New Synonyms and Redescriptions of Three Species of the Mycophagous Genus Gyrophaena (Coleoptera: Staphylinidae: Aleocharinae) in East Asia

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NEW SYNONYMS AND REDESCRIPTIONS OF THREE SPECIES OF THE MYCOPHAGOUS GENUS *GYROPHAENA* (COLEOPTERA: STAPHYLINIDAE: ALEOCHARINAE) IN EAST ASIA

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ABSTRACT

Three new synonyms are proposed for the *Gyrophaena* Mannerheim species from East Asia: *G. cariniventris* Cameron, 1933 = *G. tricuspidata* Assing, 2005; *G. triquetra* Weise, 1877 = *G. sunanica* Pasńik, 2001; and *G. yotsudeba* Cameron, 1933 = *G. defecta* Cameron, 1933. Redescriptions, habitus photos, and line drawings of diagnostic characters are provided. *Gyrophaena cariniventris* and *G. yotsudeba* are reported for the first time in the Korean peninsula.

Key Words: *Gyrophaena cariniventris*, *Gyrophaena triquetra*, *Gyrophaena yotsudeba*, new synonym, Korea

RESUMEN

Se proponen tres nuevas sinonimias para las especies de *Gyrophaena* Mannerheim de Asia Este: *G. cariniventris* Cameron, 1933 = *G. tricuspidata* Assing, 2005; *G. triquetra* Weise, 1877 = *G. sunanica* Pasńik, 2001; y *G. yotsudeba* Cameron, 1933 = *G. defecta* Cameron, 1933. Se proveen redescripciones, fotos del habitus, y dibujos de las caracteristicas diagnósticas. Se reportan *Gyrophaena cariniventris* y *G. yotsudeba* por primera vez para la península de Corea.

In an ongoing taxonomic study of the East Asian Gyrophaenina, we have borrowed many holotypes and syntypes from several European Natural History Museum. After detailed morphological comparative study, we propose 3 new synonyms in the genus *Gyrophaena* Mannerheim (*G. cariniventris* Cameron = *G. tricuspidata* Assing; *G. triquetra* Weise = *G. sunanica* Pas´nik; and *G. yotsudeba* Cameron = *G. defecta* Cameron), none of which has been described in detail and illustrations were not provided. We have studied 7 specimens of *G. cariniventris*, 136 specimens of *G. triquetra*, and 188 specimens of *G. yotsudeba* including 1 holotype and 7 syntypes.

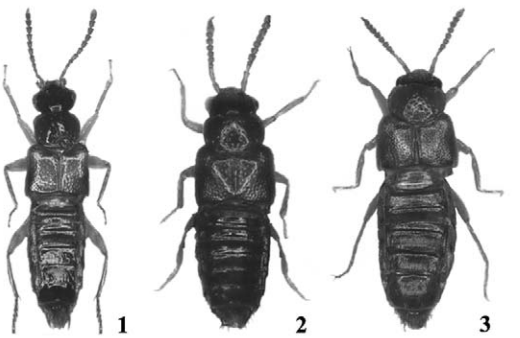
In this paper, we redescribe these 3 species with habitus and line illustrations of the diagnostic characters, and report *Gyrophaena cariniventris* and *G. yotsudeba* for the first time in the Korean peninsula. The Korean specimens studied are deposited in the Chungnam National University Insect Collection (CNUIC, Daejeon), Korea.

