

The species of *Gonocnemis* and *Paragonocnemis* from Borneo with notes on synonymy in the Oriental species (Coleoptera: Tenebrionidae)

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Abstract. Specimens of the genera *Gonocnemis* J. Thomson, 1858 and *Paragonocnemis* Kraatz, 1899 collected on Borneo are evaluated. The following species have been found: *Gonocnemis borneensis* Ardoïn, 1964, *G. sericeus sericeus* (Fabricius, 1801), *G. sumatrensis* Pic, 1915, *Paragonocnemis* (*Borneogonocnemis*) *ruficolor* (Pic, 1936), and *P. (B.) ardoïni* Bremer, 1991. Additional newly described and illustrated species are *Gonocnemis fouquei* sp. nov. and *G. schawalleri* sp. nov. The status of *P. (B.) ardoïni* Bremer, 1991 and *P. (B.) velutinus* Bremer, 1998 is discussed. The following new synonymies are proposed: *Gonocnemis minutus* Pic, 1915 = *G. minutissimus* Pic, 1916, syn. nov. (the species occurs in Thailand, Laos, and Cambodia), and *Paragonocnemis* (*Borneogonocnemis*) *ardoïni* Bremer, 1991 = *P. (B.) velutinus* Bremer, 1998, syn. nov.

Key words. Coleoptera, Tenebrionidae, Amarygmini, *Gonocnemis*, *Paragonocnemis*, new species, new synonymy, Borneo, Indonesia, Malaysia, Oriental Region

Introduction

Borneo is rich in genera and species of the tribe Amarygmini Gistel, 1848 of the family Tenebrionidae. The majority of species belong to the genus *Amarygmus* Dalman, 1823, and a few to the genera *Gonocnemis* J. Thomson, 1858 and *Paragonocnemis* Kraatz, 1899. The Bornean species of the latter two genera have not yet been studied well.

Gonocnemis is rich in the Afrotropical Region (66 taxa) (e.g. ARDOÏN 1964a,b,c, 1965, 1976; BREMER 1997, 2001; SCHAWALLER 2014), but several species occur also in the Oriental Region (12 taxa) (ARDOÏN 1964d, MERKL 1992, BREMER 2006). Concerning *Paragonocnemis*, ARDOÏN (1964c) distinguishes four subgenera of which three with 13 taxa are distributed in the Afrotropical Region (ARDOÏN 1964c, SCHAWALLER 2014). In the Oriental Region only four taxa of the subgenus *Borneogonocnemis* Pic, 1936 are found (ARDOÏN 1964c, BREMER 1991,

1998). To date the following species of *Gonocnemis* and *Paragonocnemis* have been known from Borneo: *G. borneensis* Ardoïn, 1964, *G. sericeus sericeus* (Fabricius, 1901), *G. sumatrensis* Pic, 1915, *P. (B.) ruficolor* (Pic, 1936), and *P. (B.) ardoïni* Bremer, 1991 (with respect to the latter species see below). Regarding *G. astutus* Bremer, 2006 reported from Borneo by BREMER & LILLIG (2014) see remarks under *G. fouquei* sp. nov.

During the last two decades extensive collecting activities on Borneo have yielded many specimens of *Gonocnemis* and *Paragonocnemis*. Evaluation of this material is the topic of this paper. Besides comments on the already known species (including collection sites), two new species, *G. fouquei* sp. nov. and *G. schawalleri* sp. nov., are described and illustrated in the present paper.

Furthermore, synonyms of two *Gonocnemis* species known from Thailand, Laos, and Cambodia, and of two *Paragonocnemis* species hitherto known from Thailand and Borneo are established.

All specimens of *Gonocnemis* from Borneo for which information is available were collected at light or at night on bark of trees. Otherwise nothing is known concerning their habitat. Many African species of *Gonocnemis* develop in decaying fungal stacks of termitaries of the genus *Macrotermes* Holmgren, 1910 just after the death of the termites (GIRARD & LAMOTTE 1990, BREMER 1995). Many specimens of the Bornean *Gonocnemis* are immature. This is also true for the better known African *Gonocnemis*. Therefore their colouration is of minor importance for identification. This also applies to the shape of aedeagi. Besides a few exceptions (e.g. *Gonocnemis oberthueri* Ardoïn 1964 and *G. letestui* Pic, 1930), the shape of their aedeagi is rather uniform and of little use in species determination. Shape of body and antennae, however, is rather characteristic.

Material and methods

The studied material is deposited in the following collections:

BMNH	The Natural History Museum, London, United Kingdom (Dr. M. V. L. Barclay);
KACO	Collection of Dr. Kiyoshi Ando, Osaka, Japan;
RGCN	Collection of Dr. Roland Grimm, Neuenbürg, Germany;
FRCS	Forest Research Centre, Forest Department Sarawak, Kuching, Malaysia;
MNHN	Muséum National d'Histoire Naturelle, Paris, France (Drs. Claude Girard and Antoine Mantilleri);
NMPC	National Museum, Prague, Czech Republic (Dr. Jiří Hájek);
SMNS	Staatliches Museum für Naturkunde, Stuttgart, Germany (Dr. Wolfgang Schawaller);
ZSM	Zoologische Staatssammlung, München, Germany (Dr. Michael Balke).

