

**Taxonomic Study of Korean Chrysochraontini  
(Orthoptera: Acrididae: Gomphocerinae)**

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## Taxonomic Study of Korean Chrysochraontini (Orthoptera: Acrididae: Gomphocerinae)

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**ABSTRACT** Five species of Korean Chrysochraontini are recognized through the taxonomic investigation. Among them *Chrysochraon dispar major* Uvarov, 1925 is newly recorded from North Korea, and *Euthystira pavlovskii* Bey-Bienko, 1954 is synonymized under *Mongolotettix japonicus* (Bolívar, 1898). A key is provided, and morphological variations of *M. japonicus* are discussed.

**Key words:** Taxonomy, Orthoptera, Acrididae, Gomphocerinae, Chrysochraontini, Variation, Fauna, Korea

### Introduction

The Chrysochraontini (Gomphocerinae) is a tribe including 28 species in the world according to Ötte et al. (<http://osf2x.orthoptera.org/osf2.2/OSF2X2Frameset.htm>). It is distinguished from the neighboring Gomphocerini by absence of fastigial foveolae and mostly ensiform antennae (Chrysochraontinae *sensu* Dirsh, 1975). Since three species of this group, *Chrysochraon japonicus*, *Podismopsis altaica* and *P. ussuriensis* firstly recorded in the Korean fauna (Ikonnikov, 1913), their distribution status have been fragmentarily known.

In the course of study on Korean Orthoptera, the first author had a chance to visit Hungarian Natural History Museum (Budapest) in August 2003. There are deposited a lot of North Korean specimens which were obtained by Hungarian expeditions during 1970–1988. The specimens were beings mostly determined by Dr. Kostia (Poland), the results combined with ones by Polish expeditions are partly published (Gorochoy and Kostia, 1993; Gorochoy et al., 1993; Kostia, 1993, 1995, 1996), but some data are still not used. Through the checking specimens, unavailable species in South Korea were observed and a newly recognized *Chrysochraon dispar major* Uvarov is

found among them. Therefore it would be worthwhile to conduct a comprehensive taxonomic study for understanding Korean entomofauna. Additional specimens examined are mostly deposited in Dept. Biology of Sungshin Women's University, Dept. Biology of Korea University, National Institute of Agricultural Science and Technology (NIAS).

The following abbreviations are used in this paper: GB: Gyeongsangbuk-do; GG: Gyeonggi-do; GW: Gangwon-do; HN: Hamgyeongnam-do; HT: Holotype; JJ: Jeju-do; LT: Lectotype; MCSN: Museo Civico di Storia Naturale, Genova, ITALY; NT: Neotype; PN: Pyeongannam-do; RG: Ryanggang-do; TU: Taiwan University, TAIWAN; ZIN: Zoological Institute of the Russian Academy of Sciences, St. Petersburg, RUSSIA; ZMMU: Zoological Museum, Moscow University, RUSSIA.

### Systematics

#### Tribe Chrysochraontini Jacobson and Bianki

#### Key to Species of Korean Chrysochraontini

1. Body thickset; antennae filiform; lateral carinae of pronotum slightly incurved, diverging in metazona; outer genicular lobe of hind femur with ventral apex broadly rounded or obtuse (Genus *Podismopsis*) ..... 2
- Body slender; antennae ensiform or distinctly

