

A Taxonomic Study of Korean Acridinae (Orthoptera: Caelifera: Acrididae)

KIM, Tae-Woo¹ and Jin-Il KIM^{1,2}

¹*Department of Biology, Sungshin Women's University, 249-1, Seoul, 136-742, Korea;*

²*Korean Entomological Institute, Korea University, Seoul, 136-701, Korea.*

Reprinted from
Entomological Research:
Vol. 35, No. 1, March 2005

The Entomological Society of Korea

A Taxonomic Study of Korean Acridinae (Orthoptera: Caelifera: Acrididae)

KIM, Tae-Woo^{1*} and Jin-Il KIM^{1,2}¹Department of Biology, Sungshin Women's University, 249-1, Seoul, 136-742, Korea;²Korean Entomological Institute, Korea University, Seoul, 136-701, Korea

ABSTRACT Five species of Korean Acridinae are recognized as a result of taxonomic investigation. A key, figures of male genitalia, and description of little known species *Ceraeris nigricornis laeta* (Bolivar) are provided.

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

Introduction

The subfamily Acridinae (Acrididae) includes 470 species in the world (Otte, 1995). They are phytophilous grasshoppers, i.e. live mainly on plants, and are active herbivores and climbers. However, morphologically compared with the other two subfamilies in Korean Acrididae, it is recognized by rather indistinct characters. Those are, the Gomphocerinae with well developed stridulatory pegs on hind femora, and the Oedipodinae with serrated intercalary veins on tegmina in order to specific communications. While the Acridinae could be generally defined as without those autapomorphic characters, Otte (1981) also provided detailed comparisons.

Up to date, however, there are considerable disagreements among taxonomists about the subfamily classification and positions of some genera in the Acrididae (Otte, 1995). Storozhenko and Otte (1994) also suggested that the division of Acridinae, Gomphocerinae and Oedipodinae might be artificial. General agreements about their higher classification have not been accomplished yet, thus species presented in this study are rather conventionally arranged (Otte, 1995).

Since Walker (1870) firstly recorded *Xiphocera fumosa*, labelled 'Corea', the diversity of Acridinae has been fragmentarily known from Korean fauna. All of thirteen specific and subspecific names have been cited in the past literatures, thus it would be worth-

while to conduct a comprehensive taxonomic study of Korean Acridinae to review the past records and analyze new data.

The specimens observed in this study are mostly deposited in Sungshin Women's University, Korea University, and NIAST (National Institute of Agricultural Science and Technology, Suwon) in Korea. The following abbreviations used in this article: [!]: misspelling; =: synonym; ANSP: Academy of Natural Sciences, Philadelphia, USA; CB: Chungcheongbuk-do; CN: Chungcheongnam-do; GB: Gyeongsangbuk-do; GG: Gyeonggi-do; GN: Gyeongsangnam-do; GW: Gangwon-do; HH: Hwanghae-do; HT: Holotype; IEE: Instituto Espanol de Entomologia, Madrid, SPAIN; JB: Jeollabuk-do; JJ: Jeju-do; JN: Jeollanam-do; LT: Lectotype; PN: Pyeongannam-do; RMNH: Nationaal Natuurhistorische Museum, Leiden, NETHERLANDS; ST: Syntype; UZIU: Zoological Institute, Uppsala University, Uppsala, SWEDEN; ZM-MU: Zoological Museum, Moscow University, RUSSIA.

Systematics

Subfamily Acridinae Stål

Key to Species of Korean Acridinae

1. Antennae ensiform; vertex strongly projecting forwards; frons strongly sloping; tegmen with apex sharply acuted 2
2. Antennae filiform; vertex moderately projecting forwards; frons rather rounded; tegmen with apex