Gyrophaena cariniventris Cameron
(Figs. 1 and 4-12)

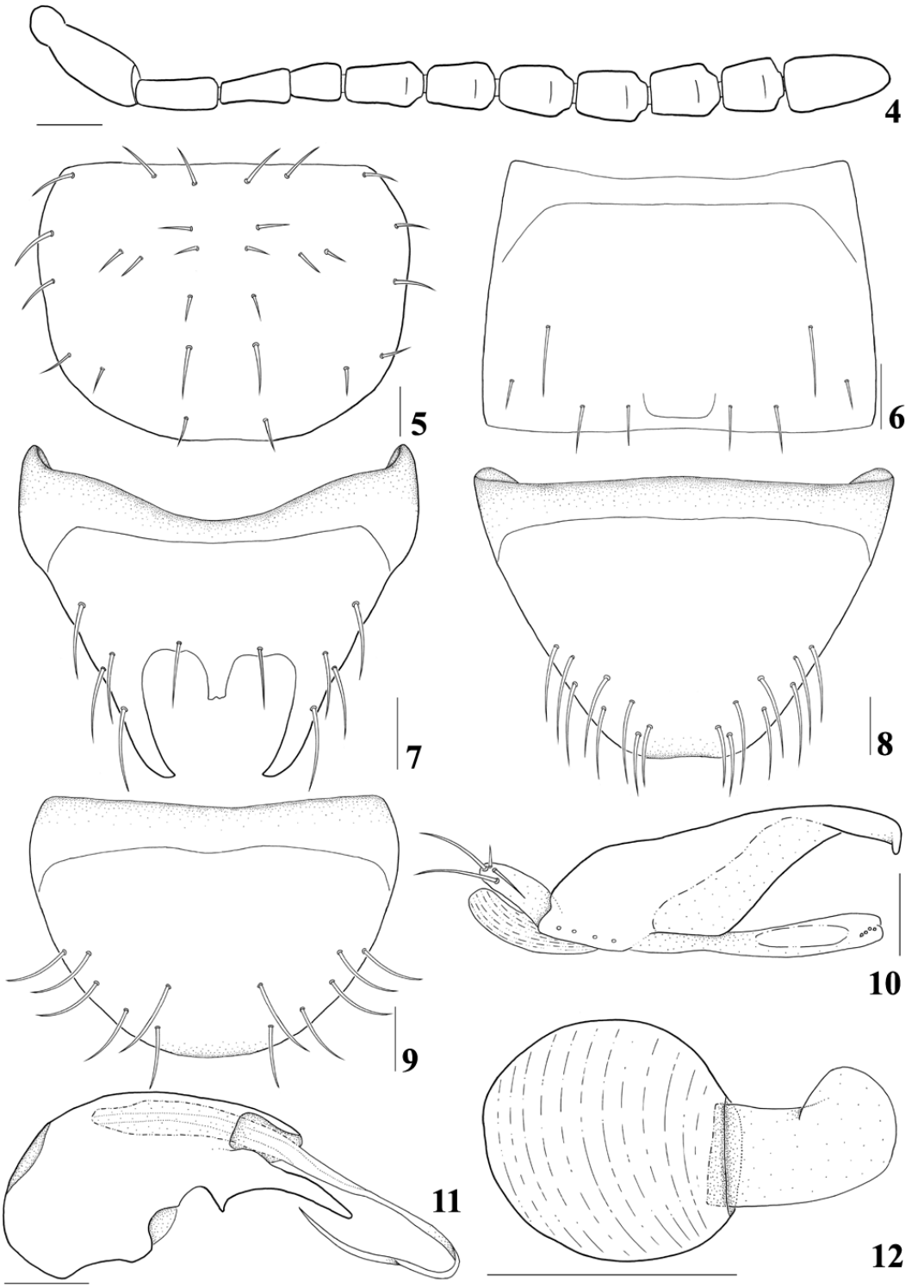
Gyrophaena cariniventris Cameron, 1933: 173; Smetana, 2004: 443.