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- widened near the base; lateral carinae of pronotum parallel; outer genicular lobe of hind femur with ventral apex pointed acute-angularly ..... 4
2. Vertex slightly projecting forward, frons weakly sloping; facial carinae hardly perceptible; ♀ tarsal arolium smaller, barely reaching the middle of claws ..... *Podismopsis altaica*
- Vertex strongly projecting forward nearly horizontal, frons clearly sloping; facial carinae distinctly well developed; ♀ tarsal arolium larger, distinctly exceeding the middle of claws ..... 3
3. ♂ tegmina with wide costal field, its greatest width 2.0 times of subcostal field; valves of ovipositor short and stouter, its dorsal valve with a notch on dorso-outer margin, ventral valve with a sharp tooth at the base on ventro-outer margin .....  
..... *Podismopsis genicularibus*
- ♂ tegmina with narrow costal field, its greatest width 1.5 times of subcostal field; valves of ovipositor long and narrower, its dorsal valve without a notch on dorso-outer margin, ventral valve straight without a tooth at the base on ventro-outer margin .....  
..... *Podismopsis ussuriensis*
4. Pronotum with distinct lateral and median carinae; ♂ tegmina with apex rounded; hind knees darkened; valves of ovipositor short and stouter, its dorsal valve with a distinct rounded notch on dorso-outer margin (Genus *Chrysochraon*) .....  
..... *Chrysochraon dispar major*
- Pronotum with less developed lateral carinae than median carina; ♂ tegmina with apex obliquely truncated or notched; hind knees unicolorous; valves of ovipositor long and narrower, its dorsal valve without notch on dorso-outer margin (Genus *Mongolotettix*) ..... 5
5. Antennae longer, ♂ 1.5, ♀ 1.2 times of the combined length of head and pronotum; length of middle antennomeres 2.0 times of the width; mesosternal interspace narrower than its length .....  
..... *Mongolotettix japonicus japonicus*
- Antennae shorter, ♂ 1.2, ♀ 1.0 times of the combined length of head and pronotum; length of middle antennomeres 1.5 times of the width; mesosternal interspace as wide as its length .....  
..... *Mongolotettix japonicus vittatus*

### Genus *Podismopsis* Zubowsky, 1900

Hor. Soc. Ent. Ross. 34: 2 (pro subgenus *Chrysochraon*).

Type species: *Chrysochraon (Podismopsis) altaica* Zubowsky, 1900.

### *Podismopsis altaica* (Zubowsky, 1900)

알타이삽사리 (신칭)

*Chrysochraon (Podismopsis) altaica* Zubowsky, 1900. Hor. Soc. Ent. Ross. 34: 2 (Russia). LT♂ in ZIN.

**Korean records.** *Podismopsis altaica*: Ikonnikov, 1913: 11 (Korea: "Juchemsa", Temple Yujeomsa Mt. Geumgangsan GW); Bey-Bienko, 1932: 75, figs. 9, 10, 14; Wu, 1935: 138; Bey-Bienko and Mishechenko, 1951: 421, fig. 942; Yin et al., 1996: 561; Hua, 2000: 45.

**Distributions.** North Korea, Russia (East Siberia), North Mongolia, China (Xinjiang: Zheng and Xia, 1998).

**Remark.** No specimen examined.

### *Podismopsis genicularibus* (Shiraki, 1910)

검정무릎삽사리

*Chrysochraon genicularibus* Shiraki, 1910. Acrididen Japans: 17 (Japan). HT♂ in TU.

**Korean records.** *Chloealtis genicularibus*: Doi, 1932: 36; *Chrysochraon genicularifus* [sic]: Doi, 1933: 88; Ju, 1969: 23; *Chrysochraon genicularibus*: Cho, 1959: 183, fig. 69; Cho and Lee, 1959: 5; Cho, 1969: 738 pl. 48; *Podismopsis (Podismopsis) genicularibus*: Kwon and Huh, 1994: 52; *Podismopsis genicularibus*: Kwon et al., 1996: 105.

**Specimens examined.** <RG> 2♂, Hyesan Hotel garden Hyesan, 23 viii 1971, Horvatovich S. and Papp J. (No. 194); 1♂, Chann-Pay plateau 1500 m Samjiyeon, 24 viii 1971, Horvatovich S. and Papp J. (No. 195); 1♀, Mt. Baekdusan 2-6 km from Samjiyeon Hotel, 18 vii 1977, Dely O.Gy. and Dely-Draskovits A. Netting (No. 372); <GW> 1♂1♀, Hyangnobong Goseong, 23 viii 1992, Moon TY; 2♂1♀, Myeonon-ri Bongpyeong, 5 viii 2003, Rhee HW; 1♂, Mt. Seoraksan Inje, 13 viii 1977, Yoon SJ; 28♂21♀, Mt. Daeamsan Dong-myeon Yanggu, 7-8 vii 2003 Kim JK and Kim TW; 1♂, ibid., 27 viii 2003, Kim JK; 6♂1♀, Mt. Daeusan Dong-myeon Yanggu, 10 vii 2003, Kim TW; 1♂, Dusolsan Yanggu, 5 x 1972, Kim JI; 2♂, Mt. Odaesan Pyeongchang, 18 ix 1971, Kim CH and Kim JI; 1♂, Mt. Taebaeksan Taebaek, 23 vii 1986, Kim JI; 1♂, Mapyeong-ri Jinbu Pyeongchang, 30 vi 1985, Kim YS; 1♂, Mt. Gyeongbansan Hongcheon, 17 vii 1993, Kim JI; 6♂1♀, Mt. Gwangdeoksan Naeseo-myeon Hwacheon, 4 vii 2000, Kim TW; <GG> 1♂, Silim-dong Gwanak-gu Seoul, 4 vii 1993, Yoon EY; 1♀, Mt. Umyeon-

