

Endophallic Structure of the *Graphelmis shirahatai* (NOMURA) (Coleoptera, Elmidae, Elminae)

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Genus *Graphelmis* DELÈVE, 1968 is medium-sized riffle beetles (Elmidae) which includes 83 species of the world (ČIAMPOR, 2002; JÄCH *et al.*, 2016). The genus is characterized by developed membranous endophallus (e. g. ČIAMPOR, 2002, 2005 a, b). However, its fully everted endophallus has not been described.

HAYASHI and YOSHITOMI (2015) described the endophallic structures of four Japanese species of the genus *Zaitzeviaria* NOMURA, 1959. The author examined the endophallus of *Graphelmis shirahatai* (NOMURA) collected from Hii-kawa River, Izumo, Shimane Prefecture, Japan by the same method of *Zaitzeviaria*: Living adults were soaked in a water solution of sodium percarbonate (Oxygen-based bleaching agent available) in 24 hours keep the room temperature, and the endophallus was inverted by the pressure of the bubbles in the body. In addition, specimens of everted endophallus were dried by vacuum freeze drying equipment and were ultrathin coated with gold by high-vacuum evaporation. The minute structures on surface photographed under a scanning electron microscope (SEM), JEOL JCM-6000 Neoscope Scanning Electron.

The endophallus of *G. shirahatai* (Figs. 1–8) is expanded ventrally, the shape is simple without bladder-like projections, entirely swollen, and apex with a gonopore; Surface of middle area smooth; Vertically aligned fine spines on apical area and thick spines almost equally spaced on basal area; Triangular smooth piece on basal-ventral part; Total length is ca. 0.4 mm (length of penis is ca. 0.8 mm).

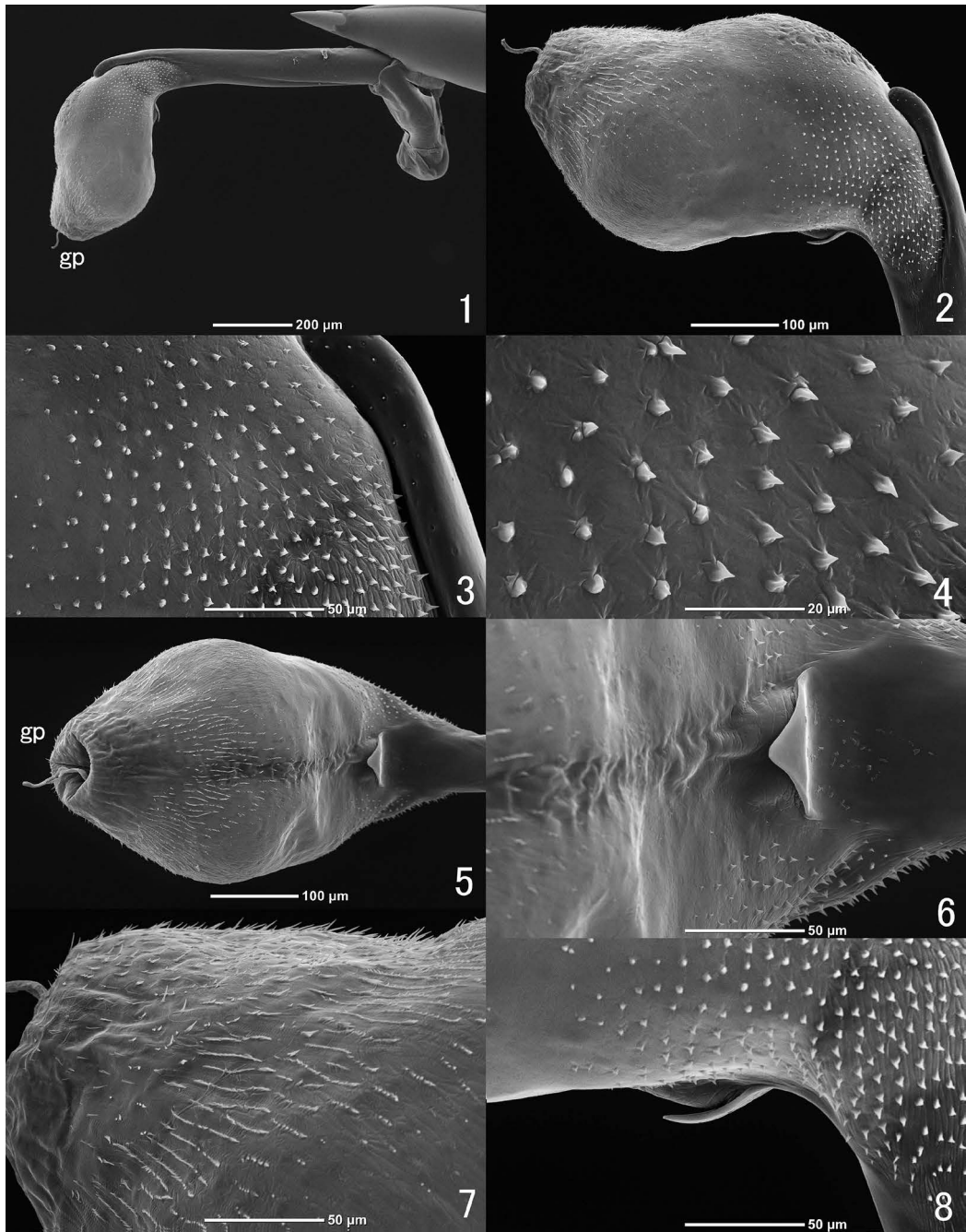
According to ČIAMPOR (2001, 2002, 2003, 2004, 2005 a, b, 2006) and ČIAMPOR and KODADA (2004), almost species of the genus does not possess eclerites in their endophallus but members of *Graphelmis picta* species group possess distinct sclerites (see ČIAMPOR, 2004: figs. 81–88). The Japanese species, *G. shirahatai* is assigned to *Graphelmis clermonti* species group (ČIAMPOR, 2004) that endophallus is lacking distinct sclerites.

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Figs. 1–8. SEM photographs of endophallus of *Garapelmis shirahatai* (NOMURA) from Shimane Prefecture, Japan. — 1, Penis and endophallus; 3, 4, spines on basal area; 7, spines on apical area, 6, 8, triangular smooth piece on basal-ventral part. — 1–4, 7, 8, Lateral view; 5, 6, ventral view. gp, gonopore.

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