

First Record of the Fungivorous Tenebrionid, *Bolitotrogus kurosonis* Miyatake (Coleoptera: Tenebrionidae), from Korea with a New Host Fungus

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한국산 균식성 미기록종, 갈색가시거저리의 분류학적 검토와 숙주버섯

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ABSTRACT: A taxonomic review of *Bolitotrogus kurosonis* Miyatake 1964 is presented. *B. kurosonis* is a fungivorous tenebrionid beetle and is a rare inhabitant of fungi on deciduous trees (*Quercus*, *Carpinus laxiflora*, etc.) in Korea. Sporophores of *Inonotus mikadoi* (Lloyd) Imaz. was the obligate feeding and breeding sites for this species in Jeju-do. A description, an additional key to the Korean Bolitophagini, fungal host, photographs of adult, and illustrations of diagnostic characteristics are provided.

Key words: *Bolitotrogus kurosonis*, Fungivorous, Tenebrionidae, Korea, *Inonotus mikadoi*

초 록: 버섯에서 서식하는 거저리류 가운데 갈색가시거저리(*Bolitotrogus kurosonis* Miyatake)를 국내에서 처음 보고한다. 갈색가시거저리는 균식성으로 활엽수림에 나는 민주름버섯류, 특히 시루뻐버섯속(*Inonotus*)의 황갈색시루뻐버섯[*Inonotus mikadoi* (Lloyd) Imaz.]에서 서식하는 것으로 관찰되었다. 본 종의 성충에 대한 기재문을 기술하였고, 본 종의 상위 분류군인 한국산 가시거저리족(Bolitophagini)에 대한 검색표를 작성하였다. 성충의 사진, 진단 형질과 숙주버섯에 대한 생태적 정보를 제공하였다.

검색어: 갈색가시거저리, 미기록종, 균식성, 거저리, 황갈색시루뻐버섯

Bolitotrogus Miyatake, 1964 is a small genus of the tribe Bolitophagini in the family Tenebrionidae, which consists of only three species of the world fauna (Miyatake, 1964; Löbl *et al.*, 2008) and is distributed in Korea, Japan and Taiwan.

Members of *Bolitotrogus* are recognized by: body sub-cylindrical, strongly convex, with short tubercles and nodules dorsally; antennomeres robust and strongly compressed from antennomeres 7 to 11, forming a compact club; clypeus with a pair of horns of very short tubercle in male but simple in female; pronotum slightly explanate and finely serrate on sides, with short dentiform-horns; metasternum with groove between

middle and hind coxae; tibiae finely mucronate (Miyatake, 1964).

A fungivorous tenebrionid, *Bolitotrogus kurosonis* Miyatake in the tribe Bolitophagini, is recorded for the first time from Korea. *B. kurosonis* was found in the deciduous forests in Jeju-do. Both adults and larvae are generally associated with host fungus of the order Aphyllophorales throughout its life (per. obs.). The polyporous fungi, especially the woody and perennial forms, provide a microhabitat, shelter, and breeding place for Bolitophagini tenebrionids (Jung *et al.*, 2007). This species for uses the fruiting bodies of *Inonotus mikadoi* for breeding and feeding. *I. mikadoi* is common and widespread in Korea (Lee, 1988; Kim and Han, 2008).

In this paper, a fungivorous tenebrionid, *B. kurosonis* is

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recognized. A key, description, additional key to the Korean Bolitophagini, host fungi, photograph of the adult, drawings of the aedeagus and diagnostic characteristics are provided.

Materials for this study were collected from within the host fungi associated with decaying or dead trees and reared in the laboratory. Host fungus collected for this study were identified using several illustrated mushroom books (Breitenbach and Kränzlin, 1986; Imazeki and Hongo, 1989; Lee, 1988) and the assistance of a mushroom taxonomist, Dr. Seok S. J. of the National Academy of Agricultural Science (NAAS). Materials for this study have been deposited in Jung's Insect Collection (Seoul, Korea).

Results

[Taxonomic accounts]

Tribe Bolitophagini Kirby (가시거저리족)

Bolitophagini Kirby, 1837: 236.

Type genus: *Bolitophagus* Illiger, 1798.

