Taxonomic Study of Korean Oedipodinae (Orthoptera: Caelifera: Acrididae)

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Research Paper

Taxonomic Study of Korean Oedipodinae (Orthoptera: Caelifera: Acrididae)

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ABSTRACT As a result of Korean Oedipodinae is taxonomically revised, eleven species are recognized and *Microgastrimargus taeguensis* Lee and Park 1992 is a new synonym of *Oedaleus infernalis* Saussure 1884. A key to Korean species of Oedipodinae, and description of a little known species *Epacromius japonicus* (Shiraki 1910) are provided.

Key words : Caelifera, Fauna, Korea, Orthoptera, Oedipodinae, Acrididae, Taxonomy

Introduction

The members of subfamily Oedipodinae can be easily observed in the open field on hot sunny days. Like most of ground dwellers, the grasshoppers prefer to barren and arid habitats with sparse vegetations. They are characterized by remarkable size, round head, filiform antennae, and usually banded or with vivid colored hind wings, which make them call 'band-winged grasshoppers' (Otte, 1984). In addition to those characters, its sound-producing mechanisms represented by hind femora against tegmina with serrated intercalary veins (Bey-Bienko and Mishchenko 1951).

There are about 816 species of the Oedipodinae in the world (Otte, 1995). Since Walker (1870) had first recorded *Pachytylus cinerascens* (= *Locusta migratoria*) from Korea, their distribution status have been fragmentarily known. Including lately described *Microgastrimargus taeguensis* Lee and Park 1992, a total of 26 species and subspecies names has been cited in the Korean fauna. Therefore it would be meaningful to accomplish a comprehensive taxonomic work, we're going to provide basic information for the species.

The specimens examined in this study are mostly deposited in Dept. Biology of Sungshin Women's University, Dept. Biology of Korea University, Natural History Museum of Ewha Women's University, National Institute of Agricultural Science and Technology (NIAST) in KOREA, and Hungarian Natural History Museum (Budapest) in HUNGARY. The following abbreviations are used in this paper for description, collecting localities and depositories of types: BL: Body length; CB: Chungcheongbuk-do; CN: Chungcheongnam-do; EIHU: Hokkaido University, Sapporo, Hokkaido, JAPAN; GB: Gyeongsangbuk-do; GG: Gyeonggi-do; GN: Gyeongsangnam-do; GU: Gyeonsan University, Gyeongsan, KOREA; GW: Gangwon-do; HFL: Hind femoral length; HT: Holotype; JB: Jeollabuk-do; JJ: Jeju-do; JN: Jeollanam-do; LS: Linnean Society, London, UK; LT: Lectotype; MHNG: Museum d'Histoire Naturelle, Geneva, SWITZERLAND; NMW: Naturhistorisches Museum Wien, Wien, AUSTRIA; NT: Neotype; PL: Pronotal length; PN: Pyeongannam-do; RG: Ryanggang-do; RMNH: Nationaal Natuurhistorische Museum, Leiden, NETHERLANDS; ST: Syntype; TL: Tegminal length; TU: Taiwan University, TAIWAN; UZIU: Zoological Institute, Uppsala University, Uppsala, SWEDEN; ZIN: Zoological Institute of the Russian Academy of Sciences, St. Petersburg, RUSSIA; ZMUC: Zoological Museum, University of Copenhagen, DENMARK.

Systematics

Subfamily Oedipodinae Walker, 1870

Key to Species of Korean Oedipodinae

1. Median carina of pronotum entire or intersected by only one transverse groove 2
– Median carina of pronotum intersected by 2–3 transverse grooves 8

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2. Median carina of pronotum very distinctly intersected by transverse groove; lateral carinae of pronotum distinct only in metazona ..... *Celes skalozubovi akitanus*
– Median carina of pronotum entire or only slightly intersected by transverse groove; lateral carinae of pronotum not distinguished 3
3. Pronotum dorsally flat, with slightly convex median carina 4
– Pronotum sharply roof-shaped, with strongly raised median carina 6
4. Frons strongly sloping, foveolae trapezoidal; mesosternal interspace wider than its length; ♂ subgenital plate cone-shaped ..... *Aiolopus thalassinus tamulus*
– Frons rather rounded, foveolae triangular; mesosternal interspace as wide as its length; ♂ subgenital plate tongue-shaped 5
5. Hind wings pale blue; tarsal arolia very small and narrower, not reaching half the length of claws ..... *Epacromius japonicus*
– Hind wings hyaline; tarsal arolia broad and thicker, reaching half the length of claws ..... *Epacromius pulverulentus*
6. Mandibles bluish; thorax ventrally with dense hairs; hind wings without dark band; tympanal lobe largely developed, covering half the tympanum ..... *Locusta migratoria*
– Mandibles dark brown; thorax bare ventrally or with sparse hairs; hind wings with a remarkable transverse band; tympanal lobe less developed 7
7. Pronotum longer, its anterior and posterior margins acute angle ..... *Gastrimargus marmoratus*
– Pronotum shorter, its anterior margin nearly straight, posterior margin obtuse angle ..... *Oedaleus infernalis*
8. Median carina of pronotum bidentate in prozona by 2 transverse grooves; occiput with a pair of tubercles between the eyes ..... *Trilophidia annulata*
– Median carina of pronotum not bidentate in prozona; occiput smooth, without tubercles between the eyes 9
9. Ocular distance as long as the diameter of an eye; pronotum with median carina intersected by 3 transverse grooves; tympanal lobe largely developed, covering 1/3 of the tympanum ..... *Sphingonotus mongolicus*
– Ocular distance wider than the diameter of an eye; pronotum with median carina intersected by 2 transverse grooves; tympanal lobe less developed 10
10. Dorsal apex of hind femur without longitudinal ridges ..... *Bryodema gebleri*
– Dorsal apex of hind femur with numerous narrow longitudinal ridges ..... *Bryodemella tuberculatum dilutum*