san Seocho-gu Seoul, 10 vii 1994, Shim MJ; <GB>  
2♂, Mt. Sobaeksan Birobong, 3 viii 1994, Moon TY;  
1♂, Is. Ulleungdo, 5-9 vi 1963, Anonymous.

**Distributions.** Korea, Japan (Hokkaido), Russia  
(Amur, Ussuri, Sakhalin, Kuriles).

*Podismopsis ussuriensis* Ikonnikov, 1911

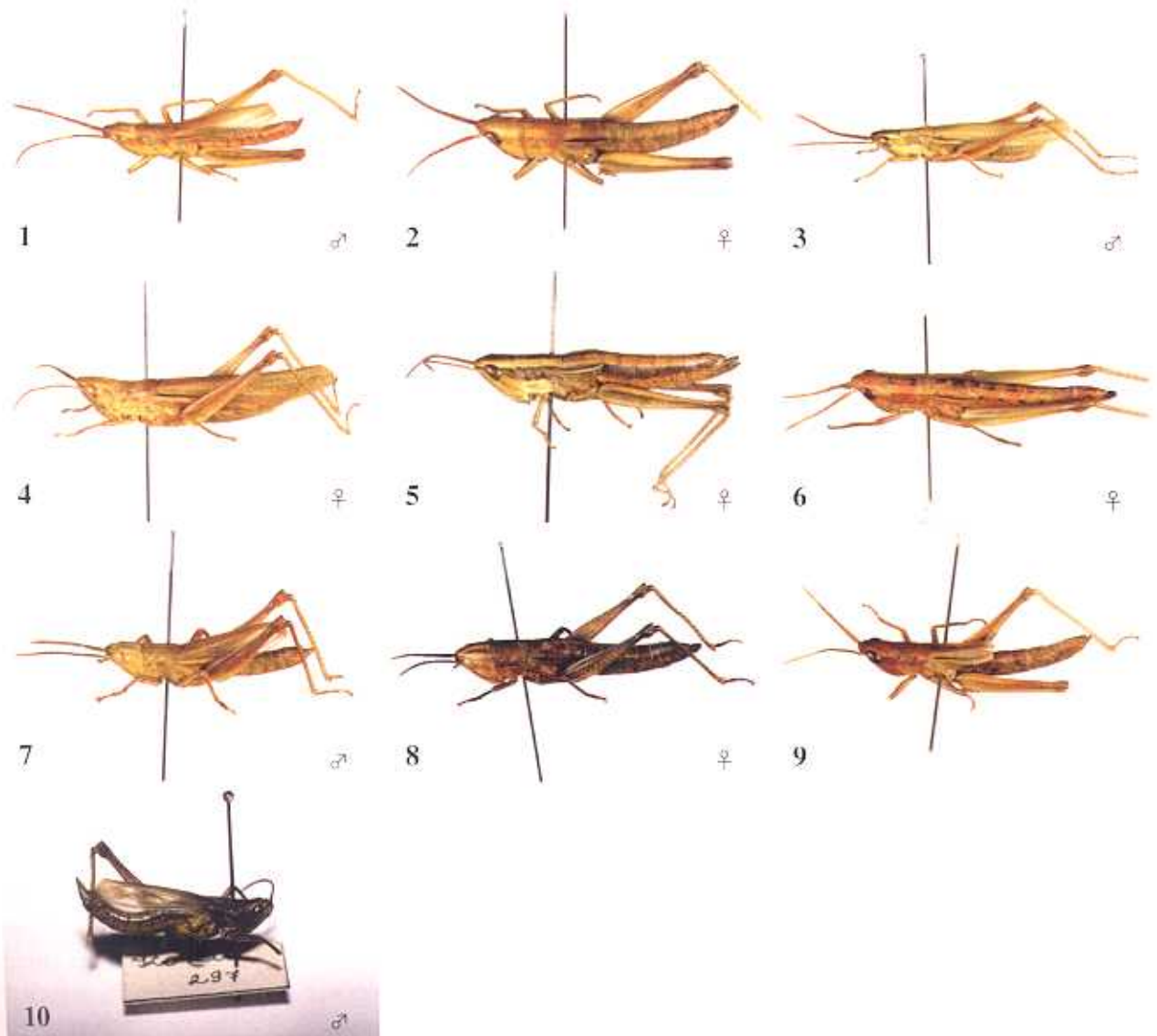
백두산삼사리

*Podismopsis ussuriensis* Ikonnikov, 1911. Ann.  
Mus. Zool. Acad. Sci. St. Petersburg. 16: 246 (Russia).  
LT♂ in ZMMU.