Comments on already known species of *Gonocnemis*

Gonocnemis borneensis Ardoïn, 1964

(Figs 3a, 3b)

Gonocnemis borneensis Ardoïn, 1964d: 133–134 (original description). BREMER (2006): 6 (photograph).

Type locality. Indonesia, South Kalimantan Province, Pengaron.

Type material examined. HOLOTYPE: Borneo, Pengaron, 59217, Doherty (BMNH).

Additional material examined. MALAYSIA: SABAH: S Keningau, 350 m, 20.–22.iii.2007, 1 spec., W. Schawaller leg. (SMNS); Keningau, 300 m, 26.–28.i.2010, 1 spec. (at light), R. Grimm leg. (RGCN); near Keningau,

fogging, *Melanolepis* sp., B4, 20.ii.2001, 1 spec., A. Floren leg. (ZSM); Tambunan, 500 m, 4.–8.ii.2014, 1 spec., R. Grimm leg. (RGCN). SARAWAK: Santubong Peninsula, Permai Rainforests Resort, 10–150 m, 29.iii.–3.iv.2016, 1 spec., R. Grimm leg. (RGCN). INDONESIA: EAST KALIMANTAN: Ca. 55 km W of Balikpapan, PT Fajar Surya Swadaya [area], base camp surrounded with *Acacia* plantation, 01°16.4'S, 116°21.1'E, 82 m, 23.xi.–1.xii.2011, 7 spec. (individual collecting on vegetation, dead wood and in puddles), J. Hájek, J. Schneider & P. Votruba leg. (5 NMPC, 2 SMNS).

Diagnostic description. Body length 3.15–4.01 mm, body width 1.47–1.82 mm. Ratios: pronotum width / length 1.12–1.17, elytra length / width 1.57–1.62, length elytra / length pronotum 2.55–2.62, greatest width elytra / greatest width pronotum 1.40–1.42. Upper side brown, antennae and legs lighter brown, pronotum dull, elytra somewhat lustrous. Characterized by extremely short hairs on both sides of carinae of elytral intervals (visible at 50× magnification, one row of hairs on each side, especially discernible in apical area). Eyes touching each other on frons. Pronotum with dense, small punctures; disc moderately convex; lateral margins broadly explanate and somewhat serrate, maximum width in middle, slightly arcuate towards frontal corners, nearly straight to shallowly emarginate towards hind corners; hind corners sharp, with angle of about 85°, anterior margin not emarginate. Elytra elongate oval, with eight carinated intervals, punctures of rows large, distances on disc equal to their diameters. Basal 2/5 of protibiae markedly bent. Antennomeres VIII–X drop-shaped (length/width of penultimate antennomere 8 : 7). For aedeagus see Fig. 3b.

Differential diagnosis. Hairs on both sides of carinated elytral intervals are markedly shorter than those of other *Gonocnemis* species of the Oriental Region.

Distribution. Borneo (ARDOIN 1964d).

Gonocnemis sericeus sericeus (Fabricius, 1801)

(Figs 5a, 5b)

Opatrum sericeum Fabricius, 1801: 120 (original description).

Gonocnemis dapsoides Fairmaire, 1882: 246 (original description). GEBIEN (1906): 225 (synonymy).

Gonocnemis sericeus sericeus: ARDOIN (1964d): 128–129 (redescription).

Material examined. INDONESIA: EAST KALIMANTAN: Ca. 15 km N Balikpapan, Sungai Wain Protection Forest, 01°08.1'S, 116°49.9'E, 35 m, 8.–11.xii.2011, 5 spec. (primary rainforest; individual collecting in stream, puddles and dead wood; light trap at border of forest), J. Hájek, J. Schneider & P. Votruba leg. (1 RGCN, 3 NMPC, 1 SMNS); ca. 55 km W of Balikpapan, PT Fajar Surya Swadaya [area], base camp surrounded with *Acacia* plantation, 01°13.4'S, 116°22.6'E, 66 m, 26.+30.xi.2011, 1 spec. (individual collecting on vegetation, dead wood and in puddles & light trap), P. Votruba, J. Schneider & J. Hájek leg. (NMPC); ca. 50 km W of Balikpapan, PT Fajar Surya Swadaya [area], base camp surrounded with *Acacia* plantation, 01°16.4'S, 116°21.1'E, 82 m, 23.xi.–1.xii.2011, 2 spec. (individual collecting on vegetation, dead wood and in puddles & light trap), P. Votruba, J. Schneider & J. Hájek leg. (1 NMPC, 1 SMNS); near Balikpapan, 9.iv.1998, 1 spec., 24.viii.1998, 49 spec., 8.xii.1998, 1 spec., 2.ii.1999, 1 spec., 9.v.1999, 1 spec., H. Makihara leg. (49 KACO, 4 RGCN). SOUTH KALIMANTAN: Papagaran, 25.–30.x.2007, 1 spec., Y. Yokoi leg. (KACO).