Genus *Celes* Saussure, 1884

Mem. Soc. Geneve 28: 53. Type species: *Gryllus variabilis* Pallas, 1771.

Celes skalozubovi akitanus (Shiraki, 1910)
홍날개메뚜기

Oedipoda akitana Shiraki, 1910. Acrididen Japans: 40, tab. 2, fig. 13 (Japan). ST in EIHU. = *Celes scalozubovi orientalis* Ikonnikov, 1913. Korea Acrid.: 15 (Korea). ST in ZIN. [Tarbinsky, 1932]

Korean records. *Celes akitana*: Doi, 1933: 88; Furukawa and Shiraki, 1950: 28, fig. 63; Cho, 1959: 182, fig. 67; Cho, 1969: 737, pl. 79; Ju, 1969: 23; *Celes skalozubovi akitanus*: Furukawa, 1939: 57, 147; Bey-Bienko and Mishchenko, 1951: 587; Cho and Lee, 1959: 14; Tsyplenkov, 1970: 214; Storozhenko, 1986: 316, fig. 143 (11); Tadauchi, 1989: 54; Kwon and Huh, 1994: 53; Moon and Yoon, 1996: 53; Kwon et al., 1996: 105; *Celes akitanus*: Zheng and Xia, 1998: 143; Hua, 2000: 41.

Specimens examined. <RG> 2♀, Hyesan cemetery, 8 x 1978, A. Vojnits & L. Zombori, No. 474; <GW> 1♀, Dutayeon Bangsan-myeon Yanggu, 6 x 1972, Kim JI; 3♂2♀, Changwon-3ri Ssangyong Yeongwol, 28 vi-24 vii 1999, Kim MA; 1♂, ibid., 9 vii 2000, Kim MA; 1♀, Mt. Odaesan, 27 vii 1958, Anonymous; 1♂1♀, ibid., 25 vi 1994, Lee SG and Min JH; 1♀, Pyeongchon Seohwa Inje, 30 viii 2004, Rhee HW; 1♀, Jeungsan Nam-myeon Jeongseon, 19 ix 2004, Kim TW; <GG> 1♂, Mt. Pakyon 20 km NE from Kaesong, 10 ix 1971, S. Horvatovich and J. Papp, No. 254; 1♀, Eommi-ri Gwangju, 15 ix 1984, Chang GS; 1♀, Mt. Godaesan Sinseo-myeon Yeoncheon, 31 viii 1967, Kim JI; 1♀, Mt. Dobongsan Seoul, 10 ix 1972, Lee NS; <JN> 1♀, Mt. Daedunsan Haenam, 15 viii 1972, Kim JI.

Genus *Aiolopus* Fieber, 1853

Lotos 3: 100. Type species: *Gryllus thalassinus* Fabricius, 1781.

Aiolopus thalassinus tamulus (Fabricius, 1798)
청분홍메뚜기

Gryllus tamulus Fabricius, 1798. Ent. Syst. Suppl.: 195 (India, China). LT♂ in ZMUC.

Korean records. *Aiolopusta* [!] *tamulis* [!]: Doi, 1936: 106; *Aiolopus tamulus*: Cho, 1959: 179, fig. 62; Cho, 1969: 734, pl. 48; Tsyplenkov, 1970: 214; *Aiolopus tamulumus* [!]: Ju, 1969: 22; *Aiolopus thalassinus tamulus*: Storozhenko, 1986: 315, fig. 159(14); Kwon and Huh, 1994: 52; Huh and Kwon, 1995: 14; Moon and Yoon, 1996: 53; Kwon et al., 1996: 105.