Gyrophaena tricuspidata Assing, 2005: 26. **New synonym.**

Description. Body length 2.8-3.6 mm, light brown to brown; head dark brown, antenna yellow, legs yellow, abdominal tergites VI-VIII dark brown. Body shape narrow and elongate in dorsal aspect, widest at posterior margin of elytra, surface subglossy and slightly pubescent (Fig. 1). Head 1.3 times wider than long, widest across eye, several punctures present. Antennomere 4 about 1.4 times longer than wide, 5 about 1.7 times longer than wide, 6-7 about 1.4 times longer than wide, 8 about 1.3 times longer than wide, 9 about 1.1 times longer than wide, 10 about as long as wide, 11 about 2.1 times longer than wide (Fig. 4). Pronotum 1.4 times wider than long, widest at middle, anterior margin straight, posterior margin broadly round (Fig. 5). Elytra 1.6 times longer than



Figs. 1-3. Habitus. 1, *Gyrophaena cariniventris*, male, 3.2 mm; 2, *Gyrophaena triquetra*, male, 1.5 mm; 3, *Gyrophaena yotsudeba*, male, 2.5 mm.



Figs. 4-12. *Gyrophaena cariniventris*. 4, antenna, dorsal aspect; 5, pronotum, dorsal aspect; 6, male tergite VII, dorsal aspect; 7, male tergite VIII, dorsal aspect; 8, male sternite VIII, ventral aspect; 9, female sternite VIII, ventral aspect; 10, paramere, lateral aspect; 11, median lobe, lateral aspect; 12, spermatheca, lateral aspect. Scales = 0.1 mm.

wide, postero-lateral angles of elytra sinuate. Tergites II-VI transversely impressed. Male tergite VII with one distinct tubercle (Fig. 6). Male tergite VIII with three processes, outer two processes longer than inner process and sharp at apex, inner process narrow and bifid at apex (Fig. 7). Male sternite VIII postero-medially truncate (Fig. 8), female sternite VIII more or less round (Fig. 9). Median lobe cylindrical and asymmetrical, apical process of median lobe slightly curved (Fig. 11). Flagellum moderate and not coiled. Apical lobe of paramere as in Fig. 10. Spermatheca as in Fig. 12.

Materials Examined. Syntype (1 male, NHM) labeled as follows: Japan Chuzenji, AT FT J.E.A. Lewis, M. Cameron. Bequest. B.M. 1955-147, *Gyrophaena cariniventris* Cam.; Korea: Gangwon Province, Jeongseon-gun, Gohan-eup, Mt. Hambaeksan, 13 VII 1999, HJ Kim, *ex* mushroom (1 male, CNUIC); Pyeongchang-gun, Jinbu-myeon, Mt. Odaesan, Sangwonsa, 22 VI - 16 VIII 2001, SJ Park, CW Shin, FIT (3 males, CNUIC); Taebaek-city, Mt. Taebaeksan, Baektansa Area, 14 VI 1999, US Hwang, HJ Kim, *ex* mushroom (2 females, CNUIC).

Distribution. Korea, China, and Japan.

Remarks. Assing (2005) described *G. tricuspidata* from China but diagnostic characteristics (structure of antenna, male tergite VII and VIII, sternite VIII, median lobe, and spermatheca) of this species were not sufficient to maintain the separation of *G. tricuspidata* and *G. cariniventris*. Therefore, we synonymized *G. tricuspidata* under *G. cariniventris*.

Gyrophaena cariniventris is similar to *G. laevior* Cameron but can be distinguished by slender body, antennomeres 6-9 elongate (antennomeres 6-9 subquadrate in *G. laevior*) (Fig. 4), male tergite VII with 1 tubercle (male tergite VII without tubercle in *G. laevior*) (Fig. 6), male tergite VIII with 3 processes inner process narrow and bifid at apex (male tergite VIII with 3 processes inner process broad in *G. laevior*) (Fig. 7), and the structure of median lobe (Fig. 11).

Gyrophaena triquetra Weise
(Figs. 2 and 13-21)

Gyrophaena triquetra Weise, 1877: 91; Smetana, 2004: 446.

