## Systematic revision of the genus *Graphelmis* (Coleoptera: Elmidae) VII. *Graphelmis obesa* species group

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ČIAMPOR Jr., F. 2005. Systematic revision of the genus Graphelmis (Coleoptera: Elmidae) VII. Graphelmis obesa species group. *Entomol. Probl.* 35(2): 117–122. – The ninth new species group is designated within the genus *Graphelmis* DELEVE, 1968, including two new species: *G. obesa* sp.nov. from Sabah and *G. gemuk* sp.nov. from Sarawak (both Borneo, Malaysia). Habitus and detailed drawings of characteristic structures of genitalia and pregenital segments of males are given.

Key words: Coleoptera, Elmidae, Graphelmis, taxonomy, Southeast Asia.

### Introduction

The genus *Graphelmis* DELÈVE, 1968 includes 77 species up to now, and eight well differentiated species groups were recognized within the genus (ČIAMPOR Jr 2001, 2002, 2003, 2004, 2005, ČIAMPOR Jr & KODADA 2004). Even the newly designated species group includes only two very similar species, they differ from all known species so distinctly that it is impossible to place them in any of the previously designated groups. As the majority of *Graphelmis* species, also both new species described below are distributed in Southeast Asia, namely Borneo island. *Graphelmis obesa* sp.nov. is known from Sabah and *G. gemuk* from a more southern region (Sarawak).

Material and methods, as well as the acronyms and symbols used, follow ČIAMPOR Jr. (2001).

#### Graphelmis obesa species group

Members: G. obesa sp.nov., G. gemuk sp.nov.

**Diagnosis**. Within the genus, *G. obesa* species group is characterized by following features: 1) distinctly ovate body shape; 2) produced anterior pronotal angles rounded; 3) male metatibiae simple; 4) elytral punctures feebly impressed, almost fused to shallow grooves; 5) ventral lobe of penis with apex constricted and distinctly narrowed; 6) base of penis deeply emarginated in ventral view; 7) anterior median strut of male spiculum gastrale short; 8) posterior margin of male sternite 9 deeply emarginated.

#### Graphelmis obesa sp.nov.

Figs 1, 3-6

**Type locality**: Malaysia, Sabah, Kuamut river env. near Kampung Pisang Pisang, shaded stream in primary forest with submerged wood.

Material examined. Holotype ♂ (NMW): "Malaysia, Sabah, Kuamut river env. near Kampung Pisang Pisang, 3.-4.VII.

1996, 14a, shaded stream in primary forest with submerged wood". **Paratypes** (NMW, CKB):  $7\delta\delta$ , 19  $\Im$  with the same label as holotype; 2 d d: "Malaysia, Sabah, ca. 25km SE Sapulut, Sabalangang river, 21.V.2001"; 3♀♀: "Malaysia, Sabah, ca. 7km S Sapulut, Saupi river, 17.V.2001, J.F.Kočiam lgt."; 6 ざ ざ, 5♀♀: "Malaysia, Sabah, ca. 5km S Sapulut, Saliku river, 16.V.2001, J.F. Kočiam lgt."; 2♂♂, 19: "Malaysia, Sabah, Kampung Pisang Pisang env., tributary of Kuamut river, 29.06.1998, J. Kodada & F. Čiampor Lgt."; 4 ♂ ♂, 2 ♀ ♀: "Malaysia, SABAH, Corcker Range, Moyog env., around km 20 of road Kota Kinabalu Tambunan, 15.VI. 1996, 1b"; 3 ♂ ♂, 1 ♀: "Malaysia, Sabah, Kuamut river env. near Kampung Pisang Pisang, 3.-4.VII. 1996, 14b, ca. 10m wide tributary of Kuamut river in primary forest"; 1 9: "Malaysia, Sabah, Tawau Hills Park, Tawau river in primary forest, 7.-10.06. 1998, J. Kodada & F. Čiampor Lgt."; 1 9: "Malaysia, Sabah, Batu Punggul Resort env., 24.VI. -1.VII. 1996, 11a, river about 10m wide, flowing in primary forest, partly shaded"; 13, 19: "Malaysia, Sabah, Gn. Antalui, ca. 5km S Sapulut, 2.VII. 1996 13a, river about 7m wide, flowing through secondary forest".

**Diagnosis**. Within the species group, *G. obesa* differs as follows: 1) yellowish elytral pattern well coloured; 2) 7<sup>th</sup> elytral interval black between anterior and posterior yellowish portions; 3) tarsi of same pale colour as tibiae; 4) penis longer, length ratio penis:phallobasis around 2.5.

