

Three newly recorded species of the family Biphyllidae (Coleoptera) in Korea

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한국에서 새롭게 기록되는 배줄벌레과 3종

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ABSTRACT: The specimens belonging to the family Biphyllidae were collected at Mt. Baekun-san (Nonsil and Hanjae), Jeollanam-do with Lindgren funnel traps from May to August, 2015. Through this study, we report seven species of the genus *Biphyllus* including three newly recorded species; *B. aequalis* (Reitter), *B. flexuosus* (Reitter) and *B. kuzurius* Sasaji. We herein present the key to the identification of species of the Korean Biphyllidae and illustrations of diagnostic characteristics of them.

Key words: Biphyllidae, *Biphyllus*, New record, Taxonomy, Korea.

조 록: 전남 백운산 지역의 논실 및 한재 지점에서 2015년 5월부터 8월까지 깔데기트랩(Lindgren funnel trap)을 이용하여 배줄벌레과(Biphyllidae) 곤충을 채집하였다. 그 결과 배줄벌레속(*Biphyllus*) 7종이 채집되었고, 그 중 3종인 둥근배줄벌레(*B. aequalis* (Reitter)), 담갈무늬배줄벌레(*B. flexuosus* (Reitter)), 애배줄벌레(*B. kuzurius* Sasaji)가 국내에서 처음 기록되는 종으로 확인되었으며, 이들을 동정하기 위한 검색표와 진단형질들을 도식하였다.

검색어: 배줄벌레과, 배줄벌레속, 미기록종, 분류, 한국

Members of the family Biphyllidae are known as false skin beetles. They are about 2 to 4 mm in length and can be distinguished by the 5-5-5 tarsal formula, the closed procoxal cavities, and the presence of lateral and/or femoral lines on the first abdominal sternite (Goodrich, 2000). There are 200 species under seven genera in the world (Zhang, 2011), 29 species belonging to two genera in the Palaearctic region (Jelínek, 2007), and 16 species of a genus in Japan (Hirano, 2010). They live under the bark of dead trees and feed on fungi (Goodrich, 2000).

The Korean fauna on this family was first studied by Park et al. (2012) with 4 newly recorded species belonging to genus

Biphyllus. Through this study, the Korean fauna of the family Biphyllidae are known to 7 species including 3 newly recorded species belong to genus *Biphyllus*.

Materials and methods

A total of 285 specimens examined have been collected by Lindgren funnel trap at Nonsil (35°06'33.1"N 127°35'82.0"E 577H) and Hanjae (35°07'08.3"N 127°36'29.2"E 903H) located on Mt. Baekun-san, Jeollanam-do (JN), southern part of Korean peninsula from May to August, 2015. These adult specimens were preserved in 70% ethanol, before being mounted on glue boards. We used an Auto montage program for taking photographs, and used the Leica EZ4 HD binocular stereo microscope (Leica Microsystems, Wetzlar, Germany) for examining the external characters. Materials are deposited

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in the insect collection room of Suncheon National University, Suncheon, Korea.

Taxonomic accounts

Family Biphyllidae LeConte, 1861 배줄벌레과

Genus *Biphyllus* Dejean, 1821 배줄벌레속

Biphyllus Dejean, 1821: 102. (Type-species: *Dermestes lunatus* Fabricius, 1787)

Diphyllus Berthold, 1827: 393. (Type-species: *Dermestes lunatus* Fabricius, 1787)

Thallestus Wollaston, 1862: 153. (Type-species: *Thallestus semiellipticus* Wollaston, 1862)

Key to species of the genus *Biphyllus* in Korean Peninsula

1. Pronotum with a single longitudinal carina along each marginal side (Fig. 2. F and G) 2
 - Pronotum with two or more longitudinal carinae along each marginal side (Fig. 2. A-E) 3
2. Lateral margin of pronotum smooth (Fig. 2. F). Apical antennomere as wide as or slightly wider than penultimate. Dorsum usually bicolor; inner margin of profemur with a projection at basal one fourth *B. rufopictus* (Wollaston)
 - Lateral margin of pronotum serrate (Fig. 2. G). Apical antennomere distinctly narrower than penultimate. Dorsum usually unicolor; inner margin of profemur smooth or simple, without a projection at basal part *B. throscoides* (Wollaston)
3. Pronotum with two pairs of longitudinal carinae, of which inner ones usually incomplete and obscure at basal part (Fig. 2. A, C and D). Elytral pubescence unicolor, or bicolor forming indistinct large markings (Fig. 1. A, C and D) 4
 - Pronotum with more than three pairs of longitudinal carinae, of which outer two pairs almost complete (Fig. 2. B and E). Elytral pubescence bicolor forming many small distinct markings (Fig. 1. B and E) 6