Gyrophaena sunanica Pasńik, 2001: 191; Smetana, 2004: 446. **New synonym.**

Description. Body length about 1.4-1.8 mm, light brown to brown; head dark brown, legs yellow, abdominal tergites III-VI dark brown. Body shape moderate and elongate in dorsal aspect, widest at posterior margin of elytra, surface subglossy and slightly pubescent (Fig. 2). Head 1.3 times wider than long, widest across eye, several punctures present. Antennomere 4 about 1.1 times longer than wide, 5-8 as long as wide, 9-10 about 1.1 times wider than long, 11 about 1.7 times longer than wide (Fig. 13). Pronotum 1.4 times wider than long, widest at middle, anterior margin straight, posterior margin broadly round (Fig. 14). Elytra 1.5 times longer than wide, postero-lateral angles of elytra slightly sinuate. Tergites III-VI transversely impressed. Male tergite VII with 2 tubercles at postero-middle margin (Fig. 15). Male tergite VIII with 2 processes, protruded at middle (Fig. 16). Male sternite VIII postero-medially more or less round (Fig. 17), female sternite VIII more or less round (Fig. 18). Median lobe cylindrical and asymmetrical, apical processes of median lobe trifid, slightly curved (Fig. 20). Flagellum moderate and not coiled. Apical lobe of paramere as in Fig. 19. Spermatheca as in Fig. 21.

Materials Examined. Syntype (3 specimens, MNHUB) labeled as follows: Japan, S. Hiller, *Gyrophaena triquetra* W., Syntypus *Gyrophaena triquetra* Weise, 1877 labeled by MNHUB 2007; Syntype (1 male, SDEI) labeled as follows: coll. DEI, Müncheberg, Syntypus, Coll. Weise; Syntype (1 female, SDEI) labeled as follows: Japan, Hiller, Coll. Weise, Syntypus, *Gyrophaena triquetra* W., coll. DEI, Müncheberg, *Gyrophaena triquetra* Weise; Korea: Gangwon Province, Yangyang-gun, Seomyeon, Mt. Seolaksan, Seolakkyegok, 16 VIII 2000, MH Kim, *ex* mushroom (93 specimens, CNUIC); Sokcho-city, Mt. Seolaksan, Osaekyaksu, 20 VII 2004, JS Park, *ex* mushroom (19 specimens, CNUIC); Chungbuk Province, Boeun-gun, Mt. Songnisan, 12 IX 1999, MH Kim, *ex* mushroom (12 specimens, CNUIC); Chungnam Province, Taeangun, Mt. Baekhwasan, 6 VII 2001, SJ Park, *ex* mushroom (7 specimens, CNUIC).

Distribution. Korea and Japan.

Remarks. Pas´nik (2001) described *G. sunanica* from North Korea but diagnostic characteristics (structure of antenna, male tergite VII and VIII, median lobe) of this species were not sufficient to separate *G. sunanica* from *G. triquetra*. Therefore, we synonymized *G. sunanica* under *G. triquetra*.