Key to the genera of Korean Bolitophagini (modified from Jung and Kim, 2009)

1. Pronotum usually with horns in male and gibbose in female. All tibiae without spur 2
 - Pronotum without horn in both sexes. All tibiae with or without spurs 3
2. Body relatively large, not shining. Pronotum with a pair of long and thick horns in male and blunt gibbose in female *Boletoxenus* Motschulsky
 - Body relatively small, weakly shining. Pronotum with a pair of short dentiform-horns in male and small nodules or absent in female *Bolitotrogus* Miyatake
3. Antennomeres 4 or 5-10 enlarged inwardly, antennomere 11 free to 10. Pronotum flattened and strongly serrate on both sides. Middle and hind tibiae without spur. Male head with two long horns inside the eyes *Byrsax* Pascoe
 - Antennomeres 4 or 5-10 slightly enlarged inwardly, antennomere 11 weakly free to 10. Pronotum flattened and not strongly serrate on both sides. Middle and hind

tibiae with spurs. Male head without horn inside the eyes 4

4. Antennomeres 9 and 10 enlarged inwardly and outwardly, convex, with fine setae and shining on enlarged part, densely pubescent on apical part; apical antennomere tapered, fusiform, with dense pubescence on apical half. Middle and hind tibiae with one spur *Parabolitophagus* Miyatake
 - Antennomeres 4 or 5-10 enlarged inwardly, flattened; opaque on the enlarged part; apical antennomere round-fusiform, dense pubescence on the most part. Middle and hind tibiae with two spurs 5
5. Antennomeres 5-10 enlarged inwardly, increasing apically; densely pubescent on the enlarged part; antennomere 11 free to 10. Pronotum reticulately punctate; lateral sides strongly narrowed before basal angles, coarsely crenate. Middle and hind tibiae with two long subequal spurs *Bolitophagus* Illiger
 - Antennomere 3 strongly obtriangular; antennomeres 4-10 distinctly enlarged inwardly; without dense pubescence on the enlarged part; antennomere 11 embedded in the apex of 10. Pronotum finely punctate and coarsely nodulose; lateral sides strongly arcuate, obscurely crenate. Middle and hind tibiae with two small subequal spurs *Bolitophagiella* Miyatake

Genus *Bolitotrogus* Miyatake 갈색가시거저리속(신칭)

Bolitotrogus Miyatake, 1964: 80

Type species: *Bolitotrogus kurosonis*, Miyatake, 1964

Body short and subcylindrical, strongly convex, weakly shining, with tubercles and nodules on dorsum. Head with a pair of shot horns on clypeus in male and without horns in female. Antennae strongly enlarged and depressed from antennomeres 7 to 10, forming a compact club, antennomere 11 embedded in antennomere 10. Pronotum with short and dentiform-horns on anterior margin in male and slightly explanate and serrate on lateral sides. All tibia without spur. Metasternum with distinct groove medially between middle and hind coxae (Miyatake, 1964).

Distribution. Korea (new record), Japan.

Bolitotrogus kurosonis Miyatake, 1964 갈색가시거저리(신칭)

(Figs. 1, 2, 3, 4, 5, 6, 7)

Bolitotrogus kurosonis Miyatake, 1964: 82.

Description. Body length 2.4 - 3.0 mm in male, 3.0 - 3.3 mm in female. Body subcylindrical and oblong, strongly convex dorsally, with coarse and large punctures and tubercles, reddish brown to dark brown, weakly shining. Head rugose, with large and coarse puncture; frons weakly depressed, antennae capitate, 3rd-6th antennomeres almost moniliform, 7th to 10th antennomeres distinctly and strongly transverse, depressed and enlarged; apical antennomere oval, embedded in 10th antennomere; fronto-clypeal suture gently arcuate posteriad and weakly impressed; fourth maxillary palpomere cylindrical; third labial palpomere cylindrical. Pronotum strongly convex, irregularly and coarsely nodulous, and coarsely and largely punctured;

anterior margin almost straight; lateral sides slightly arcuate, and weakly expanded and flattened, regularly serrate, divided into about 7 triangular teeth; basal margin sinuous, expanded posteriad. Elytra oblong, strongly convex; parallel-sided at basal 3/4, and gently rounded apically; dorsum with irregular, dense, coarse nodules; lateral sides weakly and irregularly serrate; striae punctures with small tubercles, forming longitudinal rows in some parts; interstices mixed with short, low, high, elongate, lump-like tubercles and numerous nodules. Femur strongly thick and stout; tibiae strongly curved outward on middle part, narrowed at apical half part. Metasternum moderately long, with distinct and longitudinal groove medially between middle and hind coxae.

