

Three new records of Biphyllidae (Coleoptera) in Korea

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Abstract

Three species of the family Biphyllidae - *Biphyllus japonicus* Sasaji, 1983, *Biphyllus loochooanus* Sasaji, 1991 and *Biphyllus oshimanus* Nakane, 1988 - are reported for the first time in Korea. Descriptions, photographs of the adults and line drawings of the diagnostic characters are provided for all the species recognized in this study.

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Introduction

The family Biphyllidae LeConte, false skin beetles, is belonging to the superfamily Cucujoidea in the Coleoptera and distributed throughout all continents except Antarctica, with greatest diversity (66 species) in the Neotropics (Schenkling, 1934; Wegrzynowicz, 2015). They are rather poorly known, perhaps because of their small size, inconspicuous appearance and clandestine way of life. Currently, Biphyllidae comprise more than 185 described species and 1 fossil species in seven genera worldwide (Schenkling 1934; Wegrzynowicz, 2015). There are about 29 species in two genera in the Palaearctic region (Jelínek, 2007). In East Asia, 16 species in one genera are recorded from Japan and Russia (Far East) (Jelínek 2007, Hirano, 2010).

Adults of this family are distinguished by the oval or elongate-oval body, small size (2.0-4.0 mm); surface covered with suberect or decumbent hairs, 5-5-5 tarsal formula and the slender tarsal lobes on tarsomeres 2 and 3.

The biology and immature stages are poorly known. Most

taxa within the family are likely mycetophagous, developing on dendrophilous fungi (Wegrzynowicz, 2015). These species live in the leaf litter and under the bark of dead trees or fallen branches which often associated with fungi and in the fruiting bodies of fungi (Goodrich, 2002; Cline and Shockley, 2010). Some species are associated with the fruiting bodies of Aphyllopharales which live on the various tree. For example, *Biphyllus oshimanus* Nakane lives in fruiting bodies of *Trametes versicolor* (L.) Lloyd and *Bjerkandera adusta* (Willd.) P. Karst. in Korea (per. obs.).

Seven species in one genera belonging to the family Biphyllidae were previously recorded in Korea (Park et al., 2012; Hong and Lee, 2014; Kim and Hong, 2016). In this paper, three species: *Biphyllus japonicus* Sasaji, 1983, *Biphyllus loochooanus* Sasaji, 1991 and *Biphyllus oshimanus* Nakane, 1988, are reported for the first time in Korea.

Materials and Methods

Materials for this study were collected from April to

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October between 2008 and 2020. Most of samples were collected by flight intercept traps, installed in the mixed forest, or often collected from fungi including Basidiomycetes and mycelina which are commonly used food source of fungivorous species, and then reared in the laboratory.

The detailed morphological characters are carefully examined under stereomicroscopy (M50, DM2500, Leica, Germany). Photographs for adults were captured by using digital camera (Canon EOS 60D, Japan). Several taken layers of pictures were stacked by the software (Zerene Stacker 1.04, Zerene Systems, USA). All samples used in this study, including types, are deposited in Woori Entomological Institute (Seoul, Korea). The following abbreviation was used to indicate the provinces in which the various specimens were collected: Gangwondo, GW; Gyeonggido, GG; Jeollabuk-do, JB; Jeollanam-do, JN; Gyeongsanbuk-do, GB; Jejudo, JJ.

Systematic accounts

Family Biphyllidae LeCont, 1861 배출벌레과

Genus *Biphyllus* Dejean 배출벌레속

Biphyllus Dejean, 1821: 102.

Diphyllus Berthold, 1827: 393.

Thallestus Wollaston, 1862: 153.

Type species: *Dermestes lunatus* Fabricius, 1787.

Biphyllus japonicus Sasaji, 1983 어깨무늬배출벌레 (Figs. 1, 4, 7)

Biphyllus japonicus Sasaji, 1983: 34.



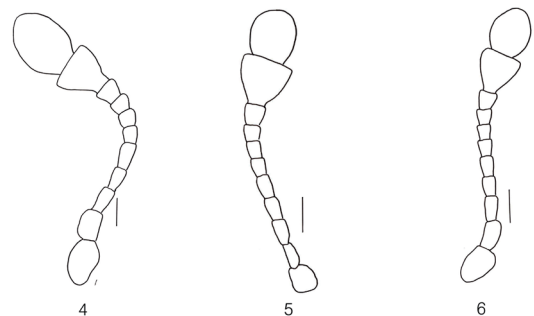
Figs. 1-3. Adults of Korean Biphyllidae. 1. *Biphyllus japonicus*; 2. *Biphyllus loochooanus*; 3. *Biphyllus oshimanus*.