Diagnostic description. Body length 6.05–6.53 mm, body width 2.39–2.63 mm. Ratios: pronotum width / length 1.18–1.25, elytra length / width 1.7–1.78, length elytra / length pronotum 2.65–2.80. Pronotum relatively short compared to elytra. Upper side of pronotum with woolly hairs which are not lined up and do not cover surface, on elytra relatively long hairs are lined up and inclined posteriorly (they may be partially abraded in old specimens). Large punctures of pronotum usually fused, in front of acute hind corners lateral margins are

basally shallowly emarginate; anterior margin emarginate. Upper side in mature specimens nearly black, with golden shimmer, in immature specimens castaneous and in several specimens with dark patch on disc; hairs yellow. Antennomeres VIII–X drop-shaped, and antennomere X slightly longer than wide (approx. 7 : 6). For aedeagus see Fig. 5b.

Differential diagnosis. This species is larger than other species from Borneo, which have length below 5 mm.

Distribution. Borneo, Java, Sumatra (ARDOIN 1964d, MASUMOTO & MAKIHARA 1997).

Gonocnemis sumatrensis Pic, 1915

(Figs 4a, 4b)

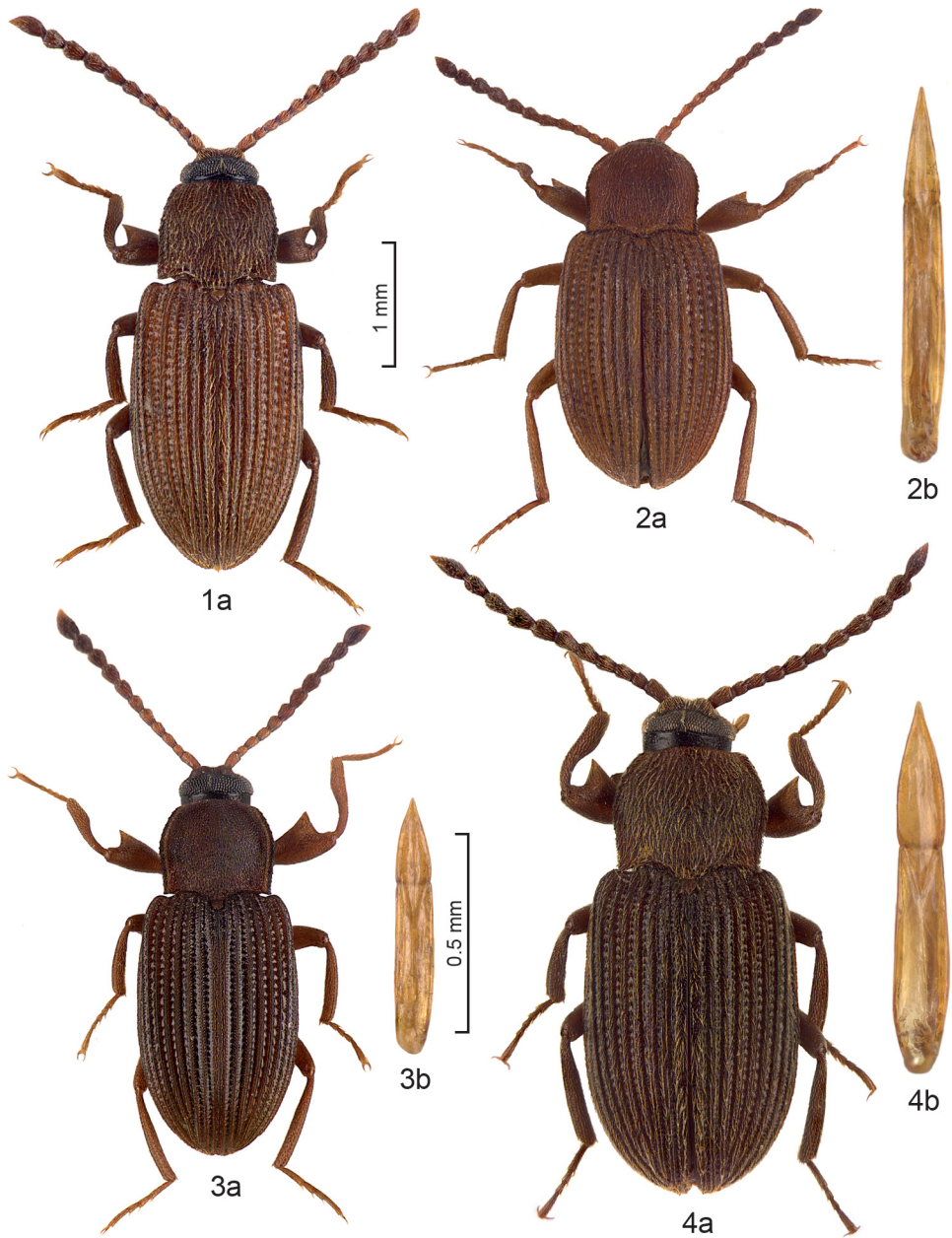
Gonocnemis sumatrensis Pic, 1915: 17 (original description). ARDOIN (1964d): 134–135 (redescription); BREMER (2006): 4 (photograph).