= *Podismopsis sharensis* Shiraki, 1930. Trans.  
Nat. Soc. Formosa 20: 327 (China). HT♂ in TU.

[Bey-Bienko, 1932]

**Korean records.** *Podismopsis ussuriensis*: Ikonnikov, 1913: 11; Mori and Cho, 1939: 4; Cho, 1959: 185; Cho, 1969: 741; Ju, 1969: 26; Kwón et al., 1996: 105; *Podismopsis (Podismacris) ussuriensis*: Bey-Bienko, 1931: 674; Bey-Bienko, 1932: 71; Wu, 1935: 137; Bey-Bienko and Mischechenko, 1951: 425, fig. 948; Storozhenko, 1986: 310, fig. 157 (9-11), 158 (15), 159 (5); Kwon and Huh, 1994: 52; *Podismopsis sharensis* [sic]: Doi, 1933: 88; Ju, 1969: 26; *Podismopsis sharensis*: Mori and Cho, 1940: 19; Cho, 1959: 184 fig. 73; Cho, 1969: 740, pl. 79.



**Figs. 1-9.** *Mongolotettix japonicus* s. lat. (1-2. Typical types, 3-4. Macropterous types, 5. Striped type, 6. Spotted type, 7-8. Subsp. *M. japonicus vittatus*, 9. Gynandromorph); 10. *Chrysochraon dispar major* (© 2005 Hungarian Natural History Museum).

**Specimens examined.** <RG> 1♂1♀, Mt. Baekdusan 2–6 km from Samjiyeon Hotel, 18 vii 1977, Dely O.Gy. and Dely-Draskovits A. Netting (No. 372); <PN> 1♂, Pyeongyang City Park between the river Daedonggang and Pyeongyang Hotel, 4 viii 1971, Horvatovich S. and Papp J. (No. 137); 1♂, Mt. Lyongaksan 14 km W from Pyeongyang, 11 viii 1971, Horvatovich S. and Papp J. (No. 159).

**Distributions.** North Korea, Russia (Ussuri), China (Jilin, Manchuria).

### Genus *Chrysochraon* Fischer von Waldheim, 1853

Orth. Eur.: 296, 307.

Type species: *Podisma dispar* Germar, 1831.

### *Chrysochraon dispar major* Uvarov, 1925

금빛삼사리 (신칭) (Fig. 10)

*Chrysochraon major* Uvarov, 1925, Jour. Bombay Nat. Hist. Soc.: 30: 260 (Uzbekistan). HT♂ in ZIN.

**Specimens examined.** <RG> 1♂, the river Karim 10 km NEE from Bochonbo 1100 m, 27 vii 1975, Papp J. and Vojnits A. Malaise trap (No. 297).

**Distributions.** North Korea (new record), Russia (Amur, Ussuri), Uzbekistan.

**Remarks.** The basic subsp. *Chrysochraon dispar dispar* (Germar, 1831) is widely distributed throughout transpalaeartic region, but Far Eastern species can be assigned to the present subsp. according to Bey-Bienko (1932), Bey-Bienko and Mishchenko (1951), and Storozhenko (1986).

### Genus *Mongolotettix* Rehn, 1928

Proc. Acad. Nat. Sci. Philad. 80: 200.

Type species: *Chrysochraon japonicus* Bolívar, 1898.

### *Mongolotettix japonicus* (Bolívar, 1898) s. lat.

삼사리 (Figs. 1–9)

*Chrysochraon japonicus* Bolívar, 1898, Ann. Mus. Civ. Stor. Nat. Genova 34: 82, (Japan). HT♂ in MCSN.

= *Euthystira pavlovskii* Bey-Bienko, 1954, **syn. nov.** Zool. Zhurn. Moscow 33 (2): 461, fig. 1. (North Korea; Nunchi village near Pungsan HN), HT♀ in ZIN.

