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Rajburicoris, a new genus of Cardiastethini, and discussion of the systematic position of *Dufouriellus* (Hemiptera: Heteroptera: Anthocoridae)

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Abstract. *Rajburicoris stysi* gen. nov. and sp. nov. from Thailand is described and the male and female genitalia are examined and illustrated. A review of the diagnostic characters of the tribe Cardiastethini Carayon, 1972, nom. restit., is given. The systematic position of the controversial genus *Dufouriellus* Kirkaldy, 1906, is discussed and the genus is transferred to Anthocorini; Dufouriellini Van Duzee, 1916, syn. nov., becomes a junior synonym of Anthocorini.

Key words. Heteroptera, Anthocoridae, Cardiastethini, *Dufouriellus*, *Rajburicoris stysi*, taxonomy, new genus, new species, Thailand

Introduction

The tribe Cardiastethini was erected by CARAYON (1972) and characterized mainly by the vestigial female genitalia; it is distributed worldwide and includes 15 genera. ŠTYS (1975) noted that the valid name of the tribe was Dufouriellini because one of the genera included by Carayon in his new tribe, *Dufouriellus* Kirkaldy, 1906, was the type genus of Dufouriellinae Van Duzee, 1916.

The results of our studies of the Anthocoridae sensu lato and particularly of the genus *Cardiastethus* Fieber, 1860, and its relatives have been only partially published with the description of a new genus (CARPINTERO & DELLAPÉ 2006). In this contribution we describe a new genus and species from Thailand. We also redefine the Cardiastethini based on known and new characters, and redescribe the genus *Dufouriellus* and exclude it from the tribe.

Material and methods

Specimens examined belong to the following collections:

DCBA Diego L. Carpintero Collection, Buenos Aires, Argentina;
MACN Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina;
USNM National Museum of Natural History, Washington, D.C., USA.

The slide-mounted specimens were cleared in a 10% solution of potassium hydroxide and mounted in Canada balsam. Drawings of the genitalia were made from mounted specimens using a binocular compound microscope with attached camera lucida. Scanning electron micrograph was made from a specimen mounted on a stub, sputter coated with gold-palladium alloy, and examined under a JEOL T-100 SEM microscope. Measurements are given in millimetres.

Taxonomy

Rajburicoris gen. nov.

Type species. *Rajburicoris stysi* sp. nov.

Description. Male (Fig. 1). Dorsal surface smooth except rough pronotum, with uniformly distributed, dense, erect hairs.

Head produced anteriorly; row of hairs at level of posterior border of eyes present; eyes attaining 2/3 of head length, surpassing ventral outline and slightly surpassing dorsal outline of head in lateral view; almost reaching the rostrum in ventral view; frons straight, finely punctate; ocelli large and elevated. Rostrum slightly surpassing middle coxae. Antennae: thick, pedicellus thinner basally; long and erect hairs uniformly distributed, some of them longer than width of segment.