Material examined. **INDONESIA: EAST KALIMANTAN:** Ca. 55 km W Balikpapan, PT Fajar Surya Swadaya [area], base camp surrounded with *Acacia* plantation, 01°16.4'S, 116°21.1'E, 82 m, 23.xi.–1.xii.2011, 3 spec. (individual collecting on vegetation, dead wood and in puddles & light trap), P. Votruba, J. Schneider & J. Hájek leg. (2 NMPC, 1 SMNS). **SOUTH KALIMANTAN:** Pengaron, 59212 [accession number referring to the A. Fry catalogue], 1 spec., Doherty leg. (BMNH, ex coll. A. Fry). **MALAYSIA: SABAH:** Keningau, 300 m, 6.–7.ii.2006, 1 spec., 10.ii.2006, 43 spec., 17.–19.ii.2006, 12 spec., 24.–25.xi.2006, 1 spec., R. Grimm leg. (52 RGCN, 5 ZSM); bei Keningau, *Melanolepis* sp. 50 yrs., B4, 20.ii.2001, 2 spec., A. Floren leg. (ZSM); E Keningau, Bingkor, 20.–22.iii.2007, 2 spec., R. Grimm leg. (RGCN); Kota Kinabalu, Bukit Padang, 2.ii.2006, 1 spec., R. Grimm leg. (RGCN); 15 km S Tenom, 450 m, 11.v.2005, 1 spec., R. Grimm leg. (RGCN); Sepilok, 12.–13.iii.2007, 4 spec., 13.–15.i.2010, 1 spec., 31.iii.–1.iv.2015, 1 spec., 26.–27.iii.2017, 8 spec., R. Grimm leg. (12 RGCN, 2 BMNH); Sepilok, 50 m, 12.–13.iii.2007, 14 spec., W. Schawaller leg. (SMNS); Poring Hot Springs, Lower Montane, Mixed dipterocarp Forest, 650 m, *Aporusa* sp., Fog A50/F3, 22.i.1993, 1 spec., A. Floren leg. (ZSM).

Diagnostic description. Body length 3.35–5.02 mm (most specimens > 4.0 mm), body width 1.50–2.22 mm. Ratios: pronotum length / width 0.81–0.87, elytra length / width 1.55–1.63, length elytra / length pronotum 2.57–2.69. Of medium size. Elongate. Upper side brown, pronotum opaque, elytra somewhat lustrous; legs and antennae brown. Eyes touching each other on frons. Penultimate antennomere drop-shaped and somewhat elongate (length/width 13 : 9). Pronotum widest in middle, towards hind corners more or less narrowed, sometimes slightly emarginate in front of hind corners; lateral margins flat; punctures on surface very dense and of medium size. Elytra elongate oval, with eight rows of large, dense punctures, intervals with narrow carinae; these carinae present one row of short hairs on each side (hairs well visible at 25× magnification). For aedeagus see Fig. 4b.

Differential diagnosis. *Gonocnemis sumatrensis* is similar to *G. evidens* Bremer, 2006 from Thailand which has the same form of antennae. On average specimens of this species are smaller (body length 3.4–4.3 mm). In contrast to *G. sumatrensis* the sides of pronotum of *G. evidens* present nearly the same width in their middle and at their base. *Gonocnemis evidens* has shorter hairs on elytra than *G. sumatrensis* (the posteriorly inclined hairs alongside the carinae approach the base of the next hairs, in *G. sumatrensis* they overlap the base of the next hairs); the elytral carinae on intervals are missing on the first three to four intervals in *G. evidens*, they are low and narrowly visible on these intervals in *G. sumatrensis*.

Distribution. Borneo and Sumatra (ARDOIN 1964d).



Figs 1a–4b. *Gonocnemis* spp. 1a–4a – habitus, dorsal views; 2b–4b – aedeagi, dorsal views. 1a – *Gonocnemis schawalleri* sp. nov. 2a, 2b – *G. fouquei* sp. nov. 3a, 3b – *G. borneensis* Ardoïn, 1964. 4a, 4b – *G. sumatrensis* Pic, 1915.