*Corresponding author

E-mail: pulmuchi@sungshin.ac.kr, Tel: 82-2-920-7173

- rounded 3
2. Hind femur with spine-like genicular lobes on both sides (Genus *Acrida*) *Acrida cinerea*
 - Hind femur with round genicular lobes on both sides (Genus *Gonista*) *Gonista bicolor*
3. Antennae very long; middle antennomeres 4 times longer than wide; subgenital plate of male short and rounded with blunt apex; ovipositor with short wide valves, its dorsal valve 1.5 times as long as greatest height (Genus *Ceraeris*)
 *Ceraeris nigricornis laeta*
- Antennae relatively short; middle antennomeres 2-3 times longer than wide; subgenital plate of male long and conical, sharply narrowed toward apex; ovipositor with long narrow valves, its dorsal valve 3 times more as long as greatest height 4
4. Pronotum with longitudinal black bands on lateral sides; tegmen with intercalary vein extending along median field (Genus *Mecostethus*)
 *Mecostethus alliaceus*
- Pronotum without black bands on lateral sides; tegmen with intercalary vein and connecting cross-veins bearing numerous small teeth (Genus *Stethophyma*) *Stethophyma magister*

Genus *Acrida* Linnaeus, 1768

Syst. Nat. Ed. 10: 427.

Type species: *Gryllus (Acrida) turrinus* Linnaeus, 1758.

Acrida cinerea (Thunberg, 1815) 밤아깨비 (Fig. 4)

Truxalis cinereus Thunberg, 1815. Mém. Acad. Imp. Sci. St. Petersb. 5: 263 (China, Java, Japan), HT♂ in UZIU. = *Acrida lata* Motschulsky, 1866. Bull. Sci. Nat. Mosc. 39(1): 181 (Japan). = *Acrida turrina koreana* Ikonnikov, 1913. Korea Acrid.: 10, figs. 1-2 (Korea). [Dirsh and Uvarov, 1953]

Korean records. *Acrida lata*: Doi, 1932: 34; Cho, 1959: 171, fig. 49; Cho and Lee, 1959: 5; Cho, 1963: 162; Cho, 1969: 727, pl. 48; Ju, 1969: 22; *Acrida koreana*: Bey-Bienko and Mishchenko, 1951: 400, fig. 922; *Acrida cinerea*: Dirsh, 1954: 154, fig. 19; Tsyplenkov, 1970: 214; Rentz and Miller, 1971: 262; Inoue, 1985: 108, figs. 1, 32, 63; Storozhenko, 1986: 297; Tadauchi, 1989: 54; Kwon and Huh, 1994: 52; Huh and Kwon, 1995: 12; Moon and Yoon, 1996: 52; Kwon et al. 1996: 104.

Specimens examined. More than 880♂♀ specimens from all areas in Korea.

Remarks. The Korean record of African species *Truxalis nasuta* (Linnaeus) (= *Acrida nasuta*: Rehn, 1902. Chemulpo) was revised to *Acrida turrina* (Linnaeus) (Bey-Bienko, 1929), and finally identified as the present species (Dirsh, 1954).

Genus *Gonista* Bolivar, 1898

Ann. Mus. Civ. Stor. Nat. Genova, 39: 29.

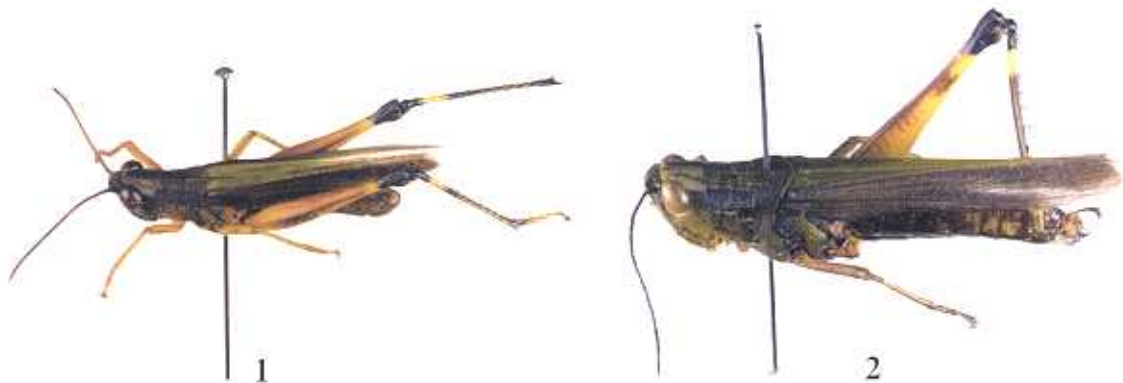
Type species: *Gonista antennata* Bolivar, 1898.