Specimens examined. <PN> 2♀, Sagam 45 km N from Pyongyang, 12 viii 1971, S. Horvatovich and J. Papp, No. 163; <GW> 1♂7♀, Madal-ri Hyeonnae-myeon Goseong, 25 ix 1978, Lee SS; <GG> 1♀, Daeseong-ri Oeseo-myeon Gapyeong, 4 ix 1982, Eom GS; 14♂10♀, Yeocha-ri Ganghwa, 7 viii-9 x 1996, Han SM; 1♂2♀, Is. Baeknyeongdo, 25 vii 1987, Kim JI and Yoo HJ; 1♀, Mt. Seongjusan Bucheon, 15 ix 1991, Yoon SJ; 5♂4♀, Eco-garden Seodun-dong Suwon, 13 viii-11 ix 1998, Dept. Bio.; 4♂1♀, ibid., 6 vii-27 ix 1999, Kim TW and Jang SS; 1♂, the riverside of Namhangang Yeoju, 23 x 2004, Kim TW; 1♂, Songchu Uijeongbu, 25 ix 1994, Yang MJ; 1♀, Is. Yeongheungdo Ongjin Incheon, 15 vii 1999, Kim MA; 2♂, Yongmi-ri Gwangtan Paju, 29 ix 2004, Kim TW; 3♂1♀, Misari Hanam, 14 vii 1991, Cho HJ; 1♂, Banpo-dong Seoul, 6 x 1999, Paik GJ; 2♀, Hwon-dong Seoul, 20 ix-2 x 1994, Han YH; <GB> 1♀, Gyeongju, 15 viii 1989, An EM; <GN> 1♂, Namhae, 26 vii 1983, Kim SH; <JN> 1♂, Is. Sangbaekdo Samsan-myeon Yeosu, 13 x 2001, Kim AY; <JJ> 1♂, Gwaeumsa Temple, 14 vi 1990 Yoon TJ; 1♂1♀, ibid., 18 vii 2001, Lee HS; 2♂, Mt. Sanbangsan Andeok Namjeju, 28 ix 2000, Kim TW; 1♂2♀, Andeokgyegok Namjeju, 11 x 1999, Kim TW; 1♂2♀, Hagui-2ri Aewol Bukjeju, 9 viii 2001, Park HC; 3♀, Is. Udo Bukjeju, 10 x 1999, Kim TW; 1♂3♀, Hamdeok-ri Jocheon Bukjeju, 8 vii 2002, Kim TW; 5♀, Seonheul-ri Jocheon Bukjeju, 28 ix 2000, Kim MA; 2♀, Jeongbangpokpo Dongheundong Seoguipo, 9 vii 2002, Kim TW.

Genus *Epacromius* Uvarov, 1942

Trans. Amer. Ent. Soc. 67: 338. Type species: *Oedipoda pulverulentus* Fischer von Waldheim, 1846.

Epacromius japonicus (Shiraki, 1910)
해변메뚜기 (Figs. 1–5)

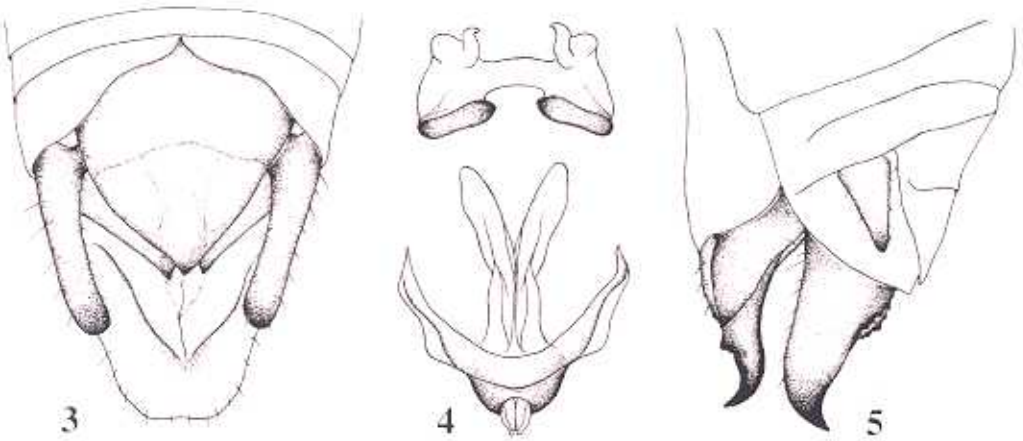
Oedipoda japonica Shiraki, 1910. Acrid. Japan: 39, pl. 1, fig. 10a–e (Japan). ST in TU.

Korean record. *Aiolopus japonicus*: Kim, 1998: 389.

Description. Body sandy color in living state, well camouflaged in the sand-dune. Head subconical or rather rounded. Antennae filiform, composed of 23–25 segments. Pronotum with a distinct median carina only in metazona, without lateral carinae. Serrated intercalary vein on tegmen present in male, but simple in female. Apex of tegmen rounded. Basal part of hind wings tinged with pale blue. Tarsal arolia very small and narrower, not reaching half the length of claws. Terminalia with a lot of whitish hairs. Supra-anal plate of male triangular with a weak transverse ridge and median concave. Subgenital plate of male strongly depressed, tongue-shaped. Cercus long rod-shaped in male, short conical in female. Ovipositor hook-shaped, its dorsal valves upper-basally with small rows of teeth, its ventral valves outer-basally with blunt projection. Measurements (mm): BL ♂ 21.5–26.5, ♀ 28.0–33.0, PL ♂ 4.0–5.0, ♀ 5.3–6.5, TL ♂ 18.5–25.5, ♀ 26.5–32.0, HFL ♂ 11.0–14.5, ♀ 16.0–18.0.