**Description**. Body form obovate (Fig. 1); CL in  $\delta \delta$ (2.88 – 3.25 mm,  $\emptyset$ = 3.09 ± 0.12), in  $\Im \Im$  (3.13 – 3.44 mm,  $\emptyset$ = 3.30 ± 0.12); EW in  $\delta \delta$  (1.49 – 1.74 mm,  $\emptyset$ = 1.61 ± 0.07), in  $\Im \Im$  (1.59 – 1.79 mm,  $\emptyset$ = 1.72 ± 0.08), CL/EW in  $\delta \delta$  (1.83 – 2.03,  $\emptyset$ = 1.92 ± 0.06), in  $\Im \Im$  (1.81 – 1.99,  $\emptyset$ = 1.93 ± 0.05).

Colour pattern: pronotum with indistinctly paler anterior margin and border along posterior half of median pronotal groove; elytra with more or less distinct yellow Vshaped marking in anterior half and yellowish posterior third.

Head. HW in  $\circ \circ \circ (0.68 - 0.76 \text{ mm}, \emptyset = 0.72 \pm 0.03)$ , in  $\circ \circ (0.71 - 0.82 \text{ mm}, \emptyset = 0.77 \pm 0.04)$ ; ID in  $\circ \circ \circ (0.37 \pm 0.04)$ ;



Figs 1, 2: Habitus of: 1) Graphelmis obesa sp.nov.; 2) G. gemuk sp.nov.

-0.41 mm,  $\emptyset = 0.38 \pm 0.01$ ), in  $\Im \Im (0.38 - 0.44 \text{ mm}$ ,  $\emptyset = 0.41 \pm 0.02$ ); ED in  $\Im \Im (0.26 - 0.32 \text{ mm}$ ,  $\emptyset = 0.30 \pm 0.02$ ), in  $\Im \Im (0.29 - 0.35 \text{ mm}$ ,  $\emptyset = 0.32 \pm 0.02$ ); HW/ID in  $\Im \Im (1.81 - 1.92, \emptyset = 1.87 \pm 0.04)$ , in  $\Im \Im (1.78 - 2.00, \emptyset = 1.85 \pm 0.07)$ . Labrum glabrous, sparsely setose; anterior half slightly paler; clypeus shorter than labrum, as well as frons and vertex densely micropunctured; eyes moderately large, oval in lateral view and convex in dorsal view, without distinctly raised margin.

Thorax. Pronotum wider than long, widest at base; PL in  $\delta \delta$  (1.00 – 1.06 mm, Ø= 1.02 ± 0.03), in  $\Im \Im$  (1.00  $-1.19 \text{ mm}, \emptyset = 1.13 \pm 0.05$ ); PW in  $\Im \Im (1.23 - 1.38 \text{ mm}, 1.23 - 1.38 \text{ mm})$  $\emptyset = 1.31 \pm 0.05$ ), in  $\Im \Im (1.28 - 1.49 \text{ mm}, \emptyset = 1.39 \pm 0.06)$ ; AP in  $\delta \delta$  (0.77–0.92 mm, Ø=0.82 ± 0.05), in  $\Im \Im$  (0.87– 0.97 mm,  $\emptyset = 0.92 \pm 0.04$ ); lateral margins explanate; anterior angles produced, rounded; sublateral tubercles reduced; median groove narrow, moderately deeply impressed, with slightly raised margins in some specimens; prebasal admedian pits vestigial; surface densely micropunctured, except for almost glabrous prebasal portion. Prosternum plicate; prosternal process with lateral margins microreticulate, raised around coxae; posterior margin microreticulate, with distinct median protuberance. Scutellum almost rounded, anterior margin straight; surface shiny with few tiny setae. Mesosternum with oblique microreticulate carinae. Metasternum with disc almost flat, finely grooved, sparsely setose in males; longitudinal suture narrow; admedian prebasal punctures shallow, transverse; lateral margins of disc somewhat raised. Elytra with sides parallel-sided in about anterior half, then converging toward rounded or feebly produced apices; EL in  $\delta \delta$  (1.88  $-2.25 \text{ mm}, \emptyset = 2.08 \pm 0.11), \text{ in } \Im \Im (2.00 - 2.25 \text{ mm}, \emptyset =$  $2.18 \pm 0.09$ ); lateral margins slightly explanate and serrate; strial punctures moderately deeply impressed, deeper on sides. Legs glabrous; tibiae very finely grooved; FT in d d (0.85 − 0.97 mm, Ø= 0.91 ± 0.04), in Q Q (0.88 − 1.00 mm, Ø= 0.95 ± 0.04); MT in d d (0.79 − 0.91 mm, Ø= 0.85 ± 0.04), in Q Q (0.82 − 0.94 mm, Ø= 0.88 ± 0.04); HT in d d (0.85 − 0.97 mm, Ø= 0.92 ± 0.04), in Q Q (0.88 − 1.03 mm, Ø= 0.95 ± 0.05); length of tarsomere 5 equal to combined length of tarsomeres 1− 4.