**Korean records.** *Chrysochraon japonicus*: Ikonnikov, 1913: 11; Doi, 1932: 36; Cho, 1959: 183, fig. 70; Cho, 1969: 739, pl. 48; Ju, 1969: 23; *Mongolotettix japoni-*

*cus*: Bey-Bienko, 1931: 674; Bey-Bienko, 1932: 83, fig. 17; Wu, 1935: 139; Bey-Bienko and Mishchenko, 1951: 419; Cho, 1959: 174; Cho, 1969: 731; Tsyplenkov, 1970: 214; Rentz and Miller, 1971: 264; Storozhenko, 1986: 314, figs. 139 (2), 142 (5–8), 159 (8); Tadauchi, 1989: 55; Kwon and Huh, 1994: 52; Huh and Kwon, 1995: 14; Moon and Yoon, 1996: 53; Kwon et al., 1996: 105; Hua, 2000: 47; *Euthystira pavlovskii*: Storozhenko, 1986: 314; Otc, 1995: 165; Yin et al., 1996: 286.

**Specimens examined.** *M. japonicus japonicus*: More than about 650 specimens from all areas of Korea; *M. japonicus vittatus*: <JJ> 2♀, Eorimok, 15 vii 1983, Kim JJ; 1♀, Jejudo, 22 ix 1984, Kim YS; 2♂1♀, Mt. Hallasan, 6 viii 1984, Lee SM; 5♂4♀, Mt. Hallasan Yeongsil, 27 ix 2000, Kim TW et al.

**Distributions.** *M. japonicus japonicus*: Korea, Japan, Northeast China, Russia (Amur, Ussuri); *M. japonicus vittatus*: Korea (Is. Jejudo), China (Manchuria), Russia (Central Siberia, Transbaikalia), Mongolia.

**Remarks.** This species is one of very common grasshoppers in Korea, but three variational types are proved in the process of examining a series of specimens. Based on the general morphology, those are 1) Macropterous type (12♂14♀): this species shows obvious sexual dimorphism, i.e. typically male is mesopterous (Fig. 1), but female is micropterous (Fig. 2). Sometimes, however, macropterous phase in both sexes occurred (Figs. 3–4), it is well known fact in other related genera, *Chrysochraon* or *Euthystira* (Bellman, 1988; Detzel, 1998; Fontana et al., 2002). In the condition, the hind wings are functionally longer as well as tegmina exceeding abdominal apex. For the support flying, accordingly macropterous type has a little morphometric change, i.e. hind margin of pronotum wider, its humeral angles more bulged than those of typical one. Besides, owing to an instability, ambiguous or asymmetrical tegmina are even casually occurred. In a case of micropterous male (Fig. 9), it is inferred gynandromorph partly because of no having normal stridulation. 2) Striped or spotted types: the ground colour of male is yellowish bright brown and female is grayish dull brown. Both have pale stripes along median line and lateral sides from behind eyes along the abdomen. However, sometimes, its stripes indistinguishable or very darkened (Fig. 5), as well as median line spotted (Fig. 6). The variations are more distinct in female, because of larger size and micropterous conditions allowing more exposure of dorsal abdomen. Based on the facts, *Euthystira pavlovskii*

**syn. nov.** is only single female known just a melanic striped form of this species. Fontana et al. (2002) also presented striped female in *Euthystira brachyptera* (Oeskey). Additionally at present *Chrysochraon*, *Euthystira*, and *Mongolotettix* are seemed to homogeneous genera hardly separable by a little difference. According to the authors (Bey-Bienko, 1964; Bellmann, 1988; Pomares, 2002), only *Chrysochraon* is representative, while the others are subgeneric or even synonymic positions are considered. 3) Alpine type (7 ♂8 ♀); comparing with basic type, it is recognized morphologically by smaller size and short antennae (Figs. 7–8), those are characters applicable to the subsp. *Mongolotettix japonicus vittatus* (Uvarov, 1914). The type is only discovered around mountain area over 1,000 m altitude (Mt. Hallasan JJ) in South Korea and the adults occurred usually a month late (July–September) for those of *M. japonicus japonicus* (May–August). The record from the Mt. Changbai-shan (= Baekdusan) of North China (Won et al., 1990) is the closest distribution of this subspecies.

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