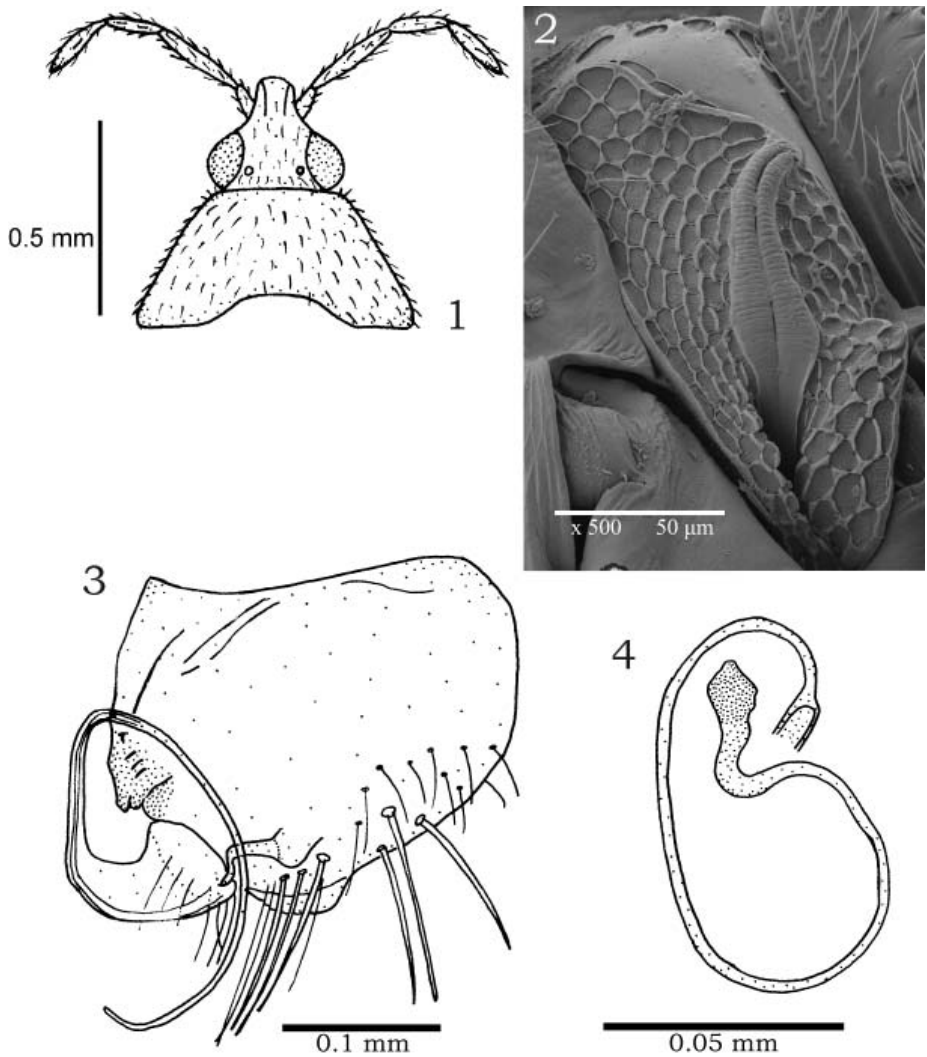
Thorax. Pronotum with carinate lateral margin; collar present, narrow; anterior and posterior lobe well delimited by transversal sulcus; basal margin slightly concave. Scutellum with basal transversal sulcus; central parastigmatic fossulae absent, basal pair of parastigmatic fossulae present on basal third of lateral margin. Exocorium without flattened bristles. Ratio of width of apex of exocorium (between C and Sc) to endocorium equal to 0.5. Sc vein long, parallel to R + M, near to C. Cuneal fracture not fused. Stubs of membrane present, long. Tibiae with short hairs. Fore tibiae with long spines on apical half. Fossula spongiosa on anterior legs absent. Hind tibiae curved, with interior row of long hairs, 2.5 times as long as tibia wide. Metapleural scent gland sulcus slightly curved backwards and continued as thin sinuate carina directed forwards (Fig. 2). Supracoxal area restricted to basal margin of metapleura. Subdorsal area wide, extending over the carina. Metasternum with apical margin rounded, only longitudinal sulcus present.

Genitalia. Pygophore (Fig. 3) with irregular and short parameroid. Left paramere very long, thin and acute, widened basally.

Female. Genitalia. Omphalus (Fig. 4) with extremely long spermatic tube, located near anterior margin of abdominal sternite 7; last sternite prolonged medially at its posterior margin.

Differential diagnosis. This new genus is closely related to *Alofa* Herring, 1976, and *Buchananiella* Reuter, 1884, by the morphology of the male genitalia, but it can be easily separated by the particular shape of paramere and omphalus (Figs. 3-4).

Etymology. The generic name refers to the Thai province where the specimens were collected. The gender is masculine.



Figs. 1-4. *Rajburicoris stysi* sp. nov. 1 – head and pronotum; 2 – metapleura; 3 – male genitalia; 4 – female genitalia, omphalus and spermatic tube.

Rajburicoris stysi sp. nov.

Type locality. Thailand, Rajburi, Banpong-muang.
Type material. HOLOTYPE: ♂ (slide mounted), 'Thailand, Rajburi, Banpong-muang, 15-IV-1952, R. E. Elbel collector' (USNM). PARATYPES: ♀ (slide mounted), same data as holotype (USNM); ♂ (pinned), same data as holotype, 2-III-1952 [left antenna missing, hemelytra glued on separate card] (MACN).

Description. Male. Structure as in generic description. Head, pronotum and scutellum dark reddish brown; hemelytra pale brown and slightly translucid except dark reddish-brown cuneus. Ventral surface brown; legs and rostrum yellowish. Antennae yellowish except darker apex of pedicellus. Sulcus of metapleural scent gland (Fig. 2) with elongate central groove, reaching the carina and with perpendicular canaliculi over all its extent. Subdorsal area well developed. Evaporatorium with elongate hat-like and short bridge-like structures, trabeculae parallel and shallow.

Measurements (paratype, all in mm). Total length: 2.25; width: 0.80. Head: length 0.29; width 0.35; width of vertex 0.12. Lengths of antennal segments: scapus 0.09; pedicellus 0.30; basiflagellomere 0.19; distiflagellomere 0.20. Pronotum: length 0.30; width at base 0.68. Exocorium / endocorium ratio: 0.5.