Gonista bicolor (De Haan, 1842) 딱다기 (Fig. 5)

Acridium (Opsomala) bicolor De Haan, 1842. Bijdrag. Kennis Orthop.: 147 (Java), HT♂ in RMNH.

Korean records. *Gelastorhinus* [!] *bicolor*: Ikonnikov, 1913: 19 (Korea); Cho, 1959: 172, fig. 51; Cho and Lee, 1959: 11; Cho, 1963: 162; Cho, 1969: 728, pl. 48; Ju, 1969: 24; *Gelastorhinus bicolor*: Doi, 1932: 34; *Gonista bicolor*: Bey-Bienko and Mishchenko, 1951: 406, fig. 929; Tsyplenkov, 1970: 214; Kwon and Huh, 1994: 52; Huh and Kwon, 1995: 12; Moon and Yoon, 1996: 52; Kwon et al., 1996: 105; Hua, 2000: 47.

Specimens examined. <PN> 1♂, Lake Taesong-ho South Pyongyang, 13 ix 1979, H. Steinmann



Figs. 1-2. Habitus of *Ceraeris nigricornis laeta* (Bolivar) (1, Male, 2, Female).

and T. Vasarhelyi, No. 525; <HH> 1 ♀, Songhwa South Hwanghae, 17 ix 1979, H. Steinmann and T. Vasarhelyi, No. 540; <GW> 1 ♂, Chuncheon, 28 viii 1998, Park HC; 1 ♂, Mt. Samaksan Chuncheon, 9 x 1971, Nam SS; <GG> 1 ♂, Gwangneung, 7 ix 1985, Park MN; 1 ♂, Eommi-ri Jungbu Gwangju, 15 ix 1984, Chang GS; 1 ♂, Nambansanseong, 19 ix 1981, Kim HM; 1 ♀, Wonsi-dong Ansan, 30 viii 1994, Moon TY; 3 ♀, Yeoncheon, 7 ix 1997, Kim EN; 1 ♀, Jeongok, 22 viii 1984, Jang SH; 1 ♂, Eungogae, 15 ix 1984, An MG; 1 ♀, Iyeong, 3 x 1984, Lee JG; 1 ♂ 1 ♀, Mt. Gamaksan Seolma-ri Jeokseong Paju, 8 ix 1984, Chang GS; 1 ♀, Mt. Jugeumsan Naechon Pocheon, 25 ix 2004, Kim TW; 1 ♂, Wonji-dong Gangnam Seoul, 18 ix 1985, Hwang MG; 1 ♂, Mt. Cheonggyesan Seoul, 13 viii 1987, Lee YM; 1 ♂, Mt. Gwanaksan Seoul, 3 x 1980, Lee HS; 1 ♀, Dogok-dong Seoul, 13 x 1979, Kim JJ; 1 ♂ 2 ♀, Ogeum-dong Seoul, 5 ix 1980, Lee SY; 1 ♀, Mt. Yongmasan Seoul, 5 ix 1971, Kim SJ; 1 ♀, Uidong Seoul, 13 ix 1981, Park OH; <CN> 1 ♀, Onseok-dong Seosan, 12 ix 1997, Choi KJ; 1 ♂, Hyudae-ri Baebang Asan, 20 ix 1992, Kim HJ; <GB> 2 ♀, Daegu, 18 ix 1971, Lee EB; 1 ♀, Guryongpo Pohang, 14 viii 1972, Park JH; <GN> 1 ♀, Yeonsan-dong Dongnae Busan, 21 viii 1985, Park MN; 1 ♂, Is. Geojedo, 8 viii 1964, Bae JM; 1 ♂, Mt. Gudeoksan Busan, 23 viii 1971, Kim SA; <JJ> 1 ♂ 1 ♀, Musucheon Aewol Bukjeju, 9 x 1999, Kim TW; 2 ♂, Gosan-ri Hangyeong Bukjeju,

26 ix 2000, An MG; 5 ♂ 2 ♀, Mt. Sanbansan Andeok Namjeju, 28 ix 2000, Kim TW.