Specimens examined. <GG> 1♀, Ganseok-ri Bukdong Daebudo Ansan, 3 vii 2001, An MG; 7♂3♀, Is. Guleopdo Ongjin Incheon, 5 viii 1982, Kim JI and Chang GS; 3♀, the Batjireum beach Is. Deokjeokdo Ongjin Incheon, 14 ix 2001, Rhee HW; 2♂, Is. Deokjeokdo Ongjin Incheon, 23–25 vii 1955, Kim HG; <CN> 1♂, the Daecheon beach Sinheuk-dong Boryeong, 10 viii 1956, Ahn KH; 1♂, the Biin beach Seocheon, 23 vii 1971, Park JH; 2♂, Sindu-ri Wonbuk Taean, 18 vii 2002, Kim TW; 2♀, the Daeseong salt field Igok-ri Wonbuk Taean, 5 vii 2000, Park HC; <JN> 3♂2♀, the Myeongsasimri and Wonpyeong beach Is. Bigeumdo Sinan, 22 ix 2001, Park HC; 1♀, Is. Uido Heuksan-myeon Sinan, 21 vii 1979, Kim JI; 1♀, Wando-eup Wando, 6 vii 1982, Dept. Bio.; 2♂, the Myeongsasimri beach Sin-

Figs. 1–2. Habitus of *Epacromius japonicus* (Shiraki) (1, Male, 2, Female).



Figs. 3–5. Terminalia of Epacromius japonicus (Shiraki) (3. Dorsal view of male, 4. Phallic complex of male, 5. Lateral view of female).

ri Is. Sinjido Wando, 16 vii 2003, Kim TW.

Remarks. This grasshoppers are ecologically stenotopic to brackish sand-dune of marine habitats, nearly reside around coastal beaches.

Epacromius pulverulentus (Fischer von Waldheim, 1846) 발톱메뚜기

Oedipoda pulverulenta Fischer von Waldheim, 1846, Orth. Ross.: 299, 396, tab. 32, fig. 2 (Russia). ST in ZIN. = *Epacromia coerulipes* Ivanov, 1887, Trud. Obs. Isp. Prir. Charkov. Univ. 21: 303, 348 (Russia). ST in ZIN. [Mishchenko, 1968]

Korean records. *Aiolopus coerulipes*: Furukawa, 1935: 110 (Korea); Furukawa, 1939: 39, 139; Cho and Lee, 1959: 13; *Epacromius coerulipes*: Bey-Bienko and Mishchenko, 1951: 565, fig. 1256; Zheng and Xia, 1998: 85, fig. 41; *Epacromius pulverulentus*: Mishchenko, 1968: 494; Storozhenko, 1986: 314, figs. 143 (8), 144 (1, 2), 159 (19); Kwon and Huh, 1994: 52; Kwon et al., 1996: 105; Yin et al., 1996: 259.

Specimens examined. <GW> 1♀, Jukheon-dong Gangneung, 29 vii 1997, Kim HJ; <GG> 1♀, Mt. Myeongjisan Gapyeong, 23 ix 1989, Choi MY; 17♂12♀, Yeocha-ri Ganghwa, 15 viii–30 x 1996, Han SM; 1♂4♀, Jeondeungsa Temple Ganghwa, 10 viii 1991, Kim JI and Park HC, Light trap; 1♀, Mt. Bukhansan Goyang, 19 viii 1991, Yoon SJ; 1♀, Mt. Cheonggyesan Gwacheon, 14 viii 1983, Kim GJ; 1♀, Cheonjinam Gwangju, 5 viii 1998, Oh SY; 1♂, Mt. Gwanggyosan Suwon, 21 vii 2000, Jang SJ, Light trap; 1♂1♀, Ganseokri Bukdong Is. Daedudo Ansan, 3 vii 2001, An MG; 4♂, Sihwaho Ansan, 3 vii 2001, Park HC; 6♂8♀, Is. Yeongheungdo Ongjin Incheon, 15 vii 1999, Kim TW et al., Liht trap; 1♀, Mt. Cheolmasan Seogu Incheon, 10 ix 1995, Lee EJ; 3♂3♀, Wolchon-ri Is. Yeongjongdo Incheon, 29 x 2000, Jang YJ; 11♀, near Incheon Air-port Is. Yeongjongdo Incheon, 5 x 2003, Kim TW; 1♀, Yeonpung-ri Paju, 2 viii 1986, Park SM; 1♂, Hyangnam-myeon Hwaseong, 25 ix 1988, Lee MO; 1♂1♀, Gangseo Eco-park Banghwa-dong Seoul, 24 vii–24 viii 2004, Kim TW; 1♂, Mt. Suraksan Seoul, 5 x 1995, Lee JS; 4♂3♀, Mt. Cheonggyesan Seoul, 19 viii 1989, Lee JW; 1♂1♀, the riverside of Hangang Yongsan Seoul, 24 viii 1997, Lee HJ and Jeong DW; 1♂, Seodaemun Seoul, 11 viii 1981, Yoon SJ; <CN> 3♂, Muryangsa Temple Mt. Mansusan Oesan Buyeo, 19 vii 1999, Kim TW; 2♀, Is. Anmyeondo Taean, 27 vii 1994, Kim RR; 1♂, Sindu-ri Wonbuk Taean, 1 ix 2001, Park HC; 5♂1♀, the Daeseong salt field Igok-ri Wonbuk Taean, 5 vii 2000, Park HC; <JB> 1♂, Taein Jeongeup, 12 viii 1995, Kim MS; <JN> 1♀, Wando-eup Wando, 7 vii 1982, Dept. Bio.