Female. Similar to male in shape and measurements.
Etymology. This species is named in honour of Prof. Pavel Štys.
Distribution. Central Thailand, Rajburi province.

Redefinition of the tribe Cardiastethini and discussion of the systematic position of the genus *Dufouriellus*

CARAYON (1972) revised the higher classification of the Anthocoridae and erected the Cardiastethini to included ten genera: *Amphiareus* Distant, 1904, *Brachysteles* Mulsant & Rey, 1852, *Buchananiella* Reuter, 1884, *Cardiastethus* Fieber, 1860, *Dufouriellus* Kirkaldy, 1906, *Dysepicritus* Reuter, 1884, *Physopleurella* Reuter, 1884, *Tiare* Herring, 1967, *Xylocoridea* Reuter, 1875, and *Xyloecocoris* Reuter, 1879. He mentioned the following tribal characters: 'Female genitalia vestigial, formed by a pair of lamellae and generally tapered in most of its part by the sternite VII, protruding backwards. Tegumentary copulation in posterior region of abdomen, generally ventral, sometimes dorsal and exceptionally on the right side [as in *Cardiastethus uhleri* Carayon, 1972] [...] seminal mesodermic conceptacles of many types, different from *Xylocoris* Dufour, 1831'. Carayon also gave some other characters such as: '[...] Male [with] phallus very small and inapparent. Testicles with two lobes [...] clavus without large punctures. Metatibiae without setae differentiated from the rest of pilosity; foretibiae without fossula spongiosa or smaller than the diameter of the tibiae, and absent in meso- and metatibiae; rostrum short not surpassing the mesocoxae [rostrum attaining the metasternum in an undescribed *Cardiastethus* species from Central America]; paramere, normally simple with a median sulci [as in the majority of Anthocoridae sensu lato] but sometimes complex [as in *Buchananiella* and *Alofa*]. Ectospermalege normally absent, when present very variable but rarely as a copulator tube'. Many of these characters are shared with members of others tribes or vary within the Cardiastethini.

After CARAYON's (1972) paper, four new genera were included in the tribe: *Indocoris* Muraleedharan & Anantakrishnan, 1978, *Dolostethus* Henry & Herring, 1978, *Shujaocoris*

Table 1. Comparative table of character states of *Dufouriellus* Kirkaldy, 1906 and Cardiastethini genera.

Characters	***Dufouriellus***	**Cardiastethini**
Row of hairs behind eyes	Absent	Present
Position of ocelli	Behind eyes; interocellar distance wider than interocular distance	On vertex between eyes
Antennal setae	Hairs on segments III and IV, less than two times as long as width of segment	Hairs on segments III and IV, three times as long as width of segment
Scutellar foveolae	Absent	Present, sometimes vestigial
Tibial teeth or spines	Absent	Always present
Sulci on metasternum	Absent	With a longitudinal median and/or transversal subapical sulcus
Dorsal surface	Subglabrous	Pilose
Subapical transversal suture on sternite II	Straight	Sinuate
Central transversal row of orifices (glands?) on terga II to VII	Absent	Present (at least sparse)
Female sternite VII	Not prolonged	Frequently prolonged
Ectospermalege	Absent	Frequently present

Ghauri, 1988, and *Pehuencoris* Carpintero & Dellapé, 2006. Moreover, Herring (1976) established the genus *Alofa* to include *Cardiastethus sodalis* Buchanan-White, 1879, and the genus *Dasypterus* Reuter, 1871, was restored from synonymy with *Cardiastethus* by Carpintero (2002).

Dufouriellus has an isolated position among the Cardiastethini. Its inclusion in this tribe solely on the account of 'vestigial female genitalia' is controversial. The development of the female genitalia varies among the Anthocoridae (sensu lato), and they sometimes appear vestigial or more or less developed to a different degree.

Below, we present additional characters to improve the diagnosis given by Carayon (1972), and exclude *Dufouriellus* from the Cardiastethini (see Table 1):

Head. All the Cardiastethini present a transversal row of hairs (continuous or not) with a little point at its base on the head behind the eyes. The row is absent in *Dufouriellus*.

Ocelli. The relative position of the ocelli is also constant. The Cardiastethini have the ocelli on the vertex between the eyes, a character shared with *Calliodina* Carayon, 1972 (Scolopini), Xylocorini, and Almeidini among the Anthocorinae (Anthocoridae sensu Schuh & Slater (1995)). In the rest of the tribes, the ocelli are placed behind the line of the eyes. *Dufouriellus*, as well as most of the Scolopina and Anthocorini, has the ocelli more separated than eyes.