Remarks. Previous records of Taiwanese species *Gelastorhinus rotundatus* Shiraki (Okamoto, 1924; Seok, 1970) from Is. Jeju are referable to the present species since Huh and Kwon (1995).

Genus *Ceracris* Walker, 1870

Cat. Derm. Salt. Brit. Mus. 4: 790.

Type species: *Ceracris nigricornis* Walker, 1870.

Ceracris nigricornis laeta (Bolivar, 1914)

검정수염메뚜기 (Figs. 1, 2, 6)

Kuthya laeta Bolivar, 1914, Trab. Mus. Nac. Cienc. Nat. 20: 79 (Viet-Nam; Than-Moi), HT ♀ in IEE.

Korean records. *Ceracris nigricornis*: Doi, 1932: 36 (Mt. Soyosan); Ju, 1969: 23; *Ceracris nigricornis laeta*: Cho, 1959: 182, fig. 68; Cho, 1969: 738, pl. 79; Kim, 1998: 397.

Description. Overall coloration olive-green. Antennae dark black and very long, in male much longer (nearly as BL) than in female (nearly as half of BL). Middle antennomeres 4.5 times longer than wide. Vertex moderately projecting forwards and frons slightly oblique. Pronotum coarsely punctured, lateral carinae nearly parallel with blackish bands along them from behind eyes. Anal area of tegmen bright green, median area hyaline with reddish brown veins. Tegmen with apex rounded, slightly surpassing abdominal end. Legs yellowish brown. Hind knee black, with a narrow pale pre-apical ring. Hind tibia with black base and a pale post-basal ring. Subgenital plate of male short and rounded with blunt apex. Supra-anal plate tongue shaped. Cercus conical with numerous granules. Ovipositor with short wide valves, its dorsal valve 1.5 times as long as greatest height. Measurements (mm): BL ♂ 20-24, ♀ 28-34, PL ♂ 4.0-5.5, ♀ 4.5-6.5, TL ♂ 17-19, ♀ 21.5-23.0, HFL ♂ 12.5-14.5, ♀ 16-18.

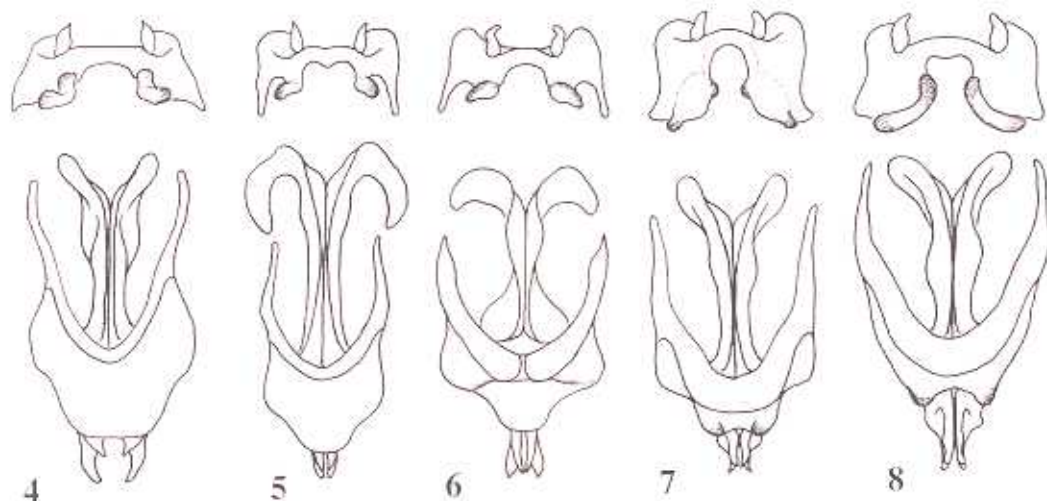
Specimens examined. <GW> 1 ♂, Haesanryeong Hwacheon, ? viii 2002, Paik YH; <GG> 3 ♀, Mt. Soyosan Dongducheon, 19-21 x 1980, Kim YH et al.; 1 ♂, Wangnim-ri Yeoncheon, 3 x 2000, Lee HS and Park SU; 1 ♀, Mt. Cheonmasan Namyangju, 12 x 1968, Kim GH; 1 ♀, Ipseok Namyangju, 26 x 1968, Kim GH; <GN> 1 ♀, Ssanggyesa Temple Hadong, 11 viii 1959, Kim HG.



