

Report of the Genus *Rhodobates* (Lepidoptera, Tineidae) New to Korea

Jae-Cheon Sohn*

Department of Science Education, Gongju National University of Education, Gongju 32553, Korea

ABSTRACT

A tineid genus, *Rhodobates* Ragonot, 1895 in Myrmecozelinae is reported for the first time from Korea, with a congener, *R. cupulatus* Li and Xiao, 2006. The voucher specimens of the species comprise four males and four females collected from Seoul City, Sejong City, Gangwon-do, Chungcheongbuk-do, and Chungcheongnam-do. Among the previously-known species of Tineidae in Korea, *Rhodobates cupulatus* is similar to *Psychooides gosari* Kim and Bae in having the uniform coloration over the body and wings, but differs from the latter in the much larger body size. External appearance and genital features of *R. cupulatus* are redescribed and illustrated. A COI sequence of *R. cupulatus* is provided for the first time and compared in the world database of DNA barcodes. The Korean records of the species represent the first evidence of its occurrence out of the type locality. Circumstances of its collecting in Korea suggest that it is possibly feeding on dead woods in damp environments.

Keywords: Korea, Lepidoptera, new records, *Rhodobates*, Tineidae

INTRODUCTION

A tineid genus, *Rhodobates* resembles some species of Hapsiferinae in external appearance but it actually belongs to Myrmecozelinae (Robinson and Nielsen, 1993). The genus comprises 21 species occurring in arid regions of the Old World (Robinson, 2001; Li and Xiao, 2006; Xiao and Li, 2009; Mey, 2011; Falck et al., 2020). The adult moths are medium or large in size and uniformly dark brown to dark ochreous in body color, rarely with patterns on the forewings. Petersen (1958) critically reviewed *Rhodobates* and defined it based on the genital features. No information on life history and feeding habits is available for the genus.

In the East Asia, the genus *Rhodobates* has been known exclusively from China where a total of eight congeners occur (Xiao and Li, 2009). In the present study, the genus is reported for the first time from Korea, with one species, *R. cupulatus*. Possible feeding habits of the species are discussed on the basis of two cases of indoor collecting. A COI barcode and the photos of external and genital features are provided for *R. cupulatus*. Specimens examined were obtained from two insect collections: the Gongju National University of Education (GJUE) in Gongju City and the National Institute of Biolog-

ical Resources (NIBR) in Incheon City. The genitalia were dissected, following Clarke (1941) except that chlorazol black and Euparal resin were used for staining and slide mounting, respectively. Terms for genitalia followed Klots (1970). DNA barcoding was conducted following Sohn et al. (2020). The resulted COI sequence was registered in the GenBank (accession number: ON368934) and queried against a database in the BOLD systems (<https://boldsystems.org>) for comparison.

SYSTEMATIC ACCOUNTS

Order Lepidoptera Linnaeus, 1758
Family Tineidae Latreille, 1810
Subfamily Myrmecozelinae Zeller, 1852

Rhodobates Ragonot, 1895

Rhodobates Ragonot, 1895: civ. Type species: *Euplocamus laevigatellus* Herrich-Schäffer, 1854.

Paraplutella Rebel, 1901: 163. Type species: *Paraplutella algiricella* Rebel, 1901.

Chliarostoma Meyrick, 1913: 335. Type species: *Chliarostoma relecta* Meyrick, 1913.

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*To whom correspondence should be addressed

Tel: 82-41-850-1666, Fax: 82-41-850-1660
E-mail: jsohn74@gjue.ac.kr



Fig. 1. Habitus of *Rhodobates cupulatus* Li and Xiao, 2006. A, Male; B, Female. Scale bars: 5 mm.

Phaulogenes Meyrick in Caradja and Meyrick 1938: 27.

Type species: *Phaulogenes amorphopa* Meyrick, 1938.

Tineodoxa Amsel, 1955: 32. Type species: *Myrmecozela tibul-ella* Rebel, 1936.

This genus can be characterized by the presence of erect filiform scales on the head, the gnathos joined by a sclerite, and the valvae forming a complex with transtilla, anellus and juxta in the male genitalia (Li and Xiao, 2006). This genus is reported for the first time from Korea.

¹Rhodobates cupulatus* Li and Xiao, 2006 (Figs. 1, 2)**

Rhodobates cupulatus Li and Xiao, 2006: 426. Type locality: China, Tianjin, Ji Co., Mt. Jiulong.

