

# First Record of the Genus *Palorus* Mulsant in Korea (Coleoptera: Tenebrionidae: Palorini)

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## 한국 미기록속 *Palorus* Mulsant (딱정벌레목: 거저리과)의 보고

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**ABSTRACT:** Two species of the genus *Palorus* Mulsant of Palorini (Tenebrionidae) are reported for the first time from Korea, *P. ratzeburgii* (Wissman, 1848) and *P. subdepressus* (Wollaston, 1864). These species are economically importance as stored product insect pests in the tropical and subtropical countries, and occur in low densities in the rice mills of southern Korea. Adult morphology, taxonomic diagnosis, illustrations of diagnostic characteristics of these species, and a taxonomic key to the 6 species related to plant quarantine inspections in Korea are provided.

**Key words:** *Palorus ratzeburgii*, *Palorus subdepressus*, Tenebrionidae, Taxonomy, New record

**초록:** 한국산 거저리과의 미기록인 *Palorus* Mulsant에 속하는 2종인 넓은이마쌀도둑거저리(신칭)(*Palorus ratzeburgii* (Wissman, 1848))와 좁은이마쌀도둑거저리(신칭)(*P. subdepressus* (Wollaston, 1864))를 보고한다. 이들 2종은 열대 및 아열대 지역에서 저장곡물해충으로 중요하지만, 국내 정미소에서는 아주 낮은 밀도로 발생하고 있다. 이들 미기록종에 대한 성충 사진, 진단형질, 저장곡물의 검역해충인 본 속의 6종에 대한 검색표를 제공하였다.

**검색어:** 넓은이마쌀도둑거저리(*Palorus ratzeburgii*), 좁은이마쌀도둑거저리(*Palorus subdepressus*), 거저리과, 미기록종, 분류

Mulsant (1854) erected *Palorus* as a subgenus of *Hypophloeus* to contain *Hypophloeus depressus* Fabricius. The genus *Palorus* belonging to tribe Palorini is the largest of the group with thirty-seven known species in Africa, Eurasia and the Pacific (Halstead, 1967) and consists of 11 species in the Palaearctic region (Löbl et al., 2008). Members of genus *Palorus* are recognized as follows: small beetles, varying from 1.5 to 4.0 mm in length; dorsal margin of eye level with side margin of head (apical region may be concealed dorsally by gena), usually distinctly margined by a supra-orbital carina; front of

head flat or raised; elytra with interstitial punctures usually much finer than stria punctures, elytra not carinate. The majority live under the bark of trees or in the galleries of wood-boring beetles, but two species, *Palorus ratzeburgii* (Wissmann) and *Palorus subdepressus* (Wollaston) are commonly found in stored food products, and *Palorus genalis* Blair, *P. cerylonoides* (Pascoe), *P. ficicola* (Wollaston) and *P. laesicollis* (Fairmaire) are found there also, but less frequently (Halstead, 1967).

In this paper, we report two cosmopolitan stored product pests by *Palorus subdepressus* (Wollaston) and *Palorus ratzeburgii* (Wissmann) for the first time from Korea. Morphological photographs of adults, diagnosis and illustrations of diagnostic characters, and taxonomic key to the 6 species

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related to inspection for plant quarantine on stored products in Korea are provided.

## Materials and Methods

Materials for this study were collected in rice mills and are deposited in the Insect Collection of Suncheon National University.

The following abbreviations are used in this paper: CB, Chungcheongbuk-do Province; GB, Gyeongsangbuk-do Province; GG, Gyeonggi-do Province; CN, Chungcheongnam-do Province; JJ, Jeju-do Island; JN, Jellanam-do Province, Korea; SCNU, Suncheon National University, Suncheon, Korea.

## Results and Discussion

### Taxonomic accounts

#### Tribe Palorini Matthews, 2003

#### Genus *Palorus* Mulsant, 1854 쌀도독거저리속(신칭)

*Palorus* Mulsant, 1854: 250.