Antennae. The Cardiastethini have long setae on basi- and distiflagellomere, three times as long as the width of the respective segment. *Dufouriellus* as well as the Anthocorini, Oriini and some Scolopina have these setae less than two times as long as the width of the segment.

Scutellar foveolae. All the Cardiastethini possess scutellar foveolae (vestigial in *Pehuencoris*). *Dufouriellus* lacks scutellar foveolae.

Tibial teeth or spines. The majority of the Anthocoridae (sensu lato) present spines or teeth on the tibiae. They are present in most of the Lasiochilinae and Lyctocorinae (Lasiochilidae and Lyctocoridae sensu SCHUH (1986)) and Anthocorinae (except the Anthocorini). *Dufouriellus* lacks tibial teeth or spines.

Metasternum. All the Cardiastethini have a longitudinal median and/or a transversal subapical sulcus, which is absent in *Dufouriellus*.

Pilosity. All the Cardiastethini have a pilose dorsal body surface, *Dufouriellus* is subglabrous.

Sternite II. In the Cardiastethini the subapical transversal suture on sternite II is sinuated, in *Dufouriellus* straight.

Terga II to VII. The Cardiastethini possess a central transversal row of orifices of unknown function. These are absent in *Dufouriellus*.

Sternite VII. The sternite projects medially over segment VIII in females of all Cardiastethini but is never prolonged in *Dufouriellus*.

Ectospermalege. Frequently present in Cardiastethini, absent in *Dufouriellus*.

We conclude that *Dufouriellus* is not a member of the Cardiastethini and must be excluded from this group. It is transferred to the Anthocorini (Anthocorinae) because of the relative position of the ocelli, length of antennal setae, and the lack of a transversal row of hairs on the head, tibial teeth or spines, and dorsal pilosity. Females of some genera of the Anthocorini have, similar to *Dufouriellus*, reduced genitalia (CARAYON 1972) and future investigations could reveal the affinities of *Dufouriellus* within this group.

Following this change, the name Dufouriellini Van Duzee, 1916, becomes a junior synonym of Anthocorini Fieber, 1836. Subsequently, we restore the name Cardiastethini Carayon, 1972, for the group presently named as Dufouriellini.

Redescription of *Dufouriellus* Kirkaldy, 1906

Dufouriellus Kirkaldy, 1906

Dufouriellus Kirkaldy, 1906: 121. Type species: *Xylocoris ater* Dufour, 1833, by monotypy.
Dufouriellus: PÉRICART (1972) (redescription); HENRY (1988) (catalogue); PÉRICART (1996) (catalogue); CARPINTERO (2002) (catalogue).

Material examined. *Dufouriellus ater*. **ARGENTINA:** 1 ♀, Buenos Aires (City), 7.ix.1908, J. B. (DCBA); 1 ♂ 4 ♀♀, Buenos Aires (Province) (DCBA); 3 ♂♂ 2 ♀♀, J. C. Paz, iv.1969 (DCBA); 1 ♀, Lezama, xi.1968 (DCBA). **CHILE:** 1 ♂, Curicó, Los Niches, xii.1996, leg. J. E. Barriga (DCBA); 1 ♀, Fundo, El Coihue, 15 km E. Potrero Grande, ii.1998, Malaise trap, J. E. Barriga (DCBA); 1 ♂ 1 ♀, Aconcagua, San Felipe,18.iii.1981, R. H. González (DCBA).

Redescription. Male. Subglabrous and smooth except a row of shallow punctures on basal half of corial margin of claval suture.

Head. Rostrum reaching fore coxae. Row of setae behind posterior margin of eyes absent.

Thorax. Scutellar foveolae absent. Exocorium without flattened setae. Ratio between apex of exocorium (between veins C and Sc) and endocorium (between Sc and claval suture): equal to 1 : 2.67. Sc long, reaching cuneus. Cuneal fracture well marked. Stub of membrane

absent. Tibiae without teeth. Fossula spongiosa absent in all legs. Scent gland channel large, little protruded, curved anteriorly, almost reaching anterior margin of metapleuron and with short carina reaching that margin, groove short and straight. Supracoxal area restricted to margin of metapleuron. Subdorsal area wide, specially towards middle of dorsal margin of metapleuron. Evaporatorium with quadrangular hat-like structures, not limiting a well-defined alveolus, and perpendicular trabeculae joining 4-6 adjacent hats. Apical margin of metasternum rounded, without apical sulci.

Genitalia. Pygophore without specialized formations.

Female. Abdomen without evident meso- or ectodermic genital structures.

Distribution. This genus includes a single species, *Dufouriellus ater* (Dufour, 1833), distributed in the Holarctic and southern Neotropical Regions.

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