4. Elytral pubescence bicolor, golden and white ones forming indistinct transverse bands (Fig. 1. D). Inner carinae of pronotum very short, reaching to one fourth as long as pronotum, and simple (Fig. 2. D) *B. lewisi* (Reitter)
 - Elytral pubescence unicolor (Fig. 1. A and C) 5
5. Inner carinae of pronotum connected with an anterior transverse carina and forming a semicircular line, reaching to middle of pronotal length (Fig. 2. A) *B. aequalis* (Reitter)
 - Inner carinae of pronotum not connected with an anterior transverse carina (Fig. 2. C) *B. kuzurius* Sasaji
6. Body larger, elongate, more than 3mm. Second submarginal carina of pronotum entire and distinctly bisinuate (Fig. 2. E). Elytral pubescence forming irregular, fine, cloud-like patches (Fig. 1. E) *B. marmoratus* (Reitter)
 - Body smaller, oval, less than 3mm. Second submarginal carina of pronotum weakly arcuate, usually obscure in middle (Fig. 2. B). Elytral pubescence forming about ten white regular markings on brown base colour (Fig. 1. B) *B. flexuosus* (Reitter)

Biphyllus aequalis (Reitter, 1889) 둥근배줄벌레(신칭)

(Figs. 1A & 1B)

Diphyllus aequalis Reitter, 1889: 300. Type locality: Japan.

Diagnosis. Body length 2.2–2.6mm. Body reddish brown with dark in the middle of pronotum and elytral suture. Pronotum transverse and covered with irregular coarse punctures. Pronotum with two pairs of longitudinal carinae, inner carinae connected with an anterior transverse carina and forming a semicircular line, reaching to middle of pronotal length. Elytra covered with unicolor pubescences and coarsely punctuate striae.

Specimens examined. JN 1 ex., Hanjae, Mt. Baekun-san (35°07'08.3"N 127°36'29.2"E 903H), 25–31 V 2015 (Lindgren funnel trap); 2 exs., ditto, 1–5 VI 2015 (Lindgren funnel trap).

Distribution. Korea (new record), Japan (Honshu, Shikoku, Kyushu).

Biological Note. These adults are collected under leaf litter (Hirano, 2010).

***Biphyllus flexuosus* (Reitter, 1889) 담갈무늬배줄벌레(신칭)**
(Figs. 1B & 2B)

Diphyllus flexuosus Reitter, 1889: 300. Type locality: Sapporo, Japan.

Diagnosis. Body length 2.5–2.9mm. Dorsum black to dark brown, antennae and legs pale reddish brown. Pronotum with V-shaped shallowly concave in the middle of basal part and four or five pairs of longitudinal carinae, of which outer two pairs almost complete. Second submarginal carina of pronotum weakly arcuate, usually obscure at middle. Elytral pubescence bicolor and forming about ten white regular markings on brown base colour. Elytra with regularly punctuate striae.

Specimens examined. JN 1 ex., Nonsil, Mt. Baekun-san (35°06'33.1"N 127°35'82.0"E 577H), 11–17 V 2015 (Lindgren funnel trap); 1 ex., ditto, 6–13 VI 2015 (Lindgren funnel trap); 1 ex., ditto, 14–20 VI 2015 (Lindgren funnel trap); 1 ex., ditto, 29 VI–4 VII 2015 (Lindgren funnel trap); 1 ex., Hanjae, Mt. Baekun-san (35°07'08.3"N 127°36'29.2"E 903H), 1–5 VI 2015 (Lindgren funnel trap).

Distribution. Korea (new record), Far Eastern Russia, Japan (Hokkaido, Honshu, Shikoku, Kyushu), Taiwan.

***Biphyllus kuzurii* Sasaji, 1985 애배줄벌레(신칭)**
(Figs. 1C & 2C)

Diphyllus kuzurii Sasaji, 1985: 11. Type locality: Fukui Prefecture, Japan.

Diagnosis. Body length 1.7–1.9mm. Body 2.2 times as long as wide. Body yellowish brown. Antennae with transverse ultimate and penultimate segments and forming clavate. 3rd antennal segment shorter than 2nd one, and longer than 4th one. Pronotum transverse, 1.6 times as wide as long; two pairs of longitudinal pronotal carinae presence, of which inner ones usually incomplete and obscure at basal part and not connected with an anterior transverse carina; lateral margin dentate minutely. Elytra 1.5 times as long as wide; pubescence unicolor.