*Caenocorse* C.G. Thomson, 1859: 117.

*Eba* Pascoe, 1863: 129.

*Platyotus* Gerstaecker, 1871: 62.

*Circomus* Fleischer, 1900: 236.

*Stenopalorus* Blair, 1930: 136.

Type species: *Hypophloeus depressus* Fabricius, 1790

#### *Palorus ratzeburgii* (Wissmann, 1848) 넓은아마쌀도독거저리(신칭) (Figs. 1, 3A-B)

*Hypophloeus ratzeburgii* Wissmann, 1848: 77.

*Hypophloeus ambiguus* Wollaston, 1857: 152.

*Hypophloeus floricola* Marseul, 1876: 115.

*Caenocorse galilaeus* J.R. Sahlberg, 1913: 49.

**Body** length 2.5-2.8 mm, width 0.9-1.1 mm, brown to dark brown, weakly shining, microreticulation distinct. **Head** moderately densely punctured; genae not produced or raised, almost level with clypeus, slightly raised above antennal insertions, puncturation a little finer than that of vertex; clypeus raised medially, puncturation similar to genal puncturation; eyes small, dorsal length equal to or less than width of scutellum; supra-orbital carinae very strongly developed. A pressed flat area at anterior margin of head broader than its outer margin and its margin in front of eye distinctly produced with eyeshade-like form.

**Pronotum** usually widest near apex but sometimes with sides more parallel; punctures not bearing distinct setae, small on disc, separated by 4-5 diameters, coarser laterally, separated by 1-2 diameters; usually shining. **Elytra** with scutellary striole represented by five or less, ill-defined punctures; interstices with single rows of punctures.

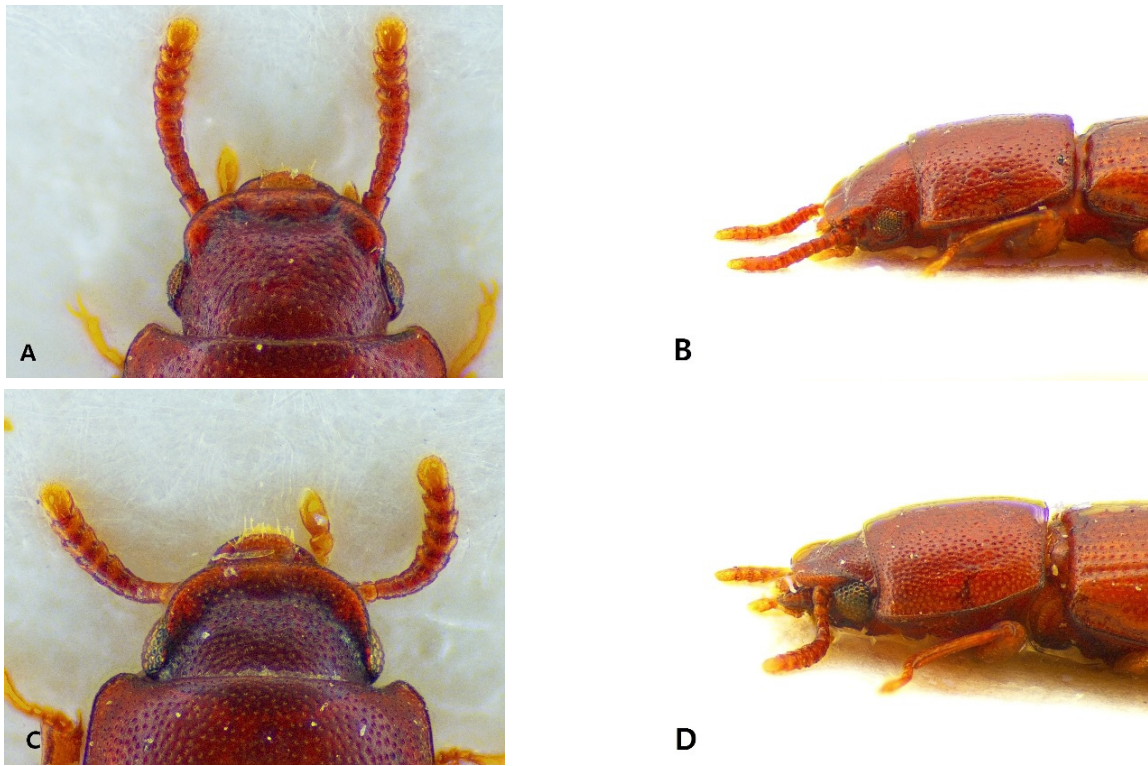
**Specimens examined:** [SCNU] GG 13 exs., Duchang rice mill (rice hull), Duchang-ri Wonsam-myeon Yongin-si, 19 VIII, 2004, I.S. Kim; CB 1 ex., rice mill (rice hull), Goesan-gun, 14 VI 2004, I.S. Kim; JN 5 exs., Jangseong (rice bran), 6 VII, 2004,