Descriptions of two new species of *Gonocnemis*

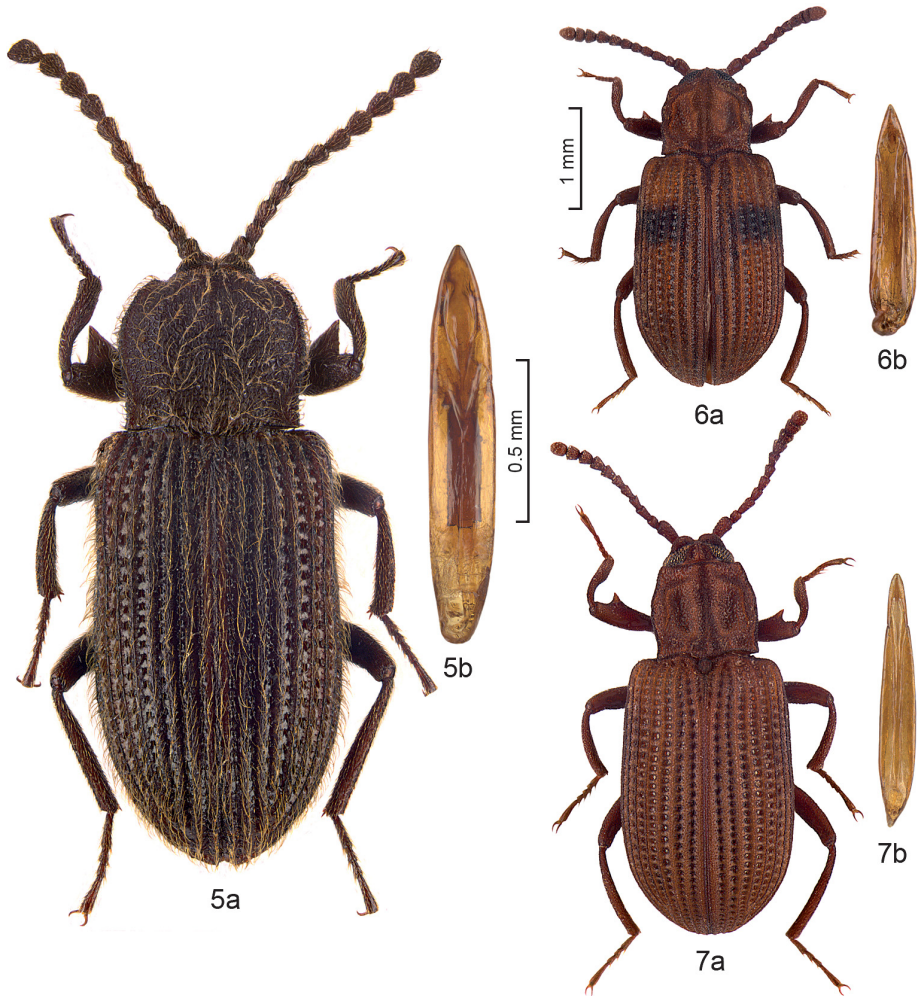
Gonocnemis fouquei sp. nov.

(Figs 2a, 2b)

Gonocnemis astutus (probable misidentification): BREMER & LILLIG (2014): 94.

Gonocnemis laterufus (misidentification): ANDO et al. (2017): 130.

Type material. HOLOTYPE: sex not determined, Borneo, Malaysia, Sabah, Tenom, 10.–12.v.2005, R. Grimm leg. (SMNS). PARATYPES: 2 spec., Borneo, Malaysia, Sabah, Tambunan, 16.–19.i.2010, R. Grimm leg. (1 ♂ RGCN,



Figs 5a–7b. *Gonocnemis* and *Paragonocnemis* spp. 5a–7a – habitus, dorsal views; 5b–7b – aedeagi, dorsal views. 5a, 5b – *G. sericeus sericeus* (Fabricius, 1801). 6a, 6b – *P. (Borneogonocnemis) ardoini* Bremer, 1991. 7a, 7b – *P. (B.) ruficolor* (Pic, 1936).

1 ZSM); 2 spec., same data, but 14.–17.iii.2013 (RGCN); 1 spec., Malaysia, Sabah, Batu Punggul Resort env., intercept trap, 24.vii.–1.viii.1996 [without collector name] (SMNS); 1 spec., Borneo, Sabah, Sepilok, 50 m, 12.–13.iii.2007, W. Schawaller leg. (SMNS); 1 spec., Borneo, Sarawak, Miri, Lambir National Park, ZB3B-012, 20.viii.2003, Kishimoto-Yamada & Itioka leg., LUBL-10227 (FRCS) [published as *G. laterufus* Pic, 1921 in ANDO et al. (2017)].

Description. Body length 2.92–3.62 mm, body width 1.42–1.60 mm. Ratios: pronotum width / length 1.04–1.10, elytra length / width 1.41–1.50, length elytra / length pronotum 2.33–2.42, width elytra / width pronotum 1.44–1.58. Upper side brown (pronotum somewhat darker than elytra); legs brown, antennae somewhat darker brown than legs; underside brown, somewhat darker brown than femora.

Head. Frons very narrow, eyes on frons separated by only narrow area (in females?) or eyes touching each other (in males?). Eyes nearly surrounding genae. The latter are small, uprising, with rounded lateral margins which form valley in middle between them. In front of genae frons is steeply descending where they form trough (its width is equal to length of antennomere II). Fronto-clypeal suture deeply impressed. Labrum horizontal, densely punctured. Mentum reversely trapezoidal. Mandibles apically bifid, with upper part distinctly longer than the lower one. Antennae reaching end of base of elytra; last antennomere pointed.

Pronotum relatively narrow in comparison to elytra, slightly wider than long; widest in middle, towards front corners narrowing and bent, towards hind corners slightly narrowing and thence nearly subparallel or allusively sinuate; upper side very closely punctured with very short, caudad inclined hairs, ground of punctures microreticulated; anterior margin slightly emarginate; somewhat convex, convexity nearly approaching sides in frontal quarter, relatively narrow horizontal margin in hind half.

Scutellum allusively pentagonal.

Elytra short, distinctly wider than pronotum, oval with maximum width in middle; intervals 1 to 2 or to 3 scarcely carinate, intervals (3) or 4 to 8 with clearly recognizable carinae not interrupted on disc; carinae on each side with one row of short, apically inclined hairs which become well visible at 25× magnification.

Prosternum. Episterna separated from central prosternum by indistinct longitudinal carina. Prosternal process narrow, scarcely widened along procoxae, but with median groove there, horizontally projecting caudad, with upraising hairs.

Mesoventrite. Frontal part depressed; anterior margin of hind part deeply excavated, its lateral margins narrow and thrown up.