Specimens examined. JN 1 ex., Hanjae, Mt. Baekun-san (35°07'08.3"N 127°36'29.2"E 903H), 25–31 V 2015 (Lindgren funnel trap).

Distribution. Korea (new record), Japan (Honshu).

***Biphyllus lewisi* (Reitter, 1889) 얼룩배줄벌레**
(Figs. 1D & 2D)

Diphyllus lewisi Reitter, 1889: 299. Type locality: Japan.

Biphyllus lewisi (Reitter); Park et al., 2012: 187 (Korea).

Specimens examined. JN 2 exs., Nonsil, Mt. Baekun-san

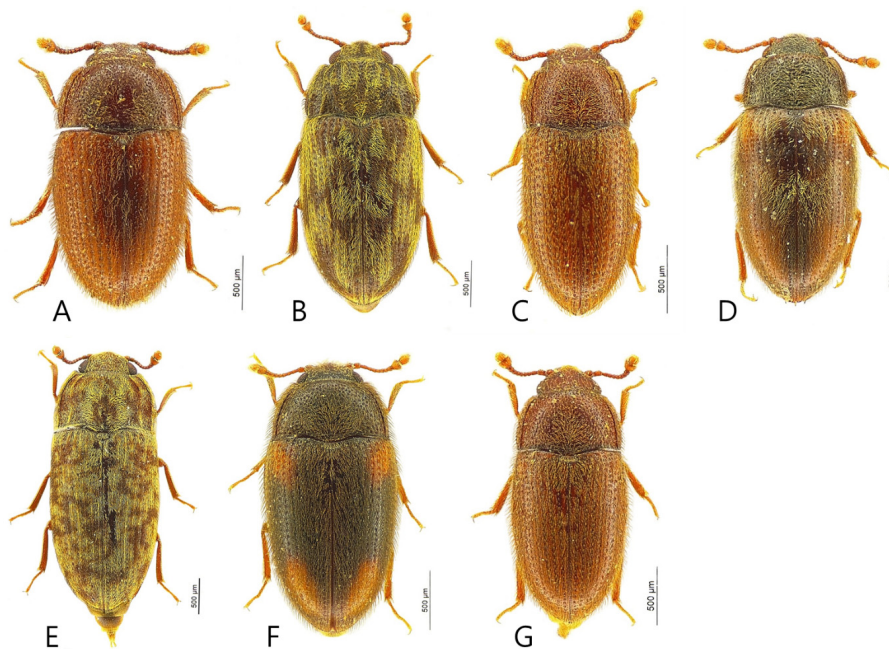


Fig. 1. Habitus of *Biphyllus*. A: *B. aequalis* (Reitter), B: *B. flexuosus* (Reitter), C: *B. kuzurii* Sasaji, D: *B. lewisi* (Reitter), E: *B. marmoratus* (Reitter), F: *B. rufopictus* (Wollaston), and G: *B. throscoides* (Wollaston).

(35°06'33.1"N 127°35'82.0"E 577H), 6–13 VI 2015 (Lindgren funnel trap); 1 ex., Hanjae, Mt. Baekun-san (35°07'08.3"N 127°36'29.2"E 903H), 18–24 V 2015 (Lindgren funnel trap); 1 ex., ditto, 6–13 VI 2015 (Lindgren funnel trap); 1 ex., ditto, 14–20 VI 2015 (Lindgren funnel trap); 1 ex., ditto, 29 VI–4 VII 2015 (Lindgren funnel trap).

Distribution. Korea, Japan (Honshu, Shikoku, Kyushu, Tsushima).

***Biphyllus marmoratus* (Reitter, 1889) 구름무늬배줄벌레**

(Figs. 1E & 2E)

Diphyllus marmoratus Reitter, 1889: 300. Type locality: Hiogo, Japan.

Biphyllus marmoratus (Reitter); Park et al., 2012: 188 (Korea).

Specimens examined. JN 39 exs., Nonsil, Mt. Baekun-san (35°06'33.1"N 127°35'82.0"E 577H), 11–17 V 2015 (Lindgren funnel trap); 17 exs., ditto, 6–13 VI 2015 (Lindgren funnel trap); 6 exs., 14–20 VI 2015 (Lindgren funnel trap); 14 exs., ditto, 21–28 VI 2015 (Lindgren funnel trap); 17 exs., ditto, 29 VI–4 VII 2015 (Lindgren funnel trap); 1 ex., Hanjae, Mt. Baekun-san (35°07'08.3"N 127°36'29.2"E 903H), 1–5 VI 2015 (Lindgren funnel trap); 8 exs., ditto, 6–13 VI 2015

(Lindgren funnel trap); 57 exs., ditto, 14–20 VI 2015 (Lindgren funnel trap); 10 exs., ditto, 21–28 VI 2015 (Lindgren funnel trap); 11 exs., ditto, 29 VI–4 VII 2015 (Lindgren funnel trap).

