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Hyphydrus falkenstromi Gschwendtner and *Sandracottus mixtus* (Blanchard) (Coleoptera: Dytiscidae) new to Korea

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제주알물방개와 호랑물방개(딱정벌레목 : 물방개과)의 국내 첫 보고

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ABSTRACT: Two dytiscid beetle species, *Hyphydrus falkenstromi* Gschwendtner and *Sandracottus mixtus* (Blanchard), are identified for the first time in Korea. *Hydaticus pacificus* Aube previously recorded in Korea was misidentification of *S. mixtus*. Habitus photographs, redescriptions, and diagnostic characters with line drawings of the species are provided.

Key words: Coleoptera, Dytiscidae, *Hyphydrus falkenstromi*, *Sandracottus mixtus*, New records, Korea

초 록: 물방개과에 속하는 두 종 – *Hyphydrus falkenstromi* Gschwendtner (제주알물방개)와 *Sandracottus mixtus* (Blanchard)(호랑물방개) – 을 국내에서 처음 보고한다. 이미 기록되었던 *Hydaticus pacificus* Aube는 *S. mixtus* (Blanchard)의 오동정이다. 두 종에 대한 성충의 사진, 재기재문 및 주요 형질에 대한 그림을 함께 제시한다.

검색어: 딱정벌레목, 물방개과, 제주알물방개, 호랑물방개, 미기록종, 한국

The beetle family Dytiscidae contain 53 species in 20 genera from Korea (Jung et al. 2011). While surveying the Korean aquatic beetle fauna and studying the second author's private collection, we identified *Hyphydrus falkenstromi* Gschwendtner and *Sandracottus mixtus* (Blanchard) collected from Jeju-do Island for the first time in Korea. We also found that *Hydaticus pacificus* Aube previously reported by Yoon and Ahn (1988) was an incorrect identification of *S. mixtus* and so eliminate it from the Korean dytiscid fauna.

In this paper, we provide habitus photographs, redescriptions, and diagnostic characters with line drawings. The specimens used in this study are deposited in the Chungnam National University Insect Collection (CNUIC), Daejeon, Korea.

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Taxonomic accounts

***Hyphydrus falkenstromi* Gschwendtner, 1939 제주알물방개 (신칭)**(Figs. 1a, 2)

Hyphydrus falkenstromi Gschwendtner, 1939: 25; Brinck, 1943: 9; Balfour-Browne, 1944a: 129; Biström, 1982: 42; Nilsson, 2003: 74.

Hyphydrus brincki Guignot, 1946: 72.

Redescription. Length 3.5–4.5 mm. Body round, very convex, surface glossy with punctures (Fig. 1a). Head and pronotum mostly reddish brown; interocular spot and posterior margin of pronotum black; elytra yellow to orange with black markings

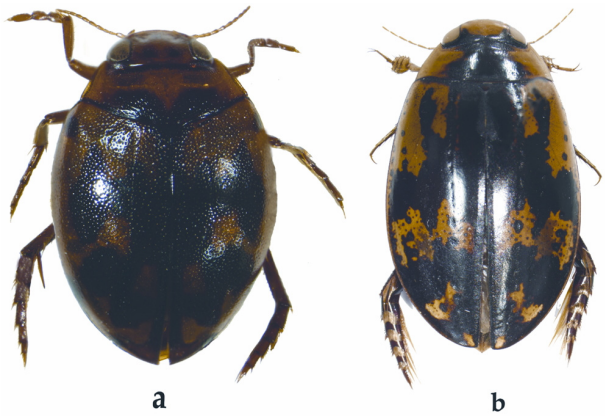

Fig. 1. Habitus. (a) *Hyphydrus falkenstromi*, 3.8 mm; (b) *Sandracottus mixtus*, 13.5 mm.