Fig. 3. Female holotype of *Xiphocera fumosa* Walker, 1870 (© 2005 The Natural History Museum, LONDON).

Genus *Mecostethus* Fieber, 1852

Gründ. Kennt. Ortho. Ober.: 1.



Figs. 4-8. Phallic complexes of Korean Acridinae (dorsal views, 4, *Acrida cinerea*, 5, *Gonista bicolor*, 6, *Ceracris nigricornis*, 7, *Mecostethus alliaceus*, 8, *Stethophyma magister*).

Type species: *Gryllus alliaceus* Germar, 1817.

***Mecostethus alliaceus* (Germar, 1817)**

벼메뚜기불이 (Fig. 7)

Gryllus alliaceus Germar, 1817: Fauna Ins. Eur.: 11, pl. 19 (Dalmatia, Illyria). Type lost.

Korean records. *Mecostethus alliaceus*: Ikonnikov, 1913: 11 (Korea); Storozhenko, 1986: 314; Kwon and Huh, 1994: 52; Huh and Kwon, 1995: 15; Kwon et al., 1996: 105; *Parapleurus alliaceus*: Furukawa, 1930: 100; Doi, 1932: 35; Bey-Bienko and Mishchenko, 1951: 462; Cho, 1959: 183, fig. 71; Cho and Lee, 1959: 8; Cho, 1969: 739, pl. 48; Ju, 1969: 25; Harz, 1975: 567, figs. 1511, 1608, 1633, 2024-2033; Inoue, 1985: 117, figs. 10, 42, 73; Tadauchi, 1989: 56; Zheng and Xia, 1998: 83; Hua, 2000: 42.

Specimens examined. <GW> 1♂, Yongneup Mt. Daeamsan Yanggu, 7-8 vii 2003; Kim JK and Kim TW: 1♀, Mt. Samyeongsan Chugok-ri Buksan-myeon Chuncheon, 25 vii 2003; Kim TW: 1♂1♀, Mt. Soppulsan Duchon-myeon Hongcheon, 25 viii 2002; Kim TW: 2♂, Mt. Bangtaesan Inje, 15-19 viii 1995; Kim Ji and Kim JK: 1♂, Chuncheon, 29 vi 1998; Park HC: 4♂, Garibong Mt. Seoraksan Inje, 24 vii 2004; Kim TW: 16♂7♀, Mulgubi Jinburyeong Goseong, 12 viii 1980; Yoon SJ et al.: <GG> 1♂3♀, Mt. Myeongjisan Gapyeong, 18 vii 1991; Kim Ji and Lee OJ: 1♀, Mt. Chukryeongsan Sudong, 6 ix 1980; Kim Ji: 1♂1♀, Yongsan-ri Baekhak-myeon Yeoncheon, 29 vi 1987; Kim Ji and Yu HJ: 5♂, Mt. Godaesan Sinseo-myeon Yeoncheon, 12 viii 1987.