Metaventrte densely punctured; median line somewhat impressed in its posterior three quarters.

Ventrtes closely punctured, with mostly recumbent hairs of medium length.

Legs. Profemora with large tooth; basal 2/5 of protibiae markedly bent and with wavy widening on inner side in anterior half; mesotibiae straight or slightly arcuate on outer side; metatibiae straight on outer side.

Aedeagus see Fig. 2b.

Differential diagnosis. Very similar to *Gonocnemis fouquei* sp. nov. are *G. astutus* Bremer, 2006 (from Thailand and Laos), *G. borneensis* Ardoïn, 1964, and *G. schawalleri* sp. nov. (from Borneo). *Gonocnemis borneensis* has approximately the same body length as *G. fouquei*; on average the elytra of *G. borneensis* are slightly longer than those of *G. fouquei*, and

the hairs on each side of the elytral carinae of *G. borneensis* are shorter and scarcely visible while in *G. fouquei* they are well visible at 25× magnification (especially in the apical region of elytra). On frons the eyes of *G. borneensis* are touching each other (in *G. fouquei* they are separated by a narrow plank in females (?) while those of males (?) are also touching each other in the middle).

Gonocnemis astutus has about the same body size and width of elytra as *G. fouquei*. The lateral margins of the pronotum of *G. astutus* in front of hind corners are subparallel and not allusively sinuate as in *G. fouquei*. Antennomeres VIII–X of *G. astutus* are distinctly shorter than those of *G. fouquei*. The aedeagi of both species are nearly identical.

For differences between *G. schawalleri* and *G. fouquei* see the key.

Etymology. Named in memory and honour of the late colleague René Fouqu  (Liberec, Czech Republic).

Distribution. Malaysia: Sabah and Sarawak.

Remarks. In the catalogue of Amarygmini (BREMER & LILLIG 2014) the occurrence of *G. astutus* on Borneo is mentioned. However, it is highly probable that the species was misidentified and in fact belongs to *G. fouquei* sp. nov.

Gonocnemis schawalleri sp. nov.

(Fig. 1a)

Type material. HOLOTYPE: sex not determined, Borneo, Sabah, Poring Hot Springs, 450–600 m, 9.–11.iii.2007, W. Schawaller leg. (SMNS).

Description. Body length 3.42 mm, body width 1.44 mm. Ratios: pronotum length / width 1.04, elytra length / width 1.64, length elytra / length pronotum 2.54, width elytra / width pronotum 1.48. Upper side brown, somewhat lustrous; underside with fatty lustre, legs lighter brown than upper side; antennae brown.

Head. Eyes touch each other in anterior part, behind that they are somewhat separated (not more than diameter of one ocellus). Genae mostly surrounded by eyes, short, ascending to their rounded lateral margins; in middle separated by narrow valley-like incision; vertically descending part is trough-like with width equal to length of antennomere II. Fronto-clypeal suture impressed. Labrum lighter brown than surroundings, flat, semicircular. Mandibles apically bifid. Mentum reversely trapezoidal, with low median carina. Underside of neck microreticulated, with well separated punctures of medium size. Antennae of medium length, reaching over 2/5 of elytra; antennomeres VIII–X drop-shaped, penultimate antennomere longer than wide (as 10 : 7), antennomere XI apically pointed.

Pronotum nearly as wide as long, widest near middle, anteriorly roundly narrowed, posteriorly scarcely narrowed but allusively sinuate in front of hind corners; hind corners acute; anterior margin nearly straight; base bi-sinusoidal; disc slightly convex except for shallow impression in front of scutellum and flattened areas near hind corners; surface with very dense, mostly fused punctation, punctures with ground microreticulated, bearing yellow hairs of medium size which are inclined backwards.

Scutellum semicircular.

Elytra somewhat elongate oval, with sides slightly widened towards shortly behind middle;

intervals 1–4 slightly elevated but not carinate on disc (only near base), intervals 5–8 carinate; carinae on each side with one row of short, slightly caudad inclined yellow hairs; between intervals rows of relatively large, but on disc not very marked punctures.

Prosternum. Episterna and central part of prosternum separated by longitudinal carina. Prosternal process relatively narrow between procoxae, with median groove, behind procoxae further narrowed to pointed apex and regularly bent downwards.

Mesoventrite with frontal part depressed and strongly microreticulated; hind part narrowed towards base, its anterior margin markedly excavated in middle.

Metaventrte. Disc separated into two somewhat convex lateral parts by broadly impressed median line. Surface closely punctured, with semi-erect hairs of medium length.

Ventrites closely punctured, with mostly recumbent hairs (on ventrite V hairs parallel and directed caudad).

Legs short; profemora with large tooth; protibiae somewhat bent in their basal 2/5, thence broadened on inner side towards apex; mesotibiae slightly arcuate on outer sides; metatibiae nearly straight on outer sides.

Differential diagnosis. Pronotum nearly as long as wide, closely punctured; lateral margins in front of hind corners of pronotum are allusively emarginate. Elytra with one row of well visible hairs on each side of elevated or carinate intervals. Basal 2/5 of protibiae moderately bent.