Abdomen. Admedian keels of ventrite 1 extending to middle, not reaching posterior margin of ventrite; abdominal intercoxal process and mesal portion of remaining ventrites sparsely shallowly punctured, punctures diminishing toward abdominal apex; lateral portions of ventrites covered by plastron structures; apex of ventrite 5 with sides slightly produced. Sternite 9 and spiculum gastrale (Fig. 5).

Aedeagus (Figs 3, 4). Penis elongate, with numerous small spines concentrated especially in apical portion; in lateral view penis subparallel, slightly curved; in ventral view narrowed near apical 0.3, in basal 0.6 subparallel, base deeply emarginated, sides unequally long; ventral lobe fused with main lobe in ca. 0.4, apex abruptly narrowed, acuminate; membranous endophallus with numerous small spines and more sclerotized ring; phallobasis curved, less than half as long as penis.

Ovipositor (Fig. 6). Terminal segment finely curved; preterminal segment ca.  $3.8 \times$  as long as terminal, with outer side concave; distal sclerite ca.  $0.56 \times$  as long as preterminal, slightly produced ventrally; basal segment ca.  $1.2 \times$  as long as preteminal and distal sclerites combined, ventral fulcrum almost straight.

**Sexual dimorphism**. Males are usually recognized by smaller body size and fine setation on disc of metasternum.

Distribution. Sabah (Malaysia).

**Etymology**: from Latin *obesus* – stout, referring to its body shape.



Figs 3–6 *G. obesa* sp.nov.: 3) aedeagus lateral view; 4) aedeagus ventral view; 5) spiculum gastrale and sternite 9; 6) ovipositor. Scale bars: 0.1mm.

# Graphelmis gemuk sp.nov.

Figs 2, 7–10

Type locality: Malaysia, Sarawak, Gunung Serapi, ca. 19 km W Kuching, stream in the primary forest.

Material examined. Holotype ♂ (NMW): "SARAWAK (Borneo), Gunung Serapi, ca. 19km W Kuching, primary forest, III. 1994, J. Kodada leg.". Paratypes (NMW, CKB): 1233,  $10 \circle \circle:$  with the same label data as holotype;  $12 \circle \circle:$   $8 \circle \circle:$ "SARAWAK (Borneo), ca. 40km SE KAPIT, 03. 1994, J. Kodada



Figs 7-10 G. gemuk sp.nov.: 7) aedeagus lateral view; 8) aedeagus ventral view; 9) spiculum gastrale and sternite 9; 10) ovipositor. Scale bars: 0.1mm.

leg.";  $4 \circ \delta$ : "MAL., Sarawak 1993 80km S Kuching, 18.2. Kampung Ana Rais, leg. M. Jäch (4)";  $1 \circ$ : "MAL., Sarawak 1993 40km S Kuching, 17.2. Baan Gong Sikog Wasserf. [waterfall] leg. M. Jäch (3)";  $1 \circ \delta$ : "MAL., Sarawak 1993 Kelabit HL, 5km E Bario Pa Ukat, 27.2., 1000m leg. M. Jäch (15)".

**Diagnosis.** *G. gemuk* differs from *G. obesa* in: 1) yellowish elytral marking (V-shaped anterior part and posterior third) interrupted by dark punctural striae; 2) 7<sup>th</sup> elytral interval yellow between anterior and posterior yellowish portions; 3) tarsi at least finely darker than tibiae; 4) penis shorter, length ratio penis:phallobasis less than 2.

**Description**. Body form obovate (Fig. 1); CL in  $\delta \delta$ (2.63 – 3.06 mm,  $\emptyset$ = 2.80 ± 0.19), in  $\Im \Im$  (2.50 – 3.13 mm,  $\emptyset$ = 2.81 ± 0.19); EW in  $\delta \delta$  (1.33–1.49 mm,  $\emptyset$ = 1.38 ± 0.06), in  $\Im \Im$  (1.33–1.49 mm,  $\emptyset$ = 1.41 ± 0.05), CL/EW in  $\delta \delta$  (1.97–2.21,  $\emptyset$ = 2.02 ± 0.09), in  $\Im \Im$  (1.88–2.10,  $\emptyset$ = 1.99 ± 0.07).