Kim Ji and Yu HJ: 1♂1♀, Mt. Cheondeoksan Sinseo-myeon Yeoncheon, 12 viii 1987; Kim Ji: 2♂, Gungnam Yeoncheon, 1 viii 1994; Yang MJ: 1♂1♀, Yeongpyeong-ri Yeongjung-myeon Pocheon, 18 viii 1996; Kim JK: 1♂, Mt. Baekunsan Hwacheon, 15 viii 1996; Yu JE: 1♂1♀, Mt. Bukhansan Seoul, 14 viii 2001; Lee HS: 1♂, ibid., 28 vi 1998; Kim TW: 1♂, Bupwon Paju, 5 vii 1998; Kim TW: 1♀, Mt. Gwangdeoksan, 8 viii 1984; Nam SH: <GB> 1♂, Birosa Mt. Sobaeksan, 4 viii 1994; Moon TY: <JB> 17♂7♀, Mt. Naejangsan, 3 viii 1974; Kim CH et al.: 2♂3♀, Baemsagol Mt. Jirisan Namwon, 3 viii 1984; Chang GS: 2♂2♀, Gucheondong Seolcheon-myeon Muju, 22 viii 1977; Kim CH and Nam SH: <JN> 5♂1♀, Is. Geomundo Yecheon, 13 vii 1984; Kim Ji and Chang GS: 2♂1♀, Temple Songgwangsa-Seonamsa, 8 viii 1976; Kim CH and Nam SH: <JJ> 1♂, Is. Jejudo, 2 viii 1959; Cho PS: 1♂, ibid., 18 vii 1966; Oh JG: 1♀, Temple Gwaneumsa, 2 viii 1955; Cho PS: 1♂, Sancheondan, 3 viii 1972; Kim Ji.

Genus *Stethophyma* Fischer von Waldheim, 1853

Ortho. Eur.: 297.

Type species: *Gryllus (Locusta) grossus* Linnaeus, 1758.

***Stethophyma magister* (Rehn, 1902)**

끝검은메뚜기 (Fig. 8)

Mecostethus magister Rehn, 1902: Proc. Acad. Nat. Sci. Philad., 54: 631 (Japan). HT♂ in ANSP. = *Stethophyma tscherskii* Ikonnikov, 1911, Ann. Mus. Zool.

16: 249 (Russia). LT ♀ in ZMMU, [Storozhenko and Otte, 1994].

Korean records. *Stethophyma tscherskii*: Ikonnikov, 1913: 12 (Korea); *Mecosstethus magister*: Cho, 1959: 184, fig. 72; Cho, 1963: 162; Cho, 1969: 740, pl. 48; Inoue, 1985: 115, figs. 7, 39, 70; Tadauchi, 1989: 55; Hua, 2000: 42; *Stethophyma magister*: Storozhenko and Otte, 1994: 63, figs. 11–12; Kwon and Huh, 1994: 53; Huh and Kwon, 1995: 15; Moon and Yoon, 1996: 53; Kwon et al., 1996: 105.

Specimens examined. <GW> 1 ♀, Chuncheon, 21 vii 1996, Kim JH; 1 ♀, Myeonon-ri Bongpyeong, 5 viii 2003, Rhee HW; <GG> 1 ♀, Mt. Pakyon 20 km NE from Kaeseong, 10 ix 1971, S. Horvatovich and J. Papp, No. 254; 1 ♂, Namhansanseong, 13 viii 1996, Kim JH; 1 ♂, Munsan Paju, 24 vi 1972, Yeo OI; 1 ♂, Temple Bogwangsa, 17 vi 1978, Jang BY; 1 ♂, ibid., 18 vii 1998, Kim TW; 1 ♀, Yongsan-ri Baekhak-myeon Yeoncheon, 29 vi 1987, Yu HJ; 2 ♀, Gwangneung Pocheon, 25 vii 1981, Kim Y and Jeon MS; 1 ♂, Eumhyeon-ri Nachon Pocheon, 26 vi 1991, Lee JH; <CB> 1 ♂, Wopung-ri Yeonpung Goesan, 25 vi 1986, Park KA; 12 ♂4 ♀, Mt. Songnisan Boeun, 7–10 viii 1990, Kim BJ and Lee OI; 1 ♂, Guksabong Cheongwon, 23 vii 1997, Kim JI; <GB> 1 ♂, Daehyeon Bonghwa, 25 vii 1986, Kim JI; 1 ♂, Valley Bulyeonggyegok Uljin, 26 vi 1990, Kim IJ; <JN> 3 ♂, Is. Geomundo Yecheon, 13 vii 1984, Chang GS; 1 ♂, ibid., 31 vii 2004, Yoo IS; <JJ> 1 ♂, Sangumburi Jocheon Bukjeju, 9 vii 2002, Kim TW; 1 ♂2 ♀, Hamdeok-ri Jocheon Bukjeju, 8 vii 2002, Kim TW; 1 ♂, Jeonghangpokpo Seoguipo, 9 vii 2002, Kim TW; 1 ♀, Ilchulbong Seongsan, 24 viii 1996, Kim SY; 1 ♂, Jeju Univ. Campus, 8 vii 1995, Song SJ.