Based on size, body shape, coloration and form of antennae *G. schawalleri* sp. nov. should be differentiated from *G. sumatrensis* Pic, 1915. The holotype of *G. schawalleri* is smaller than the majority of specimens of *G. sumatrensis* (3.42 vs. 3.35–5.02 mm; more than 20 specimens examined), the greatest width of pronotum of *G. sumatrensis* is in the middle, and towards hind corners the sides are conspicuously narrowing; in *G. schawalleri* they are scarcely narrowing (but somewhat sinuate in front of hind corners); the hairs on both sides of elytral carinae are shorter in *G. schawalleri* than in *G. sumatrensis*, this is especially obvious in the apical region. Colouration and form of antennae are nearly identical in both species.

Etymology. Named in honour of Dr. Wolfgang Schawaller (Stuttgart, Germany), specialist in Tenebrionidae and collector of the holotype.

Distribution. Malaysia: Sabah.

Remarks on species of *Paragonocnemis* from Borneo

Paragonocnemis Kraatz, 1899

Paragonocnemis Kraatz, 1899: 119 (original description). ARDOIN (1964c): 807–809 (redescription).

Type species. *Paragonocnemis sculpticollis* Kraatz, 1899 = *Paragonocnemis foveicollis* (Fairmaire, 1891).

Remarks. In contrast to the species of the genus *Gonocnemis* the species of *Paragonocnemis* present carinae on pronotum and a median carina on frons. The form of pronotal carinae differs among the species of some subgenera of *Paragonocnemis*. The subgenus *Borneogonocnemis* Pic, 1936 is the only subgenus of *Paragonocnemis* which occurs in the Oriental Region. Species of the other subgenera are known only from the Afrotropical Region. An identification key to the subgenera was given by ARDOIN (1964c: 809).

***Paragonocnemis (Borneogonocnemis) ruficolor* (Pic, 1936)**

(Figs 7a, 7b)

Borneogonocnemis ruficolor Pic, 1936: 17 (original description). ARDOIN (1964c): 829–830 (redescription).*Paragonocnemis (Borneogonocnemis) ruficolor*: ARDOIN (1964c): 829 (new combination); BREMER (2010): 151 (figure of habitus, head, antennae).**Type locality.** Brunei.**Type material examined.** HOLOTYPE: ♂, Borneo, Brunei (MNHN).**Additional material examined.** MALAYSIA: SABAH: Tambunan, 500 m, 28.–31.iii.2007, 1 spec., 4.–8.ii.2014, 1 spec., R. Grimm leg. (RGCN); E Keningau, Bingkor, 20.–22.iii.2007, 1 spec., R. Grimm leg. (RGCN); Keningau, 300 m, 20.–22.iii.2007, 1 spec., 30.iii.2007, 1 spec., R. Grimm leg. (RGCN); Sepilok, 50 m, 12.–13.iii.2007, 1 spec., W. Schawaller leg. (SMNS); Tambunan, 530 m, 14.–15.iii.2007, 5 spec., W. Schawaller leg. (SMNS); Poring Hot Springs, *Xanthophyllum* affine, lower montane, mixed dipterocarp fst., fog Xa4/F2, 20.VI.1992, 1 spec., A. Floren leg. (ZSM); Crocker Range, Long Kogungan env., ca. 750–850 m, 19.–21.vi.1996, 1 spec. (7a, lower floor of primary forest vegetation (beating of undergrowth)), no collector's name (SMNS). INDONESIA: EAST KALIMANTAN: PT Silva Rimba Lestari [area], camp 'Limbang', 00°07.4'N, 116°18.1'E, 60 m, 3.–4.+6.xii.2011, 1 spec. (open oligotrophic wetland on sand ground, surrounded with shrubs; collecting in shallow pools, stream, on vegetation, + light trap), J. Hájek, J. Schneider & P. Votruba leg. (NMPC).**Diagnostic description.** Body length 3.20–4.65 mm, body width 1.45–2.0 mm. Ratios: pronotum width / length 1.08–1.17, elytra length / width 1.57–1.65, length elytra / length pronotum 2.80–3.0. Uniformly rufous to rufous with differently marked blackish colouration; matt. Frons triangular, with three carinae, middle carina more distinct and higher than lateral carinae, middle carina and lateral carinae are connate apically, eyes apically separated only by middle carina. Pronotum with four carinae which are not reaching the base; inner carinae with shorter apical parts distinctly converging towards the apex and longer basal parts weakly converging towards base; lateral carinae not reaching apex, connected with inner carinae apically by posteriorly directed oblique carina and basally by apically directed oblique carina; thus carinae create three oblong, somewhat concave pits. Elytra with rows of strong and deep punctures. Aedeagus as in Fig. 7b.**Distribution.** Borneo (PIC 1936).***Paragonocnemis (Borneogonocnemis) ardoini* Bremer, 1991**

(Figs 6a, 6b)