Fig. 1. Habitus of *Palorus ratzeburgii* (Wissmann).



Fig. 2. Habitus of *Palorus subdepressus* (Wollaston).



**Fig. 3.** Head of *Palorus ratzeburgii* (Wissmann): A (dorsal view) and B (lateral view), and head of *Palorus subdepressus* (Wollaston): C (dorsal view) and D (lateral view).

I.S. Kim; 5 exs., Samjeong rice mill, Samjeon-ri Okryong-myeon Gwangywang-si, 25 VII 2013, K.J. Hong; GB 5 exs., Gumi rice mill, Gumi-ri Guseong-myeon Gimcheon-si (N360043 E1280152), 10 XI 2013, K.J. Hong; 2 exs., Naeseong rice mill, Naeseong-ri Bonghwa-eub Bonghwa-gun (N365313 E1284427), 10 XI 2013, K.J. Hong; JJ 2 exs., Warehouse (rice), Hangeong-myeon Bukjeju-gun, 24 IX 1998, K.J. Hong.

**Distribution.** Korea (new record), Cosmopolitan.

**Biological notes.** The under bark habitat is apparently the natural one. This species spread to all parts of the world by commerce, occurs as a secondary pest in granaries, warehouses, flour mills etc., where it is found in cereals and cereal products (Halstead, 1967). This species was collected from several rice mills in the Korean peninsula including Jeju island. It is associated with other pests, particularly the maize weevil, *Sitophilus zeamais* Motschulsky.

*Palorus subdepressus* (Wollaston, 1864) 좁은이마쌀도둑거저리 (신칭) (Figs. 2, 3C-D)

*Hypophloeus subdepressus* Wollaston, 1864: 499.

*Palorus bifoveolatus* Baudi di Selve, 1876: 235.

**Body** length 2.7-3.0 mm, width 0.9-1.0 mm, red-brown, moderately shining; microreticulation shallow but usually distinct. **Head** usually with more or less distinct shallow median depression towards base; genae raised above clypeus, developed to a greater or lesser extent independently of sex or head size, posteriorly produced backwards covering apical region of eyes to a variable extent and continuous in a straight line with supra-orbital carinae; eyes variable in size, separated ventrally by 2.7-4.1 diameters. A pressed flat area at anterior margin of head narrower than its outer margin and its margin in front of eye not produced.

**Pronotum** transverse, sides slightly rounded to almost parallel; larger specimens sometimes with very shallow, ill-defined, lateral longitudinal depressions; a very small impunctate region on either side on basal half is often present. Mesosternum usually with coarse, rarely rugose but not longitudinally rugose, puncturation. **Elytra** very slightly depressed.

**Specimens examined:** CN 6 exs., rice mill (rice bran),

Nonsan-si, 6 VII 2004, I.S. Kim.

**Distribution.** Korea (new record – Central), Cosmopolitan.

**Biological notes.** This species probably originated in Africa. The under bark habitat must be the natural one. This species is a secondary pest frequently associated with the grain weevil, *Sitophilus*, most frequently recorded on cereals and cereal products and also sometimes on other commodities ginger, groundnuts, copra, illipe nuts etc (Halstead, 1967).