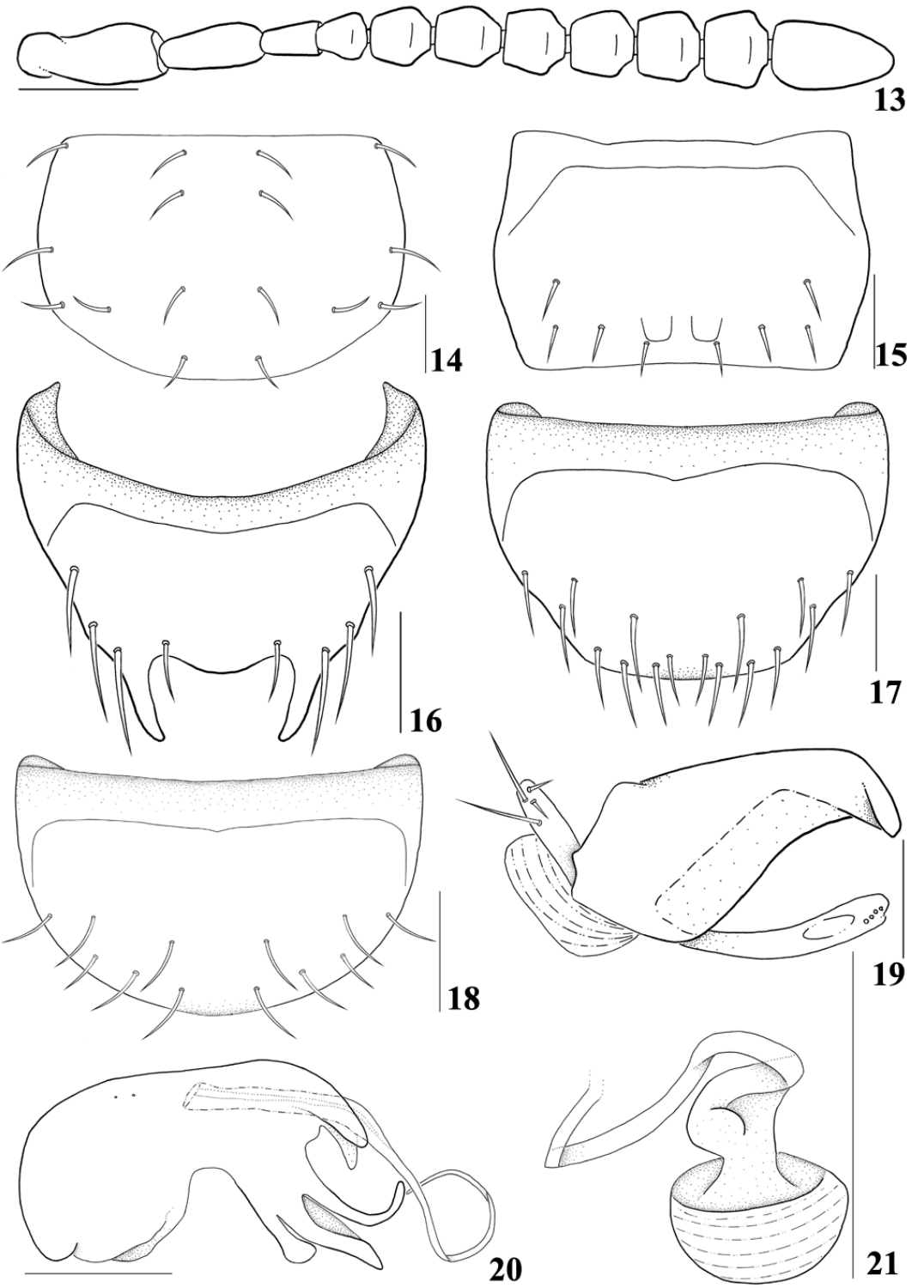
Gyrophaena triquetra is very similar to *G. rousi* Dvořák but can be distinguished by male tergite VII with 2 tubercles (male tergite VII with 1 tubercle in *G. rousi*) (Fig. 15), postero-middle margin of male tergite VIII protrude (postero-middle margin of male tergite VIII truncate in *G. rousi*) (Fig. 16), and the structure of median lobe (Fig. 20).

Gyrophaena yotsudeba Cameron
(Figs. 3 and 22-30)