Re-description. Head: Vertex and frons grayish brown, speckled with white. Antenna 1/2 as long as forewing, dark brownish gray. Labial palpus grayish brown laterally, pale brownish gray mesally. Thorax: Tegula dark brownish gray, tinged with pale grayish orange distally; mesonotum dark brownish gray, speckled with pale grayish orange. Forewing (Fig. 1) length 8.0–9.5 mm in males, 10.2–12.1 mm in females, slightly broadened distally, brownish gray, speckled with dark grayish brown; cilia brownish gray, speckled with dark grayish brown. Hindwing and cilia grayish brown. Male genitalia (Fig. 2): Uncus broad, oblique laterally, triangularly-emarginated on apex, spiniform posterolaterally. Tegumen oblique laterally; gnathal arms upcurved, broadened in distal 1/3, with claw-like apex. Valva knife-shaped, narrowly-round apically, slightly concave after distal end of sacculus; sacculus broad, tapered distad. Juxta with a pair of diverging processes. Vinculum linguiform; saccus round distally. Phallus (Fig. 2B) narrow, curved in distal 1/3, dilated apically. Female genitalia (Fig. 2C, D): Papillae anales small, setose on top. Apophyses posteriores 2.6× longer than apophyses anteriores.

Ostium bursae as transverse slit on middle of sclerotized abdominal segment VIII, convex ventromedially. Ductus bursae digitiform pouch-like in posterior 1/7, narrow in anterior 6/7. Corpus bursae 2/3 as long as ductus bursae, obovate, without signum.

Material examined. Korea: 1♂, Seoul: Yangcheon-gu, Sinteu Park, 11 Jun 2005, Sohn JC, GJUE; 1♀, Gyeonggi Prov.: Suwon-si, Gwonseon-gu, Seodun-dong, 3 Jun 2003, Sohn JC, GJUE; 1♀, Gangwon Prov.: Chuncheon-si, Gangwon National University (indoor), 17 May 2001, Sohn JC, [GSN] SJC-448, GJUE; 1♂, Hoengseong-gun, Gapcheon-myeon, Hadae-ri, 17 Jun 2002, Sohn JC, GJUE; 1♂, Chungbuk Prov.: Boeun-gun, Mt. Songnisan, Hwayang Valley, 25 May 2002, Sohn JC, [GSN] SJC-477, GJUE; 1♂, Cheongju-si, Heungdeok, Sannam-dong, Wonheungibangjuk (dike), 13 Jun 2005, Sohn JC, [GSN] SJC-447, GJUE; 1♀, Sejong City: Goeun-dong, Garakmaeul-13-danji (36°30'51.0"N, 127°13'48.5"E, indoor), 27 May 2020, Sohn JC, [barcoding] JCS-COI D291, GJUE; 2♀, Chungnam Prov.: Seoecheon-gun, Seo-myeon, Sinhap-ri sand-dunes (36°08'47.6"N, 126°32'33.6"E), 20 Jun 2020, Sohn JC, GJUE and NIBR.

Distribution. Korea (new record), China (Tianjin).

Remarks. This species can be distinguished from all the previously-known tineids in Korea in having the uniformly-brown body and wings. *Psychoides gosari* Kim and Bae exhibits the similar appearance to *R. cupulatus* but it is much smaller than the latter in body size. In Korea, *Rhodobates cupulatus* were collected in the open fields near to dikes, coastal sand-dunes as well as within buildings. The indoor collecting comprises one possibly attracted by building lights and the other in the basement where a lumber-processing laboratory has been located. The latter case may hint the trophic association of *R. cupulatus* with dead woods.

DNA taxonomy. The COI barcode of *Rhodobates cupulatus* is provided for the first time in the present study. The seq-

