.18590030405>

- Stål, C. (1862) Nova methodus familias quasdam Hemipterorum disponendi. *Ofversigt af Kongliga Svenska Vetenskaps-Akademiens Förhandlingar*, 18, 195–212.
- Stål, C. (1864) Hemiptera mexicana enumeravit speciesque novas descripsit. (Continuatio.). *Entomologische Zeitung. Herausgegeben von dem entomologischen Vereine zu Stettin*, 25(1–3), 49–86.
- Uhler, P.R. (1895) An enumeration of the Hemiptera-Homoptera of the Island of St. Vincent, W. I. *Proceedings of the Zoological Society of London*, 1895, 55–84.
- Van Duzee, E.P. (1890) Synonymy of the Homoptera described by Say, Harris and Fitch. *Psyche*, 5, 387–391.
<https://doi.org/10.1155/1890/84393>
- Van Duzee, E.P. (1908) Studies in North American Fulgoridae. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 1907, 467–498.
- Wang, M.-L., Zhang, Y.-L. & Bourgoïn, T. (2016) Planthopper family Issidae (Insecta: Hemiptera: Fulgoromorpha): linking molecular phylogeny with classification. *Molecular Phylogenetics and Evolution*, 105, 224–234.
<https://doi.org/10.1016/j.ympev.2016.08.012>.
- Zhang, Y.L., Che, Y.L., Wang, Y.L. & Webb, M.D. (2010) Two new species of the planthopper genus *Flavina* Stål (Hemiptera: Fulgoromorpha: Issidae) from China. *Zootaxa*, 2641, 27–36.