Colour pattern: pronotum with indistinctly paler anterior margin and border along median pronotal groove; elytra with yellow V-shaped marking in anterior third to half and irregular yellowish marking in posterior third interrupted by dark punctural striae.

Head. HW in  $\delta \delta$  (0.62–0.71 mm,  $\emptyset$ = 0.66 ± 0.04), in  $\Im \Im$  (0.65–0.71 mm,  $\emptyset$ = 0.67 ± 0.02); ID in  $\delta \delta$  (0.32 – 0.41 mm,  $\emptyset$ = 0.37 ± 0.04), in  $\Im \Im$  (0.32–0.41 mm,  $\emptyset$ = 0.37 ± 0.03); ED in  $\delta \delta$  (0.26–0.29 mm,  $\emptyset$ = 0.28 ± 0.01), in  $\Im \Im$  (0.25–0.32 mm,  $\emptyset$ = 0.28 ± 0.03); HW/ID in  $\delta \delta$ (1.71–1.91,  $\emptyset$ = 1.80 ± 0.08), in  $\Im \Im$  (1.71–2.00,  $\emptyset$ = 1.83 ± 0.09). Labrum glabrous, sparsely setose; anterior half slightly paler; clypeus shorter than labrum, as well as frons and vertex densely micropunctured; eyes moderately large, oval in lateral view and convex in dorsal view, without distinctly raised margin.

Thorax. Pronotum wider than long, widest at base; PL in  $\delta \delta$  (0.88–1.06 mm, Ø=0.95 ± 0.08), in  $\Im \Im$  (0.88– 1.13 mm, Ø=1.00 ± 0.07); PW in ♂ ♂ (1.08–1.23 mm, Ø=  $1.14 \pm 0.05$ ), in  $\Im \Im (1.15 - 1.26 \text{ mm}, \emptyset = 1.21 \pm 0.03)$ ; AP in  $\delta \delta$  (0.69 – 0.82 mm, Ø= 0.73 ± 0.05), in  $\Im \Im$  (0.74 – 0.85 mm,  $Ø = 0.79 \pm 0.04$ ); lateral margins explanate; anterior angles produced, rounded; sublateral tubercles reduced; median groove narrow, moderately deeply impressed, with slightly raised margins in some specimens; prebasal admedian pits vestigial; surface densely micropunctured, except for almost glabrous prebasal portion. Prosternum plicate; prosternal process with lateral margins microreticulate, raised around coxae; posterior margin microreticulate, with distinct median protuberance. Scutellum almost rounded, anterior margin straight; surface shiny with few tiny setae. Mesosternum with oblique microreticulate carinae. Metasternum with disc almost flat, finely grooved, sparsely setose in males; longitudinal suture narrow; admedian prebasal punctures shallow, transverse; lateral margins of disc somewhat raised. Elytra parallel-sided in about anterior half, then converging toward rounded or feebly produced apices; EL in  $\delta \delta$  (1.75–2.00 mm,  $\emptyset = 1.86 \pm 0.11$ ), in  $\Im \Im (1.63 - 2.00 \text{ mm}, \emptyset = 1.81 \pm 1.81)$ 0.12); lateral margins slightly explanate and serrate; strial punctures moderately deeply impressed, deeper on sides. Legs glabrous; tibiae very finely grooved; FT in  $\delta \delta$  (0.71–0.85 mm,  $\emptyset = 0.77 \pm 0.06$ ), in  $\Im \Im$  (0.76–0.82 mm,  $\emptyset = 0.79 \pm 0.02$ ); MT in  $\delta \delta$  (0.68–0.79 mm,  $\emptyset = 0.73 \pm 0.05$ ), in  $\Im \Im$  (0.71–0.76 mm,  $\emptyset = 0.73 \pm 0.02$ ); HT in  $\delta \delta$  (0.71–0.85 mm,  $\emptyset = 0.78 \pm 0.06$ ), in  $\Im \Im$  (0.74–0.82 mm,  $\emptyset = 0.78 \pm 0.03$ ); length of tarsomere 5 equal to combined length of tarsomeres 1–4.

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Ovipositor (Fig. 6). Terminal segment almost straight; preterminal segment ca.  $3.5 \times$  as long as terminal, with outer side concave; distal sclerite ca.  $0.5 \times$  as long as preterminal; basal segment ca.  $1.2 \times$  as long as preterminal and distal sclerites combined, ventral fulcrum almost straight.

**Sexual dimorphism**. Males are usually recognized by smaller body size and fine setation on disc of metasternum.

Distribution. Sarawak (Malaysia).

**Etymology:** from Malay *gemuk* – stout, bulky, referring to its body shape, which is very similar to *G. obesa*.

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