Remarks. This grasshoppers also prefers to saline ground (Uvarov, 1942), e.g. muddy salt-marshes or coastal beaches in Korea. However, compared with neighboring species *Epacromius japonicus* (Shiraki), they occupy more wider habitats to inland along the streamsides.

Genus *Locusta* Linnaeus, 1758

Syst. Nat. Ed. 10: 431. Type species: *Gryllus (Locusta) migratorius* Linnaeus, 1758.

Locusta migratoria (Linnaeus, 1758) s. lat. 풀무치

Gryllus (Locusta) migratorius Linnaeus, 1758, Syst.

Nat. Ed. 10: 432, No. 45 (Russia). ST in LS. = *Gryllus (Locusta) danicus* Linnaeus, 1767. Syst. Nat. Ed. 12: 702, No. 57 (Europe). Type lost. [Uvarov, 1951]. = *Gryllus (Locusta) cinerascens* Fabricius, 1781. Spec. Ins. 1: 369 (Italy). NT♂ in MHNG. [Johnston, 1956]

Korean records. *Pachytylus cinerascens*: Walker, 1870: 723 (Corea); Rehn, 1902: 634; *Pachytylus migratorius*: Rehn, 1902: 634; *Locusta migratoria*: Ikonnikov, 1913: 17; Furukawa, 1939: 45, 142; Bey-Bienko and Mishchenko, 1951: 576, figs. 7, 16–20, 25, 32–34, 1215; Cho and Lee, 1959: 6; Mishchenko, 1968: 495; Ju, 1969: 24; Storozhenko, 1986: 315, fig. 156 (3); Kwon and Huh, 1994: 53; Huh and Kwon, 1995: 16; Moon and Yoon, 1996: 53; Kwon et al., 1996: 105; Hua, 2000: 42; *Locusta danica*: Ikonnikov, 1913: 17; Mori and Cho, 1940: 19; Cho, 1959: 188, fig. 80; Cho, 1963: 162; Seok, 1970: 176; *Pachytylus danicus*: Okamoto, 1924: 55; Ju, 1969: 25; *Pachytilus* [!] *danicus*: Doi, 1932: 36; *Locusta migratoria danica*: Cho, 1969: 744, pl. 49; Ju, 1969: 24.

Specimens examined. More than 350 specimens from all areas in Korea.

Remarks. The checked samples of Korean species are shown the great variations to body dimension. The largest ones (BL ♀ > 50 mm, ♂ > 40 mm) applicable to basic subspecies *Locusta migratoria migratoria* (Linnaeus) and smaller ones (BL ♀ < 45 mm, ♂ < 35 mm) are considered to the other southern subsp. *L. migratoria manilensis* (Meyen). However, we do not try to assign to subspecific categories for them in this work, because of trends to overlap of subspecific characters (Liu et al., 1999). The isolated populations are especially much larger which found from western islands of Korean peninsular.

Genus *Gastrimargus* Saussure, 1884

Mem. Soc. Geneve 28 (9): 109. Type species: *Oedaleus (Gastrimargus) virescens* Saussure, 1884.

Gastrimargus marmoratus (Thunberg, 1815) 콩중이

Gryllus marmoratus Thunberg, 1815. Mém. Acad. Imp. Sci. St. Petersb. 5: 232 ('Cap': incorrectly labelled). LT♀ in UZIU. = *Gryllus transversus* Thunberg, 1815. Mém. Acad. Imp. Sci. St. Petersb. 5: 233 (China). LT♀ in UZIU. [Stål, 1873]

Korean records. *Oedaleus marmoratus*: Ichikawa, 1906: 183 (Is. Quelpart); Okamoto, 1924: 56; *Gastrimargus transversus*: Doi, 1932: 36; Cho, 1959: 187, fig. 79; Cho and Lee, 1959: 7; Cho, 1963: 162; Cho, 1969: 744, pl. 49; Ju, 1969: 24; Seok, 1970: 175; *Gastrimargus marmoratus*: Bey-Bienko and Mishchenko, 1951: 580, figs. 1213, 1220, 1221; Tsyplenkov, 1970: 214; Ritchie, 1982: 262, figs. 26–32, 119, 127; Tadauchi, 1989: 55; Kwon and Huh, 1994: 53; Huh and Kwon, 1995: 15; Moon and Yoon, 1996: 53; Kwon et al., 1996: 105; Zheng and Xia, 1998: 15, fig. 10; Hua, 2000: 41.