Description

Body length 2.0-2.5 mm. Body oval, strongly convex dorsally, weakly shiny; body color mostly black to brownish black; antennae, palpi and legs yellowish black; one humeral red marking on elytron; covered with relatively short pubescence. Head about 1.7 times narrower than pronotal base; sparsely and finely punctate; ocular distance about 2.1 times wider than eye diameter; antennae clavate and antennae relatively slender; third antennomere about 1.2 times longer than fourth; 10th antennomere distinctly wider than preceding antennomeres, antennomeres 10-11 strongly widened, forming a big club; apical antennomere oval and rounded apically, almost equal to penultimate in width. Pronotum transverse, about 1.8 times broader than long, narrowing anteriorly; with irregular, coarse and deep punctures; strongly convex; with a single longitudinal carina along each lateral side (often with longitudinal carinae, inner carina short), paralleled to lateral margin; lateral margins weakly explanate, rimmed and not serrate; basal margin strongly rimmed and sinuate, arched posteriorly at median part. Elytra striate-punctate; striae punctures large, regular and deep; covered with relatively long, dense and suberect hairs; interstriae weakly convex, with tiny and dense punctures.; humeral red markings short and oblique.

Specimens examined: [JJ] 1♂2♀, Gyorae Natural Recreation Forest, Jocheon-eup, Jeju-si, 11.vi.-21.vii.2016, J.B. Seung and B.H. Jung (F.I.T.); 1♀, Gyorae Natural Recreation Forest, Jocheon-eup, Jeju-si, 1.vi.-21.vii.2018, J.B. Seung and B.H. Jung (F.I.T.)

Distribution: Korea (New Record), Japan.



Figs. 4-6. Antennae of Korean Biphyllidae (scale bar = 0.1mm). 4. *Biphyllus japonicus*; 5. *Biphyllus loochooanus*; 6. *Biphyllus oshimanus*.

Remarks: This species is distinguished from other Korean species by only one red humeral markings on elytron.

Biphyllus loochooanus Sasaji, 1991 긴줄무늬배줄벌레 (Figs. 2, 5, 8)

Biphyllus loochooanus Sasaji, 1991: 12.

Description

Body length 1.7-2.0 mm. Body long-oval, about 2.2 times longer than wide; strongly convex dorsally, weakly shiny; body color mostly black to brownish black; antennae yellowish brown and legs reddish brown; elytron with longitudinal marking band; covered with dense, suberect and relatively long hairs. Head densely and coarsely punctate; ocular distance about twice wider than eye diameter; antennae clavate and antennae relatively slender; third antennomere almost equal to fourth; antennomeres 10-11 distinctly wider than preceding antennomeres, strongly widened, forming a big and wide club; apical antennomere oval and rounded apically, almost equal to penultimate in width. Pronotum transverse, about 1.6 times wider than long; widest at basal 1/3 part, gradually narrowing anteriorly; with regular, coarse, large and deep punctures; strongly convex; with a single longitudinal carina along each lateral side (often with 2 longitudinal carinae, inner carina short and indistinct), paralleled to lateral margin; lateral margins weakly rimmed and not serrate; basal margin rimmed and sinuate, arched posteriorly at median part. Elytra about 1.6 times longer than wide; widest basal

1/3 part; elytron with red longitudinal marking band, red marking connected from humeral to apical part; covered with relatively long, dense and suberect hairs; striate-punctate; striae punctures regular, large and deep; interstriae convex, with tiny and sparse punctures.

Specimens examined: [GW] 1ex., Near Beopheung-sa, Mureung-ri, Sujmyeon, 2-29.vi. 2016, J.B. Seung and B.H. Jung (F.I.T.); 1ex., Yongdae National Natural Recreation Forest Yongdae-ri, Inje-gun, 25.v.2018, J.B. Seung; [JB] 5exs., near Guam-sa, Bonkheung-myeon, Sunchang-gun, 28.iv.-27.v.2016, B.H. Jung and H.C. Park (F.I.T.); 3exs., near Guam-sa, Bonkheung-myeon, Sunchang-gun, 13.vi.-25.vi.2016, B.H. Jung and H.C. Park (F.I.T.); [JN] 1ex., Hanjai, Baikun-san (Mt.), Donggok-ri, Oklyong-myeon, Gwangyang-si, 30.vi.2016, J.B. Seung.