Erroneous records

The Korean records of *Phlaeoba fumida* (Walker 1870) (Kirby, 1910: 138; Wu, 1935: 132; Bey-Bienko and Mishchenko, 1951: 412; Otte, 1995: 262; Hua, 2000: 48) are arise from *Xiphocera fumosa* Walker 1870 labelled 'Corea', but subsequently synonymized with former name (Kirby, 1910). When the corresponding author visited the Natural History Museum (London, UK) in August 2003, the type specimen of *Xiphocera fumosa* was examined. It was, however, very unfamiliar grasshopper to be in Korean fauna, besides the genus *Phlaeoba* mainly distributed in Southeastern Asia (Bey-Bienko and Mishchenko,

1951). We believe it is incorrect labelling happened during the early history of collecting expeditions (see also Kim and Kim, 2001). Moreover holotype was not male as written in the original description, but the female actually (Fig. 3).

Acknowledgments

We greatly thank Mrs. Judith A. Marshall (The Natural History Museum, London) for the kind guidance during the visit of the corresponding author, and Dr. György Sziráki (Hungarian Natural History Museum, Budapest) for allowing the observation of North Korean specimens, and Mr. Akihiko Ichikawa (Japanese Orthopterist's Society) for providing valuable literatures and voucher specimens from Japan.

References

- Bey-Bienko, G., 1929. Studies on the Dermaptera and Orthoptera of Manchuria. *Komowia*, **8**(2): 97–110.
- Bey-Bienko, G., and L.L. Mishchenko, 1951. Locusts and Grasshoppers of the USSR and adjacent countries. Part 2. 667pp. [English translated, 1964. Israel program]
- Cho, P.S., 1959. A manual of the Orthoptera of Korea. *Hum. and Nat. Sci. Korea Univ.* **4**: 131–198.
- Cho, P.S., 1963. Insect of Quelpart Island (Cheju-do). *Hum. and Nat. Sci. Korea Univ.* **6**: 159–243.
- Cho, P.S., 1969. Orthoptera. In: Illustrated encyclopedia of fauna and flora of Korea, 10(II). Samhwa Publ. Co. pp. 713–800.
- Cho, P.S., and B.J. Lee, 1959. The comparative observation on sulca on thoraxes of larvae and adults of Acrididae from Kwang-Neung, Korea. *Bull. Dept. Korea Univ.* **2**(1–4): 4–16.
- Dirsh, V.M., 1954. Revision of species of the genus *Acrida* Linné. *Bull. Soc. Française Entom.* **38**: 107–160.
- Dirsh, V.M., and B.P. Uvarov, 1953. Preliminary diagnosis of new genera and new synonymy in Acrididae. *Tijdschr. ent.* Amsterdam, **96**: 231–237.
- Doi, H., 1932. Miscellaneous note on Insects. *J. Chosen Nat. Hist. Soc.* **13**: 30–49.
- Furukawa, H., 1930. Miscellaneous on Japanese Orthoptera [I]. *Komyon*, **4**(2): 99–111.
- Hatz, K., 1975. The Orthoptera of Europe II. Dr. W. Junk N.V. The Hague, 939pp.
- Hua, I.-Z., [Ed.] 2000. List of Chinese Insect. Zhongshan Univ. Press, pp. 32–57.
- Huh, E.Y., and Y.J. Kwon, 1995. A check list of the Caellifera from Chejudo (Orthoptera). *Ivs. Koreana Suppl.* **5**: 7–18.
- Ikonnikov, N., 1911. Zur Kenntnis der Acridioiden Sibiriens,