Specimens examined. More than 300 specimens from all areas in Korea.

Genus *Oedaleus* Fieber, 1853

Lotos 3: 126 (pro subgenus *Oedipoda*). Type species: *Acrydium nigrofasciatum* De Geer, 1773. = *Microgastrimargus* Lee and Park, 1992, **syn. nov.** J. Basic Sci. Res. Inst. Hyosung Women's Univ. 6: 62. Type species: *Microgastrimargus taeguensis* Lee and Park, 1992.

Oedaleus infernalis Saussure, 1884 팥중이

Oedaleus (Oedaleus) infernalis Saussure, 1884. Mem. Soc. Geneve 28 (9): 116 (Japan). LT♂ in NMW. = *Oedaleus infernalis* var. *amurensis* Ikonnikov 1911. Ann. Mus. Zool. 16: 255 (Russia). LT♂ in NMW. [Ritchie, 1981]. = *Microgastrimargus taeguensis* Lee and Park, 1992, **syn. nov.** J. Basic Sci. Res. Inst. Hyosung Women's Univ. 6: 62, figs. 1–2 (Korea: Daegu). HT♂ in GU.

Korean records. *Oedaleus infernalis*: Burr, 1898: 29 (Korea: Port Lazareff); Ikonnikov, 1913: 17; Doi, 1932: 36; Kamiya and Miyasaka, 1938: 64; Furukawa, 1939: 51, 144; Furukawa and Shiraki, 1950: 27, fig. 62; Bey-Bienko and Mishchenko, 1951: 577; Cho, 1959: 186, fig. 78; Cho and Lee, 1959: 6; Cho, 1969: 743, pl. 49; Ju, 1969: 25; Tsyplenkov, 1970: 214; Rentz and Miller, 1971: 265; Ritchie, 1981: 128, figs. 5, 36, 52, 107–110, 163; Storozhenko, 1986: 315, fig. 159 (16); Tadauchi, 1989: 56; Kwon and Huh, 1994: 53; Huh and Kwon, 1995: 16; Moon and Yoon, 1996: 53; Kwon et al., 1996: 105; Zheng and Xia, 1998: 123, figs. 60, 61, 65, 66, 68; Hua, 2000: 42; *Oedaleus infernalis amurensis*: Bey-Bienko and Mishchenko, 1951: 577 (North Korea).

Specimens examined. More than 2,000 specimens from all areas in Korea.

Remarks. Previous Korean record of African species *Oedaleus nigrofasciatus* (De Geer) (Rehn, 1902: Chemulpo) revised to present species by Ikonnikov (1913). The new synonyms, *Microgastrimargus*, and *Mi. taeguensis* were originally distinguished from

Gastrimargus marmoratus. But its generic and specific diagnosis characters, viz. smaller body size, wings pattern, pronotum outline are corresponding with the genus *Oedaleus*. Moreover the variations of *Oe. infernalis* without distinct X-marking had been already discussed (Ritchie, 1981), as well as genitalic characters are not different with present species.

Genus *Trilophidia* Stål, 1873

Recens. Orth. 1: 117, 131. Type species: *Oedipoda cristella* Stal, 1861.

Trilophidia annulata (Thunberg, 1815)
두꺼비메뚜기

Gryllus annulatus Thunberg, 1815. Mém. Acad. Imp. Sci. St. Petersb. 5: 234 (China, Japan, Java). LT in UZIU. = *Acridium* (*Oedipoda*) *velneratum* De Haan, 1842. Bijdrag. Kennis Orthop.: 161 (China, Japan, Java). LT in RMNH. [Willemse, 1930] = *Trilophidia annulata* var. *japonica* Saussure, 1888. Mem. Soc. Geneve 28 (9): 54 (Japan). LT in MHNG. [Hollis, 1965]

Korean records. *Trilophidia annulata japonica*: Ikonnikov, 1913: 17; Tadauchi, 1989: 57; *Trilophida* [!] *annulata*: Doi, 1932: 36; *Trilophida* [!] *velnerata*: Doi, 1933: 88; *Trilophidia velnerata*: Haku, 1937: 73; Cho, 1959: 186, fig. 77; Cho, 1969: 743, pl. 49; Ju, 1969: 26; *Trilophidia annulata*: Cho and Lee, 1959: 9; Hollis, 1965: 251, figs. 2–4, 8, 12, 17–19, 26; Bhowmik, 1986: 78, fig. 86, pl. 6, fig. 244; Storozhenko, 1986: 316, figs. 139 (3), 143 (12); Kwon and Huh, 1994: 53; Huh and Kwon, 1995: 16; Moon and Yoon, 1996: 54; Kwon et al., 1996: 105; Zheng and Xia, 1998: 156, fig. 85; Hua, 2000: 43; *Trilophidia japonica*: Tsyplenkov, 1970: 214; Rentz and Miller, 1971: 265.