Paragonocnemis (Borneogonocnemis) ardoini Bremer, 1991: 151–153 (original description).*Paragonocnemis (Borneogonocnemis) velutinus* Bremer, 1998: 54–56 (original description), **syn. nov.****Type material examined.** *Paragonocnemis (Borneogonocnemis) velutinus*: HOLOTYPE: Borneo: Sarawak, Belaga, Long Linau, 17.–21.iii.1990, A. Riedel leg. (SMNS).**Additional material examined.** MALAYSIA: SARAWAK: Santubong Peninsula, Permai Rainforest Resort, 10–200 m, 11.–14.ix.2008, 2 spec. (at light), 30–150 m, 10.–14.ii.2012, 1 spec. (at light), 15.–21.iv.2016, 1 spec., R. Grimm leg. (3 RGCN, 1 ZSM). INDONESIA: EAST KALIMANTAN: Ca. 55 km W Balikpapan, PT Fajar Surya Swadaya [area], base camp surrounded with *Acacia* plantation, 01°16.4'S, 116°21.1'E, 82 m, 23.xi.–1.xii.2011, 1 spec., (individual collecting on vegetation, dead wood and in puddles & light trap), P. Votruba, J. Schneider & J. Hájek leg. (NMPC).**Diagnostic description.** Body length 2.82–3.35 mm. Body width 1.30–1.71 mm. Ratios: Pronotum length / width 0.88–0.96. Elytra length / width 1.48–1.63; length elytra / length pronotum 2.63–2.89.

Paragonocnemis ardoini presents yellow to light brown ground color on upper side and underside; on each elytron there is dark, transverse macula which does not cover median two and lateral three intervals. Inner and outer sides of mesotibiae are mostly markedly bent, in some specimens from Thailand only outer side of mesotibiae is bent while inner side is straight. Antennae reach end of basal 1/4 of elytra.

Remarks. This species has a wide distribution, ranging from north and central Thailand over Sumatra to Borneo (the type series of *P. ardoini* is from central Thailand, the description of *P. velutinus* is based on a single specimen from Borneo, the holotype). Most specimens formerly identified as *P. ardoini* are smaller (body length 2.82–3.11 mm) than the specimens determined as *P. velutinus* later on. In the original description of *P. velutinus* it was stated that in addition to the larger size the mesotibiae are more bent than in *P. ardoini*, and the antennomere XI is allusively longer in *P. ardoini*. After seeing more specimens from Borneo, but also from Thailand and Sumatra, we are no longer convinced that *P. velutinus* is really different from *P. ardoini*. Most specimens of *P. ardoini* from Thailand are indeed smaller than those from Borneo (specimens from Sumatra are mostly in between); however, the other characters are not so obviously different that one may assign specimens to one or the other taxon. Therefore, we can no longer state with certainty that *P. ardoini* and *P. velutinus* are different species, and we therefore decide to synonymize both species.

Key to the Bornean species of *Gonocnemis* and *Paragonocnemis* (*Borneogonocnemis*)

1. Pronotum with carinae on the disc. 2
- Pronotum without carinae on the disc. 3
- 2 Each elytron with black transverse macula which does not extend to the inner two and lateral three intervals; aedeagus as in Fig. 6b. *P. (B.) ardoini* Bremer, 1991
- Elytra without similar black transverse macula; aedeagus as in Fig. 7b.
..... *P. (B.) ruficolor* (Pic, 1936)
- 3 Body larger, length over 6 mm; aedeagus as in Fig. 5b.
..... *G. sericeus sericeus* (Fabricius, 1801)
- Body smaller, length below 5 mm. 4
- 4 Hairs on both sides of elytral carinae extremely short; aedeagus as in Fig. 3b.
..... *G. borneensis* Ardoin, 1964
- Elytral hairs longer. 5
- 5 Body apically stockier, length/width ratio of elytra: 1.41–1.49; aedeagus as in Fig. 2b. ...
..... *G. fouquei* sp. nov.
- Body apically more elongate, length/width ratio of elytra: 1.55–1.63. 6
- 6 Pronotum subquadrate, length/width ratio: 1.04. *G. schawalleri* sp. nov.
- Pronotum distinctly wider than long, length/width, ratio: 0.81–0.87; aedeagus as in Fig. 4b. *G. sumatrensis* Pic, 1915

Remarks on *Gonocnemis minutissimus* Pic, 1916

Gonocnemis minutus Pic, 1915

Gonocnemis minutus Pic, 1915: 17 (original description).

Gonocnemis minutissimus Pic, 1916: 19 (original description), **syn. nov.**

Type localities. *Gonocnemis minutus*: Laos. *Gonocnemis minutissimus*: Cambodia.

Type material examined. HOLOTYPE: ‘*Gonocnemis minutissimus* Pic [white label with Pic’s handwriting] || [white label with barely legible handwriting] || type [handwritten label] || *minutissimus* Pic [handwritten label] || Holotype, *Gonocnemis minutissimus* Pic, 1916 [additional printed label] || MNHN: EC7010 [white printed label] || HOLOTYPE [red printed label]’ (MNHN).

Remarks. *Gonocnemis minutissimus* Pic, 1916 was not evaluated in the revisions of the Oriental species of *Gonocnemis* (ARDOIN 1964d, BREMER 2006) as both authors were unable to trace the type of *G. minutissimus* in MNHN. In the meantime the holotype was found in MNHN and forwarded to the first author for evaluation.

Comparison of material revealed that the holotype of *G. minutissimus* Pic, 1916 is only a relatively small specimen of *G. minutus* Pic, 1915. The latter species is known from Thailand, Laos and Cambodia.

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