- Ann. Mus. Zool. Acad. Sci. St. Petersburg*, **16**: 242-270.
- Ikonnikov, N., 1913. Über die von P. Schmidt aus Korea mitgebrachten Acrididoidea. *Kuznetzk*, pp. 1-22.
- Inoue, M., 1985. A taxonomic revision of Japanese Acrididae (Orthoptera) with special reference to their karyomorphology. *Trans. Shikoku Ent. Soc.*, **17**(3): 103-183.
- Ju, D.R., 1969. Check list of insect classification. Gwahak-won Publ. Pyeongyang, pp. 16-19.
- Kim, J.H., 1998. The Odonata and Orthoptera, etc. of Korea in Color. Kyo-Hak publishing Co., Ltd. 471pp.
- Kim, T.W., and J.I. Kim, 2001. A taxonomic study on four subfamilies of Tettigoniidae (Orthoptera, Ensifera) in Korea. *Korean J. Entomol.*, **31**(3): 157-164.
- Kirby, W.F., 1910. A synonymic catalogue of Orthoptera. Vol. 3. British Museum (Natural History), 674pp.
- Kwon, Y.J., and E.Y. Huh, 1994. Order 14. Orthoptera. In: Check list of insects from Korea. Konkuk University, pp. 48-53.
- Kwon, Y.J., J.H. Lee, S.J. Suh, S.L. An, E.Y. Huh, and Y.S. Yeo, 1996. Korean species list. Kor. Nat. Coun. Conser. Nat. pp. 103-104.
- Moon, T.Y., and I.B. Yoon, 1996. The list of Orthoptera deposited in the Korean Entomological Institute, III. Caelifera. *Entomol. Res. Bull. (KEI)*, **22**: 51-54.
- Okamoto, H., 1924. The insect fauna of Quelpart island (Saishiu-to). *Bull. Agr. Exp. Sta. Gov. Gen. Chosen*, **11**(2): 233pp.
- Otte, D., 1981. The North American grasshoppers. Vol. 1. Acrididae (Gomphocerinae and Acridinae). Harvard Univ. 275pp.
- Otte, D., 1995. Orthoptera species file 5: Grasshoppers (Acridomorpha) D. Acridoidea: Acrididae (part). The Orthopterists' Society at the Academy of Natural Sciences of Philadelphia. 630pp.
- Rehn, J.A.G., 1902. Contributions towards a knowledge of the Orthoptera of Japan and Korea, I.-Acrididae. *Proc. Acad. Nat. Sci. Philad.*, **54**: 629-637.
- Rentz, D.C., and G.R. Miller, 1971. Ecological and faunistic notes on a collection of Orthoptera from South Korea. *Ent. News*, **82**: 253-273.
- Seok, D.M., 1970. The insect fauna of the Is. Quelpart. Bo-jinje Publ. Co. Seoul, pp. 175-177.
- Shiraki, T., 1910. Acrididen Japans. Fukuin printing Co. LTD, Yokohama, 1-90, 2 pls.
- Storozhenko, S.Yu., 1986. Order Orthoptera. In: Lehr PA, [ed.] *Keys to insects of the Soviet Far East*, **1**: 241-317.
- Storozhenko, S.Yu., and D. Otte, 1994. Review of the genus *Stethophyma* Fischer (Orthoptera: Acrididae: Acridinae: Parapleurini). *J. Orth. Res.*, **2**: 61-64.
- Tadauchi, O., 1989. Orthoptera. In: A check list of Japanese insects I, pp. 47-57.
- Tsyplenkov, Ye.P., 1970. Grasshoppers (Orthoptera: Acridoidea) of the Korean People's Republic. *Ent. Obozr.*, **49**: 355-359. [English translated, 1970, *Ent. Rev.*, **49**(2): 213-215]
- Walker, F., 1870. Catalogue of the specimens of Dermaptera Saltatoria in the collection of the British Museum III-IV. 809pp.
- Wu, C.F., 1935. Catalogus Insectorum Sinensium I. The Fan Memorial Institute of Biology, pp. 15-214.
- Zheng, Z., and K. Xia, 1998. Oedipodidae and Arcypteridae (Orthoptera: Acridoidea). Fauna Sinica Insecta Vol. 10. Science press, Beijing, 616pp.

(Received 7 January 2005; Accepted 31 January 2005)