Distribution. Korea, Far eastern Russia, Japan (Honshu, Kyushu).

Biological Note. These species are commonly collected in southern part of Korean peninsula (Park et al., 2010).

***Biphyllus rufopictus* (Wollaston, 1874) 붉은무늬배줄벌레**

(Figs. 1F & 2F)

Thallestus rufopictus Wollaston, 1874: 172. Type locality: Japan.

Biphyllus rufopictus (Wollaston); Park et al., 2012: 189 (Korea).

Specimens examined. JN 68 exs., Nonsil, Mt. Baekun-san (35°06'33.1"N 127°35'82.0"E 577H), 11–17 V 2015 (Lindgren funnel trap); 7 exs., ditto, 6–13 VI 2015 (Lindgren funnel trap); 1 ex., 14–20 VI 2015 (Lindgren funnel trap); 2 exs., ditto, 21–28 VI 2015 (Lindgren funnel trap); 4 exs., ditto, 29 VI–4 VII 2015 (Lindgren funnel trap); 1 ex., Hanjae, Mt. Baekun-san (35°07'08.3"N 127°36'29.2"E 903H), 1–5 VI 2015 (Lindgren funnel trap); 1 ex., ditto, 6–13 VI 2015 (Lindgren funnel trap); 1 ex., ditto, 14–20 VI 2015 (Lindgren funnel trap).

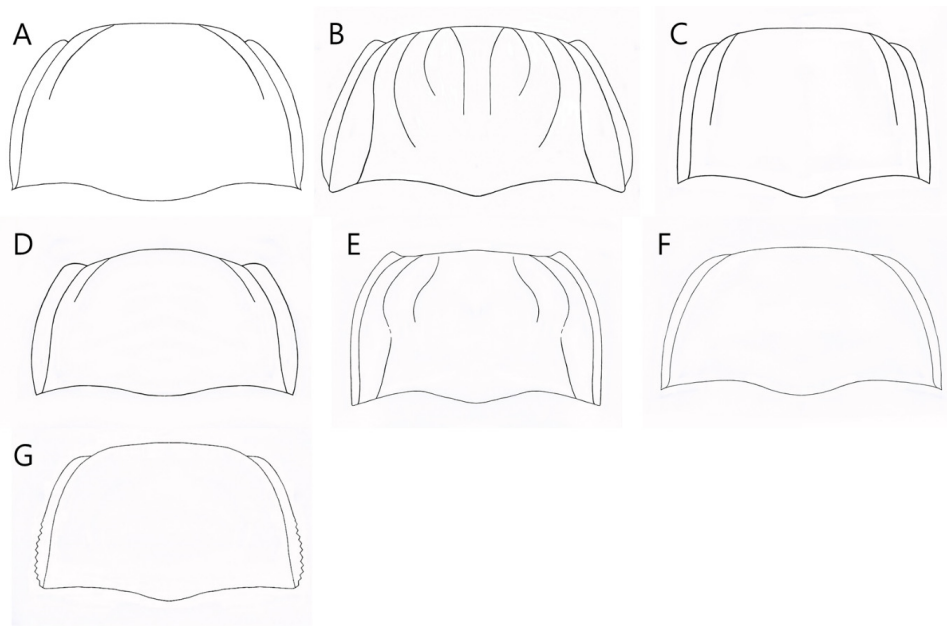


Fig. 2. Pronotum of *Biphyllus*, dorsal aspect. A: *B. aequalis* (Reitter), B: *B. flexuosus* (Reitter), C: *B. kuzurius* Sasaji, D: *B. lewisi* (Reitter), E: *B. marmoratus* (Reitter), F: *B. rufopictus* (Wollaston), and G: *B. throscoides* (Wollaston).

Distribution. Korea, Japan (Honshu, Shikoku, Kyushu).

***Biphyllus throscooides* (Wollaston, 1874) 아기배줄벌레**

(Figs. 1G & 2G)

Thallestus throscooides Wollaston, 1874: 171. Type locality: Japan.

Biphyllus throscooides (Wollaston); Park et al., 2012: 190 (Korea).

Specimens examined. JN 1 ex., Nonsil, Mt. Baekun-san (35°06'33.1"N 127°35'82.0"E 577H), 29 VI-4 VII 2015 (Lindgren funnel trap).

Distribution. Korea, Japan (Honshu, Shikoku, Kyushu, Tsushima).

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