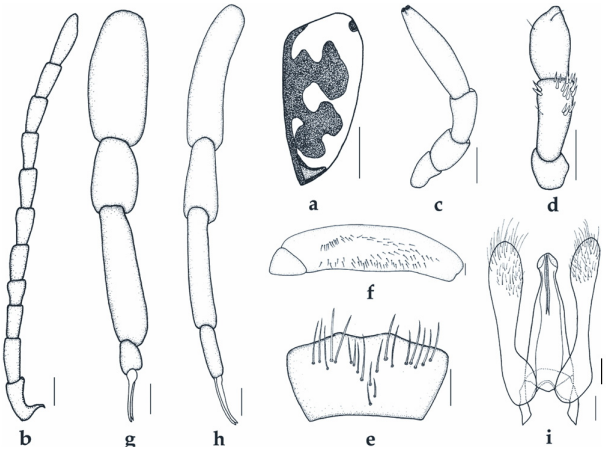

Fig. 2. *H. falkenstromi*. (a) elytron, dorsal aspect; (b) antenna; (c) maxillary palpus, ventral aspect; (d) labial palpus, ventral aspect; (e) labium, ventral aspect; (f) profemora, lateral aspect; (g) protarsus, lateral aspect; (h) mesotarsus, lateral aspect; (i) aedeagus, ventral aspect. (a) Scales = 1.0 mm, (b)–(i) Scales = 0.1 mm.

(Fig. 2a); ventral surface reddish brown. Head semicircular and about 2 times longer than wide; anterior part with one linear impression, compact punctures and setae present on around eyes, clypeal groove with few setae. Antennae long and slender, antennomere 4 shortest, 11 longest (Fig. 2b). Maxillary palpomere 4 longest and bifid on apical part (Fig. 2c). Labial palpomere 1 smallest, 2 about 3.0 times longer than 1 and many setae present on apical part, 3 protrude apical part (Fig. 2d). Labium anterior margin bisinuated; anterior and median parts with long setae (Fig. 2e). Mentum with setae on sub-apical parts, anterior margin slightly pointed. Pronotum pentagonal, widest at hind angle and with a row of black punctures on anterior margin. Prosternal process with compact spines. Profemur with many setae except median parts (Fig. 2f). Protibia with a row of spines on baso-lateral part. Protarsomere 1 about 2.0 times longer than 2 and as long as 3. Protarsal claw longer than protarsomere 4 (Fig. 2g). Elytron widest at anterior third, marking of apical part brown (Fig. 2a). Mesotibia with a row of compact spines on anterior margin. Mesotarsomere 1 longer than 3. Mesotarsal claw as long as mesotarsomere 1 (Fig. 2h). Metaventrite and metacoxal plate with setiferous large punctures. Metatrochanter with a row of setae on posterior part. Metatibial inner spine serrated. Sternite with two types of punctures, puncture of lateral part larger than that of middle part. Sternites IV–VI with about 10 long setae on median part. Sternite VII with compact setae on posterior margin and sub-apical part. Median lobe of aedeagus shorter than paramere, narrowest at sub-apical part and slightly pointed apical part (Fig. 2i). Paramere elongated with many long setae, narrowest at posterior fourth (Fig. 2i).

Remarks. This species can be distinguished from *H. japonicus* Sharp by slender mesotarsus and median lobe.

Material examined. Korea: Jeju Prov.: 1♂1♀, Seoguipo-si, Seoho-dong, 23 VII 1990, SH Lee, *ex* pond (1♂ on slide, CNUIC); 3♂♂, Seoguipo-si, Seongsan-eub, Oojo-ri, 24 VII 1990(1♂ on slide, CNUIC); 1♀, Jeju-si, Hankyeong-myeon, Yongsu-ri, 20 VIII 1994; 1♂, Aewol-eub, Yongheung-ri, eomuksaemi-pond, 31 VII 2005.

Distribution. Korea, China, Russia (Far East).

***Sandracottus mixtus* (Blanchard, 1843) - 호랑물방개(신칭) (Figs. 1B, 3)**

Dytiscus fasciatus Fabricius, 1775: 825 [homonym].

Hydaticus mixtus Blanchard, 1843: pl. 4

Hydaticus hunteri Crotch, 1872: 205 [replacement name].

Sandracottus crucialis Régimbart, 1899: 333.

Sandracottus mixtus: Balfour-Browne, 1944b: 355; azirani, 1969: 275; Nilsson, 1995: 76; 2003: 49.

Hydaticus pacificus: Yoon & Ahn, 1988: 257 [misidentification of *S. mixtus*].