**Remarks.** We have examined only one site which collected by I.S. Kim on July 6, 2004 from a rice mill at Nonsan city of Chungnam province in Korea. In 2013, we visited at this collecting site for gathering more specimens but, could not found the rice mill because probably wound up this business. On the other hand, this species has been designated as a quarantine pest on the Plant Protection Act in Korea. Therefore, it should be needed to survey on this species nationwide in order to the Pest Risk Analysis for exception from the list of quarantine pests.

**Key to the 6 species of the the genus *Palorus* for the inspection of plant quarantine in Korea**

The genus *Palorus* contains thirty-seven known species in the world (Halstead, 1967). The majority live under the bark of trees or in the galleries of wood-boring beetles, but some species are related to stored food products and have an economic importance on the international commerce (Table 1). Key to these 6 species related to stored food products as

followed (modified from Halstead, 1967);

1. Genae petaloid ..... *P. subdepressus* (Wollaston)
- Genae not forming horns, not petaloid ..... 2
2. Pronotum with deep lateral longitudinal foveae; genae not produced antero-dorsally to form a semicircular or somewhat triangular flange (or horns) ..... *P. laesicollis* (Fairmaire)
- Pronotum without deep lateral longitudinal foveae or, if present, head with genae produced antero-dorsally to form a semicircular or somewhat triangular flange (or horns) ..... 3
3. Pronotum widest near apex, without longitudinal shallow depressions; dorsal punctures without fine setae; eyes very small, dorsal length equal to half width of clypeal margin; supra-orbital carina very strongly developed, distinct from apex to base of eye ..... *P. ratzeburgii* (Wissmann)
- Without above characters combined. Supra-orbital carina not very strongly developed, may be very distinct apically but not basally ..... 4
4. Clypeus raised medially and slightly higher than genae or, if clypeus not raised medially then length 1.9-2.2 mm and body moderately cylindrical ..... 5
- Clypeus not raised medially or, slightly raised, not higher than genae, body not moderately cylindrical ..... *P. genalis* Blair
5. Clypeus raised medially and slightly higher than genae; body moderately elongate and depressed; pronotum with sides moderately to strongly convergent to base and usually with a small lateral tooth near base ..... *P. ficicola* (Wollaston)

**Table 1.** Members of the genus *Palorus* related to stored-food products

Scientific name	Distribution	Host (from Halstead, 1967)	Intercepted at ports of entry in
<i>P. ratzeburgii</i> (Wissmann)	Cosmopolitan	cereals and cereal products	Korea (PIS, 2014) & Japan (Yoshida et al., 1989)
<i>P. subdepressus</i> (Wollaston)	Cosmopolitan	cereals and cereal products, ginger, groundnuts, copra, illipe nuts	Korea (PIS, 2014) & Japan (Yoshida et al., 1989)
<i>P. genalis</i> Blair	Oriental region	cassava root, cattle food beans, illipe nuts, sago flour, tapioca root, gaplek root, rice, groundnut cake, ginger	UK (Halstead, 1967)
<i>P. cerylonoides</i> (Pascoe)	Japan, Oriental & Ethiopian region	illipe nuts, rice, flour mills	Japan (Yoshida et al., 1989)
<i>P. ficicola</i> (Wollaston)	Africa, Sri Lanka, Pakistan	threshed sorghum heads, groundnuts, milling machinery, spillage in a rice store, roller mill hinges, wheat in a warehouse	-
<i>P. laesicollis</i> (Fairmaire)	Ethiopia, Kenya	kibbled maize cob core, broken maize, oats and other detritus	-

- Clypeus not higher than genae; body moderately cylindrical and elongate; pronotum more or less quadrate, sides subparallel or slightly convergent to base and rarely with indentations ill-defined ..... *P. cerylonoides* (Pascoe)

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