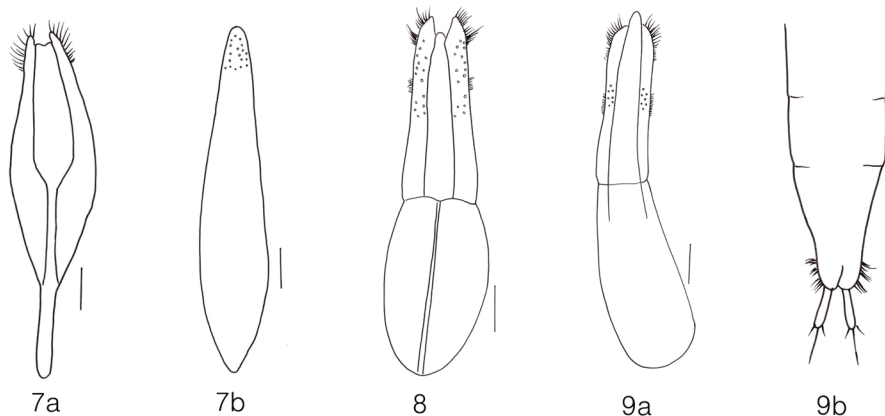
Distribution: Korea (New Record), Japan.

Biphyllus oshimanus Nakane, 1988 (Figs. 3, 6, 9)

Biphyllus oshimanus Nakane, 1988: 80.

Description

Body length 2.0-2.5 mm. Body oval, convex dorsally, weakly shiny; body color mostly black to blackish brown; antennae palpi and legs yellowish brown; elytral markings red, apical red marking of elytra often indistinct but humeral marking usually distinct, humeral red markings; covered with relatively



Figs. 7-9. Genitalia (male; scale bar = 0.1mm). 7. *Biphyllus japonicus* (a, paramere; b, median lobe); 8. *Biphyllus loochooanus*; 9. *Biphyllus oshimanus* (a, male; b, female).

short and decumbent hairs. Head relatively small, about twice narrower than pronotal base; coarsely punctate; ocular distance about twice wider than eye diameter; antennae clavate and antennae relatively slender; third antennomere a little longer than fourth; antennomeres 10-11 distinctly wider than preceding antennomeres, strongly widened, forming a big and wide club; apical antennomere oval and rounded apically, almost equal to penultimate in width. Pronotum transverse, about twice broader than long, roundly narrowing anteriorly; with regular, large and deep punctures; strongly convex, a little depressed at baso-middle part; with two longitudinal carinae along each lateral side; outer carina entire, paralleled to lateral margin; inner often with longitudinal carinae, inner carina often short, distinct at anterior 1/4 part but diminished from anterior 1/4 to basal part, lateral margins weakly explanate, rimmed and not serrate; basal margin strongly rimmed and sinuate. Elytra widest at basal 1/2 part; covered with relatively short, dense and suberect hairs with 2 red markings each elytron; humeral marking usually distinct, oblong and very shortly oblique; apical marking oval and a little distinct; striate-punctate; 10 rows of punctures present on each elytron; striae punctures large, regular and deep; interstriae weakly convex, with tiny punctures and rugose.

Specimens examined: Total more than 100 specimens: [GW] 1 ex., Near Jangneng, Yeongweol-gun, 5.v.2015, J.B. Seung; 1 ex., Neukgu-ri, Dogye-myeon, Samcheok-si, 21.v.2018, J.B. Seung and B.H. Jung (F.I.T.); 4 exs., Neunggyeong-bong, Daegwallyeong, Yongpyeong-gun, 6.vi.2016, J.B. Seung and B.H. Jung (F.I.T.); [GG] 1 ex., Wonggok-dong, Ansan-si, 12.v.2006, B.H. Jung from *Trametes versicolor* (L.) Lloyd; 2 exs., Dongguneung, Guri-si, 11.xi.2007, B.H. Jung,

Bjerkandera adusta (Willd.) P. Karst. [JB] 20 exs., near Guamsa, Bonkheung-myeon, Sunchang-gun, 28.iv.-27.v.2016, B.H. Jung and H.C. Park (F.I.T.); [JN] 1 ex., Hanjai, Baikun-san (Mt.), Donggok-ri, Oklyong-myeon, Gwangyang-si, 30.vi.2016, B.H. Jung; [JJ] 10 exs., Gyorae Natural Recreation Forest, Jocheon-eup, Jeju-si, 11.vi.-21.vii.2016, J.B. Seung and B.H. Jung (F.I.T.); 1 ex., Seongpanak, Mt. Halla, Jocheon-eup, Jeju-si, 23.vi.-21.vii.2016, J.B. Seung and B.H. Jung (F.I.T.); 10 exs., Gyorae Natural Recreation Forest, Jocheon-eup, Jeju-si, 30.v.2018, J.B. Seung; 4 exs., Gyorae Natural Recreation Forest, Jocheon-eup, Jeju-si, 13.viii.2019, J.B. Seung.

Distribution: Korea (New Record), Japan.

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