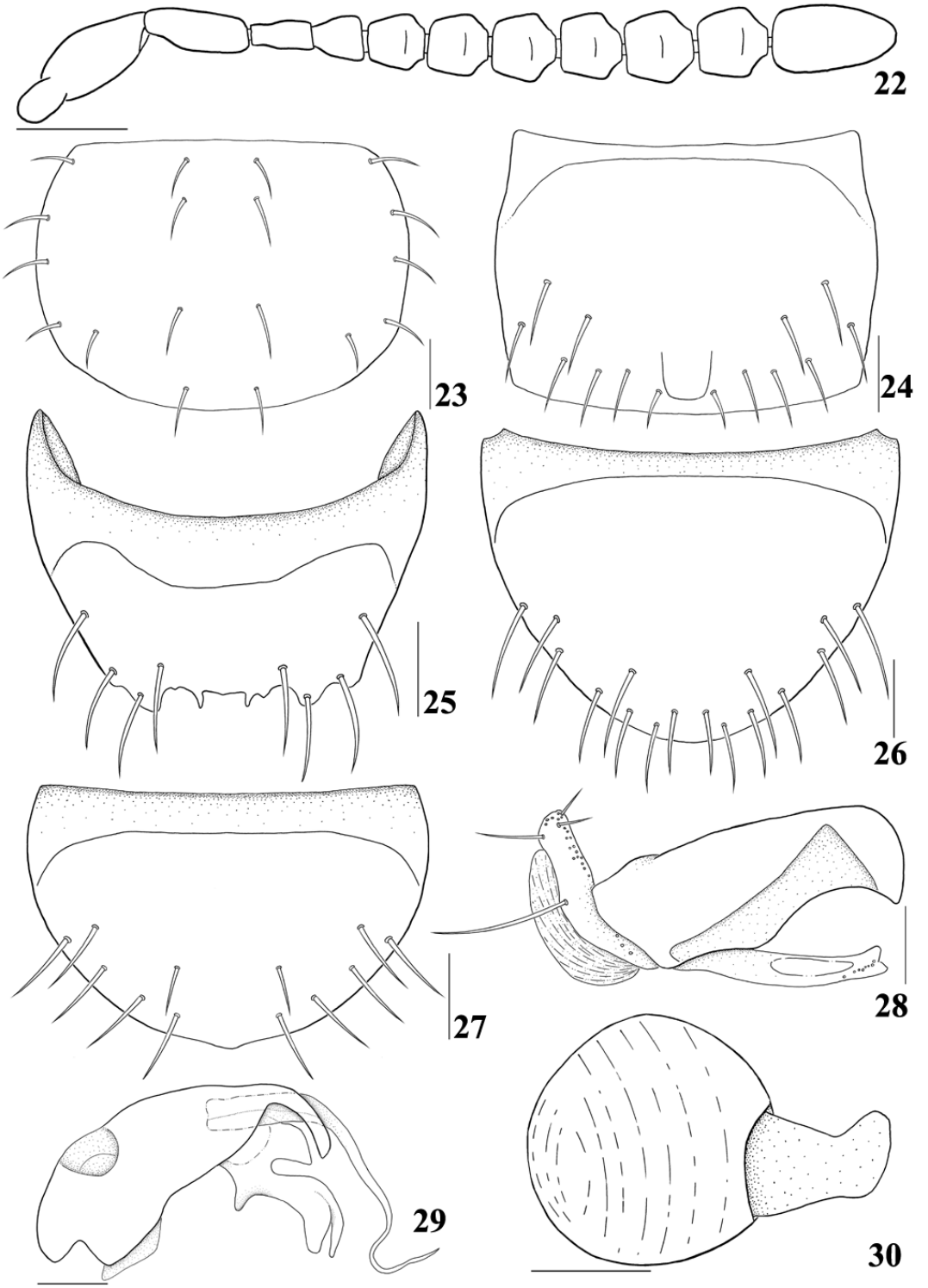
Gyrophaena yotsudeba Cameron, 1933: 208; Smetana, 2004: 446.

Gyrophaena defecta Cameron, 1933: 209; Smetana, 2004: 443. **New synonym.**

Description. Body length about 2.1-2.6 mm, light brown to brown; head dark brown, antennae



Figs. 13-21. *Gyrophaena triquetra*. 13, antenna, dorsal aspect; 14, pronotum, dorsal aspect; 15, male tergite VII, dorsal aspect; 16, male tergite VIII, dorsal aspect; 17, male sternite VIII, ventral aspect; 18, female sternite VIII, ventral aspect; 19, paramere, lateral aspect; 20, median lobe, lateral aspect; 21, spermatheca, lateral aspect. Scales = 0.1 mm.