Korean name: ¹*넙마좁나방

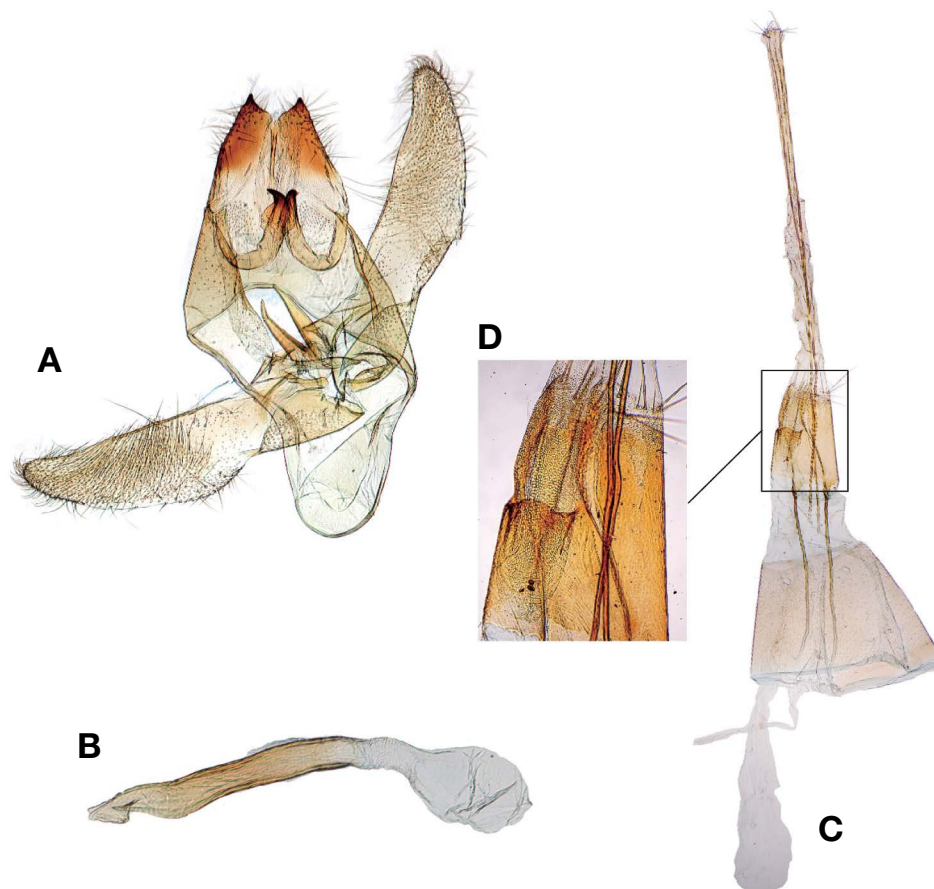


Fig. 2. Genitalia of *Rhodobates cupulatus* Li and Xiao, 2006. A, male genital capsule; B, phallus; C, female genitalia; D, enlarged image of boxed area in 2C.

uence was submitted to the BOLD systems for a search of matching sequences. This search resulted in no meaningful match.

ORCID

Jae-Cheon Sohn: <https://orcid.org/0000-0002-1829-1307>

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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REFERENCES

- Amsel H, 1955. Über mediterrane Microlepidopteren und einige transcaspische Arten. Bulletin de l'Institut Royal des Sciences Naturelles de Belgique Entomologie, 31:1-64.
- Caradja A, Meyrick E, 1938. Materialien zu einer Mikrolepidopterenfauna des Yülingshan-massivs (Provinz Yünnan). Deutsche Entomologische Zeitschrift "Iris", 52:1-29.
- Clarke JFG, 1941. The preparation of slides of the genitalia of Lepidoptera. Bulletin of the Brooklyn Entomological Society, 36:149-161.
- Falck P, Gaedike R, Moreno AV, 2020. New data on Tineidae and Meessiidae from the Canary Islands, Spain (Lepidoptera: Tineoidea). SHILAP Revista de Lepidopterologia, 48:487-497.
- Klots AB, 1970. Lepidoptera. In: Taxonomist's glossary of genitalia in insects (Ed., Tuxen SL). Munksgaard, Copenhagen,

- pp. 115-130.
- Li H, Xiao Y, 2006. A study of the genus *Rhodobates* Ragonot (Lepidoptera: Tineidae) from China. *Proceedings of the Entomological Society of Washington*, 108:418-428.
- Mey W, 2011. Basic pattern of Lepidoptera diversity in southwestern Africa. *Esperiana Memoir*, 6:7-316.
- Meyrick E, 1913. Descriptions of South African Microlepidoptera. *Annals of the Transvaal Museum*, 10:267-336.
- Petersen G, 1958. Die Genitalien der paläarktischen Tineiden (Lepidoptera: Tineidae). *Beiträge zur Entomologie*, 8:398-430.
- Ragonot EL, 1895. Microlépidoptères de la Haute-Syrie récoltés par M. Ch. Delagrangé et descriptions des espèces nouvelles. *Bulletin de la Société Entomologique de France*, 64:94-109.
- Rebel H, 1901. Neue palaearktische Tineen. *Deutsche Entomologische Zeitschrift "Iris"*, 13:161-188.
- Robinson GS, 2001. Global Taxonomic Database of Tineidae (Lepidoptera). Natural History Museum, London, Accessed 17 Sep 2021, <<http://www.nhm.ac.uk/entomology/tineidae/index.html>>.
- Robinson GS, Nielsen ES, 1993. Tineid genera of Australia (Lepidoptera). *Monographs on Australian Lepidoptera*, Vol. 2. CSIRO, Melbourne, pp. 1-344.
- Sohn JC, Kim SS, Koo JM, Choi SW, 2020. Review of *Cotachena* Moore, 1885 (Lepidoptera: Crambidae, Spilomelinae) from Korea based on morphology and DNA barcodes. *Journal of Asia-Pacific Entomology*, 24:383-389. <https://doi.org/10.1016/j.aspen.2021.01.011>
- Xiao YL, Li HH, 2009. A new species of *Rhodobates* Ragonot, 1859 from China (Lepidoptera, Tineidae). *Acta Zootaxonomica Sinica*, 34:234-236.

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