Redescription. Length 13.0–15.0 mm. Body oval, surface glossy with sparse small punctures and microsculpture (Fig. 1b). Dorsal surface mostly yellow but posterior margin of

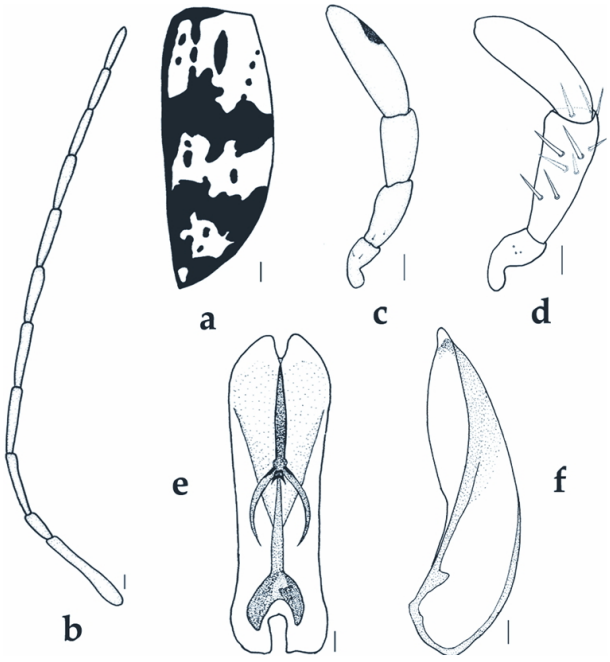

Fig. 3. *S.mixtus.* (a) elytron, dorsal aspect; (b) antenna; (c) maxillary palpus, ventral aspect; (d) labial palpus, ventral aspect; (e) median lobe of aedeagus, ventral aspect; (f) paramere, ventral aspect. (a) Scales = 1.0 mm, (b)–(f): Scales = 0.1 mm.

head, median part of pronotum, marking of elytra black (Fig. 3a). Ventral surface mostly brown but hypomera, epipleura, front and middle legs yellow. Head almost semicircular and eye protrude. Clypeus with two grooves and setae on anterior part. Antennae long and slender, antennomere 2 shortest (Fig. 3b). Labrum transverse, emarginated on anterior margin. Maxillary palpomere 4 longest and many punctures present on subapical part (Fig. 3c). Labial palpomere 2 as long as 3 and many setae present (Fig. 3d). Pronotum widest at posterior part, about 2.0 times wider than head and linear plicae present on median part. Hypomeron with many setae on anterior part. Prosternum with many setae on lateral parts. Prosternal process rounded apically and punctures present on median part. Protarsomere 5 about 2.5 times longer than 4. Scutellum with sparse punctures. Elytra widest at anterior third. Mesofemora 1.5 times longer than mesotibia and long spines present on ventral margin. Mesotibial inner spine longer than outer spine. Mesotarsomere 1 longest and 2 times longer than 5. Metatarsal claw as long as tarsomere 5. Metaventrite with a row of setae on anterior and lateral parts. Metafemur 2.0 times longer than metatibia. Metatibia and tarsus with transverse reticulation. Metatibial spines bifid on apical part. Metatarsomere 4 shortest; 5 longer than claws. Metatarsal inner claw longer than outer claw. Sternites II-VI with vertical reticulation. Median lobe of aedeagus nearly parallel-sided, widest at anterior fifth and distinctly bifid apical part (Fig. 3e). Paramere slightly longer than median lobe and acute on apical part (Fig. 3f).

Remarks. This species can be distinguished from *S. dejeanii (*Aubé) and *S. festivus* (Illiger) by the pattern of black marking on elytra and nearly parallel-sided median lobe. Yoon and Ahn (1988) firstly reported *Hydaticus pacificus* Aube in Korea but it was an incorrect identification of *S. mixtus.* We examined the specimens (1♀, Jeju-si, Ara-dong, Gwaneum-temple, 2 VIII 1955, PS Cho; 1♂, Awwoleub, Gwangryeong-ri, 21 XI 1982, JO Byon) used in their studies.

Material examined. Korea: Jeju Prov.: 1♀, Jeju-do, 18 VII 1966, KS Park, 1♀, Jeju-si, Ara-dong, Gwaneum-temple, 2 VIII 1955, PS Cho; 6♂♂10♀♀, Jeju-si, Ara 1-dong, 19 VIII 1994, SH Lee, *ex* stream (1♂: on slide, CNUIC); 1♀, Bukjeju-gun, Jocheon-eub, Gyorae-ri, 12 VI 2005, DH Lee; 1♂1♀, 22 V 2006; 1♂, Awwoleub, Gwangryeong-ri, 21 XI 1982, JO Byon; 1♀, Awwoleub, Yusuam-ri, 17 VII 1990, GD Han; 4♂♂1♀, Aewol-eub, Yusuam-ri, Goimuloreum, 9 IX 2011, SW Jung, *ex* pond (1♂: on slide, CNUIC).

Distribution. Korea, China, Japan, India, Indonesia, Myanmar.

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