Specimens examined. More than 800 specimens from all areas in Korea.

Genus *Sphingonotus* Fieber, 1853

Lotos 3: 124. Type species: *Gryllus* (*Locusta*) *caerulans* Linnaeus, 1767.

Sphingonotus mongolicus Saussure, 1888
강변메뚜기

Sphingonotus mongolicus Saussure, 1888. Mem. Soc. Geneve 30 (1): 77, 82, No. 13 (Mongolia). ST in MHNG.

Korean records. *Sphingonotus mongolicus*: Ikonnikov, 1913: 19; Doi, 1933: 88; Wu, 1935: 178; Furukawa, 1939: 71, 155; Bey-Bienko, 1950: 200; Bey-Bienko and Mishchenko, 1951: 629, fig. 1308; Cho, 1959: 186, fig. 76; Cho and Lee, 1959: 12; Mishchenko, 1968: 496; Cho, 1969: 742, pl. 79; Ju, 1969: 26; Storozhenko, 1986: 316, figs. 143 (13), 144 (7); Kwon and Huh, 1994: 53; Moon and Yoon, 1996: 54; Kwon et al., 1996: 105; Zheng and Xia, 1998: 197; Hua, 2000: 42.

Specimens examined. <PN> 3♀, Sagam 45 km N from Pyongyang, 12 viii 1971, S. Horvatovich and J. Papp, No. 163; <GW> 2♀, Bukpyeong Jeongseon, 17 viii 1989, Lee GJ; 3♂, the riverside of Donggang Mitan Pyeongchang, 9 vii 1989, Kim TW; 1♀, Noil-ri Hongcheon, 18 ix 1993, Kim SJ; <GG> 1♀, the riverside of Hantangang Yangju, 22 vii 1984, Yoo HJ; 1♂, Cheongpyeong, 7 ix 1960, Jang GR; 1♂, Ui-dong Seoul, 1 ix 1960, Jang GR; <GB> 1♀, Angang-eup Wolseong, 18 viii 1972, Park JH; 1♀, Mt. Deungunsan Danchon Uiseong, 24 vi 1991, Kim HJ; 1♂, Andong Univ. Campus Andong, 22 vi 1991, Kim HJ; 1♂, Songcheon-dong Andong, 29 vi 1991, Paik JW; 1♂, Magae1-ri Gwangheungsa Temple Andong, 18 vi 2002, An MG.

Remarks. Previous Korean records of Japanese species *Eusphingonotus japonicus* (Saussure) (= *Sphingonotus japonicus*: Doi, 1932: 36; Kamiya and Miyasaka, 1938: 65; Ju, 1969: 26) are referable to the present species. The habitats of this grasshoppers seem to be restricted around riversides where composed of sand, pebbles and sparse vegetations.

Genus *Bryodema* Fieber, 1853

Lotos 3: 129, type species: *Oedipoda gebleri* Fischer von Waldheim, 1836.

Bryodema gebleri (Fischer von Waldheim, 1836)
빨간종아리메뚜기

Oedipoda gebleri Fischer von Waldheim, 1836. Bull. Mosc. 9: 346, pl. 4, fig. 1 (Russia: Mt. Altai). Type lost.

Korean record. *Bryodema gebleri*: Ju et al., 1993: 287 (North Korea: Mt. Baekdusan).

Remark. No specimen examined.

Genus *Bryodemella* Yin, 1982

Acta Bio. Plateau Sin. 1 (1): 86. Type species: *Bryodemella holdereri* Krauss, 1901.

Bryodemella tuberculatum dilutum (Stroll, 1813)
참홍날개메뚜기

Gryllus (*Locusta*) *dilutus* Stroll, 1813. Rep. exact. color. d'apres nat. spec.: 21, pl. 9b, fig. 31 (Russia: Siberia). = *Bryodema tuberculatum sibirica* Ikonnikov,

1913, Korea Acrid.: 17 (Korea). [Bey-Bienko, 1930]

Korean records. *Bryodema tuberculatum dilutum*: Bey-Bienko, 1930: 91, pl. 18, fig. 2, pl. 20, fig. 6; Bey-Bienko, 1931: 675; Wu, 1935: 175; Furukawa, 1939: 61, 150; Cho, 1959: 181, fig. 66; Cho, 1969: 737, pl. 79; Tsyplenkov, 1970: 214; Rentz and Miller, 1971: 264; Kwon and Huh, 1994: 53; Moon and Yoon, 1996: 54; Kwon et al., 1996: 105; *Bryodema tuberculatum*: Doi, 1932: 36; Cho and Lee, 1959: 12; *Bryodema tuberculata sibirica*: Haku, 1937: 73; *Bryodema tuberculata sibinca* [!]: Ju, 1969: 22; *Bryodema tuberculatum sibirica*: Ju et al., 1993: 287.