Figs. 22-30. *Gyrophaena yotsudeba*. 22, antenna, dorsal aspect; 23, pronotum, dorsal aspect; 24, male tergite VII, dorsal aspect; 25, male tergite VIII, dorsal aspect; 26, male sternite VIII, ventral aspect; 27, female sternite VIII, ventral aspect; 28, paramere, lateral aspect; 29, median lobe, lateral aspect; 30, spermatheca, lateral aspect. Scales = 0.1 mm.

and legs yellow. Body shape moderate and elongate in dorsal aspect, widest at posterior margin of elytra and abdominal tergite IV (Fig. 3). Head 1.3 times wider than long, widest across eye, many distinct punctures present. Antennomere 4 about 1.1 times longer than wide, 5-6 as long as wide, 7-9 about 1.1 times wider than long, 10 as long as wide, 11 about 1.8 times longer than wide (Fig. 22). Pronotum 1.3 times wider than long, widest at middle, anterior margin straight, posterior margin broadly round (Fig. 23). Elytra 1.5 times longer than wide, postero-lateral angles of elytra slightly sinuate. Tergites III-VI transversely impressed. Paratergites III-VII well developed. Male tergite VII with 1 distinct tubercle at postero-middle margin (Fig. 24). Male tergite VIII with 6 processes, inner 4 processes minute (Fig. 25). Male sternite VIII postero-medially convex, more or less round (Fig. 26), female sternite VIII more or less round (Fig. 27). Median lobe cylindrical and asymmetrical, apical process of median lobe as in Fig. 29. Flagellum moderate and not coiled. Apical lobe of paramere as in Fig. 28. Spermatheca as in Fig. 30.

Materials Examined. Syntype (1 male, NHM) labeled as follows: Japan Chuzenji, AT FT J.E.A. Lewis, M. Cameron. Bequest. B.M. 1955-147., *yotsudeba*, *Gyrophaena yotsudeba* Cam. P.M. Hammond det. 1973; Holotype (1 male, NHM) labeled as follow: Japan Chuzenji, AT FT. J.E.A. Lewis, M. Cameron. Bequest. B.M. 1955-147, *G. defecta* Cam. Type; Korea: Gangwon Province, Pyeongchang-gun, Mt. Odaesan, Chongmyolbogung, 8 VII 1998, KJ Ahn, *ex* mushroom (42 specimens, CNUIC); Mt. Odaesan, Bukdaesa, 23 VIII 2000, MH Kim, *ex* mushroom (37 specimens, CNUIC); Yangyang-gun, Seo-myeon, Mt. Seolaksan, Seolakkyegok, 16 VIII 2000, MH Kim, *ex* mushroom (48 specimens, CNUIC); Taebaek-city, Jangseong-dong, Mt. Taebaeksan, Baekdansa, 16 VII 2000, MH Kim, *ex* mushroom (59 specimens, CNUIC).

Distribution. Korea and Japan.

Remarks. The holotype of *G. defecta* was very similar to syntypes of *G. yotsudeba*, both of which were simultaneously described by Cameron (1933). Diagnostic characteristics (structure of antenna, male tergite VII and VIII, sternite VIII, median lobe, paramere, and spermatheca) of *G. defecta* were exactly same as *G. yotsudeba*. Therefore, we synonymized *G. defecta* under *G. yotsudeba*.

Gyrophaena yotsudeba is similar to *G. yotsumata* Cameron but can be distinguished by antennomeres 5-6 subquadrate (slightly elongate in *G. yotsumata*) (Fig. 22), male tergite VIII with 6 processes, inner 4 processes minute (male tergite VIII with 4 processes in *G. yotsumata*) (Fig. 26), and the structure of median lobe (Fig. 29).

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