Sexual characteristics. male: clypeus with a pair of small horn-like projections, anterior margins of pronotum with a pair of small or disappeared dentiform-horns at middle part; female: clypeus without a pair of horns, with small nodules, pronotum

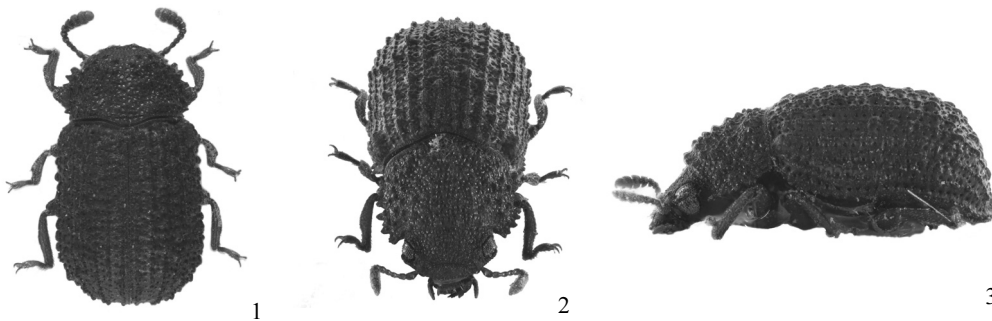


Fig. 1-3. Habitus of *Bolitotrogus kurosonis*. 1. dorsal view; 2. frontal view; 3. lateral view.

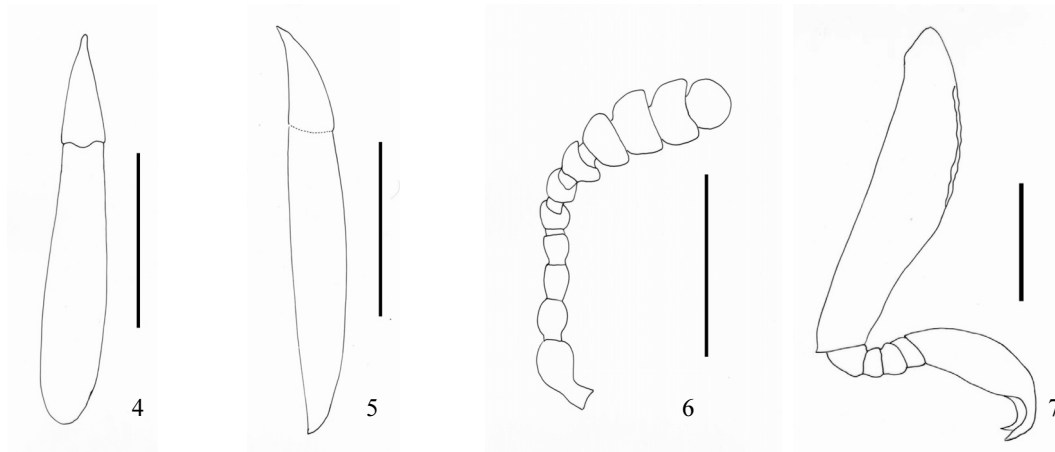


Fig. 4-5. Genitalia of *Bolitotrogus kurosonis*. 4. dorsal view; 5. latero-dorsal view; 6. Antenna of *B. kurisonis*; 7. Foreleg of *B. kurisonis* (scale bar = 0.5mm).

with or without small blunt nodules at middle part; anterior margin on pronotum almost straight and simple.

Distribution: Korea (new record), Japan (Shikoku).

Host-fungus: *Inonotus mikadoi* (Lloyd) Imaz.

Specimens examined. 3 ♀ ♀ 2 ♂ ♂ Halla-mountain, Seongpanak, Jeju-si, Jeju-do, 19 IV 2010, B.-H. Jung *ex. Inonotus mikadoi*.

Remarks. *Bolitotrogus kurosonis* Miyatake is rarely distributed in Korea and a mycetobiont which is an obligatory fungal inhabitant. This species mostly inhabits the fruiting bodies of *Inonotus mikadoi*, which are ligneous and longevous. *B. kurosonis* feeds and collects in the fruiting bodies which began to decay. Host fungi of this species are thick enough for it to feed and breed in it through its life cycle. This species is also found in fungi associated with decaying trees which are distributed in shaded areas. Both adults and larvae usually feed on and breed in the context of fruiting body of *Inonotus mikadoi* year around, forming a chamber.

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