Specimens examined. <RG> 1♂2♀, the river Karim 10 km NEE from Bochonbo 1100 m, 27 vii 1975, J. Papp and A. Vojnits, No. 295, 297; <PN> 1♀, Unsan about 65 km NE from Pyongyang along the river Tedong, 12 vi 1970, E. Antal, No. 132; 1♂, Mt. Daesongsan 10 km NE of Pyongyang, 11 ix 1979, H. Steinmann and T. Vasarhelyi, No. 521; <GW> 2♂, Yanggu, 4 vi 1967, Kim JI and Oh JG; 1♀, Mt. Odaesan, 27 vii 1958, Anonymous; 1♂, Mt. Chiaksan Wonseong, 30 vii 1975, Kim JI; 1♂, Yuchon Doam Pyeongchang, 2 vii 1985, Cho HY; 1♀, Ganpyeong-ri Jinbu Pyeongchang, 29 vi 1985, Chang GS; 2♂, Dongsan-ri Jinbu Pyeongchang, 2 vii 1985, Kim YS; 1♀, Gangchon Chuncheon, 23 vi 1973, Oh HA; <GG> 2♂, Mt. Bagyonsan near Sanchonri in the San river valley about 22 km from Kaesong, 7 vi 1970, S. Mahunka and H. Steinmann, No. 107; 1♂, Mt. Godongsan Gapyeong, 23 viii 1977, Yoon OH; 1♂, Gwangneung, 7 vi 1968, Lee JG; 1♀, ibid., 19 vi 1969, Wu SW; 1♂, ibid., 11 vi 1977, Kim Suki; 1♀, Gwangju, 17 vii 1972, Lee OJ; 1♂, Maseok Namyangju, 11 vi 1966, Yoon TH; 1♂2♀, Paldang Namyangju, 3 x 1963, Lee JS et al.; 2♂, Mt. Cheonmasan, 23-25 vii 1961, Anonymous; 1♂, ibid., 11 vi 1966, Kim YS; 1♂, Sangsangok-dong Hanam, 10 vi 1977, Kim NS; 1♂, Gupabal Seoul, 11 vi 1961, Kim MM; 1♂, Jeongneung Seoul, 5 vi 1959, Yoo JA; <CB> 1♀, Silim Jecheon, 11 vii 1988, Yoon SJ; 1♂, Songmyeon-ri Cheongcheon-myeon Goesan, 23 vi 1989, Yang JO; 1♂, Mt. Songnisan, 6 vi 1970, Choi SN; 5♂1♀, ibid., 21 vi 1989, Kim NR et al.; 1♀, ibid., 7 viii 1990, Kim BJ; <GB> 1♂, Mungyeongsaejae, 11 vii 1977, Lee HG; 1♀, Mt. Bohyeonsan Yeongcheon, 19 vii 1968, Lee HY; 1♂2♀, Uljin, 27-30 vi 1972, Han IW; 1♂, Temple Unmunsa Mt. Unmunsan Sinwon-ri Unmun-myeon Cheongdo, 18 vi 2001, Park HC; <JB> 2♂1♀, Jeonju, 12 vi 1983, Yeo SH; 1♀, Mt. Moaksan Jeonju, 30 vii 1984, Jeong WS.

Erroneous records

The Korean records of *Psophus stridulus* (Linnaeus) (Wu, 1935: 160; Bey-Bienko and Mishchenko, 1951: 583; Storozhenko, 1986: 315; Harz, 1975: 458; Ragge and Reynolds, 1998: 282; Zheng and Xia, 1998: 135) are arise from the Manchurian report of Bey-Bienko (1929: 102). It was, however, just editing error on the article. He wrote as under No 32. *Psophus stridulus* follows as, "Typical *C. skalubovi* [!] Adel., but not the sbsp. *orientalis* Ikonnikov, described by its author from KOREA and the lake Hanka Russian Far East". But the writing practically to be for No 33. *Celes skalozubovi skalozubovi* in the same page.

Likewise, the Korean record of *Celes affinis* (Fischer von Waldheim) is appeared only in Yin et al. (1996: 142), but also an editing error was happened, that is already synonymized name with European species *Celes variabilis* (Pallas) by Kirby (1910), as well as the valid species *Celes skalozubovi* Adelung was not ranked. Besides, the Eurasian species *Oedaleus decorus* (Germar) distributed to Korea is appeared only in Fontana et al. (2002: 434), but we can not find any information for the occurrence. It is considered citing error for *Oedaleus infernalis* Saussure.

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