

Some Orthopteran Insects (Orthoptera: Insecta) of Jeju Island (1)<sup>1</sup>Paik, Jong-Cheol\* and Sae-Ho Jung<sup>1</sup>*(Department of Applied Biology, College of Agriculture, Suncheon National University, Suncheon 540-742, Korea.**<sup>1</sup>Jejudo Folklore and Natural History Museum, Ildo-2 dong, Jeju 690-012, Korea)*濟州道の 메뚜기목 곤충(1)<sup>1</sup>白種哲\* · 鄭世瑚<sup>1</sup>*(順天大學校 農科大學 應用生物學科, <sup>1</sup>濟州道民俗自然史博物館)*

## ABSTRACT

The orthopteran insects of Jejudo are revised. Key to the Korean orthopteran taxa including Tetrigidae species are given.

**Key words** : Orthoptera, fauna, Jeju Island, new record, Korea

The members of the order Orthoptera comprise terrestrial insects, phytophilous, cavernicolous, myrmecophilous, and burrowing; diurnal and nocturnal; vegetarian and carnivorous. They are mainly medium-sized to large and include some of the largest living insects. More than 20,000 species represented in all geographical regions, especially much richly in subtropical and tropical regions, and can be divided into two suborders, Caelifera and Ensifera, fallen into six superfamilies, i.e., Gryllacridoidea, Tettigonoidea, Grylloidea, Acridoidea, Tetrigoidea and Tridactyloidea. Of these, last two superfamilies are rather small groups. For comprehensive accounts of the order Orthoptera, see Chopard (1938, 1949), Beier (1955, 1972); for classification, see Harz (1969, 1975), Dirsh (1975), Kevan (1982) and/or Vickery *et al.* (1985), etc.

The system of Orthoptera on the family and subfamily levels is varying. There have been a lot of attempts to subdivide superfamily Acridoidea into a large number of families and subfamilies (Otte 1994-2000), but such increasing of taxonomic level of subfamilies and families has resulted in dividing the order Orthoptera into 10 separate orders (Dirsh 1975). The conservative system of superfamily Acridoidea is

adopted here, based mainly on Bey-Bienko and Mistchenko (1951), Mistchenko (1952), and Storozhenko (1986, 1997, 2004) with minor corrections. The system of superfamily Tetrigoidea is given after Liang and Zheng (1998). The system of superfamily Tridactyloidea is given after Günter (1980).

Suborder Caelifera is divided into three superfamilies, Tridactyloidea, Tetrigidae, and Acridoidea. All of these superfamily represented in the Korean Peninsula. In Korea, 5 families and 63 species are listed (ESK and KSAE 1994). Suborder Ensifera is divided into three superfamilies, Tettigonoidea, Stenopelmatoidea (= Gryllacridoidea), and Grylloidea, but the Grylloidea is considered as a suborder by some authors. Family Tettigoniidae is divided into from 15 (Rentz 1979) to 24 subfamilies (Gorochov 1995), 6 of them are known from Korea and neighboring countries. Bradyporidae formerly regarded as a full family with 7 subfamilies, but is regarded it as subfamilies of Tettigoniidae by the recent phylogenetic works. Only 1 species from subfamily Zychiinae, *Deracantha transversa* Uvarov, 1930, is known from the Korea Peninsula (Mori 1929). Also known from North Korea. Recently, Ichikawa *et al.* (2000) divided Gryllidae into 3 families, Gryllidae, Eneopteridae, and Trigonidiidae. The system of Gorochov (1995) is used here, but the tribe Sclerogryllini is regarded as a distinct subfamily. In Korea, 7 families, 66

<sup>1</sup> Partial financial support of this study was provided by Suncheon National University (Oversea fund of 2003).

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species are listed (ESK and KSAE 1994).

Until now the insects of the order Orthoptera from Cheju island are not studied completely. The first data on Orthoptera of Jeju-do were published by Ichikawa (1906) who recorded 3 species of the family Acrididae. Okamoto (1924) listed 2 species of Tettigoniidae and 6 species of Acrididae. Thereafter numerous lists of insects of Jejudo was published (Seok 1970, Komiya 1971, Kim 1984, Lee *et al.* 1985, Kim 1989, Kim and Oh 1990, 1991, Kim 1993).

Paik (1995) summarized all published data on the orthopteran fauna and Huh and Kwon (1995), 25 species of the suborder Caelifera from Jejudo (Jeju or Cheju Island, Chejudo or Jejudo, Quelpart Island). Unfortunately, these references have a number of errors and omissions in them, and misinterpretation of earlier references of the orthopteran insects by the Korean reporters (Cho 1959, 1963 and etc.).

Materials collected by the authors were examined and deposited in the Department of Applied Biology, Suncheon National University (SCNAE), and the Jejudo Folklore and Natural History Museum (JFNHM), Korea.

We wish to thank Dr. S. Yu. Strozhenko, Russia for his help and gift of the some Ussurian specimens for comparing and variable comments of the Korean Orthopteroid insects.

## RESULTS

The following purely simple key of Korean taxa rather easily distinguishes the suprageneric taxa, but does not reflect phylogenetic interrelation between the taxa.

### Preliminary key to families (and subfamilies) of Orthoptera from Korea

- 1(44) Antennae multi-segmented, usually longer than body; tympanum, if present, situated on the fore tibia; ovipositor long (**Suborder Ensifera**).
- 2(19) All tarsi 4-segmented.
- 3(16) Male wings with stridulatory organs. Male cerci usually with 1-3 teeth. Tympanum usually well developed. Ovipositor sword-like, sickle-like, or sabre-like (Superfamily Tettigoniioidea) ..... Tettigoniidae (여치 과)
- 4(5) the 1st segment of antennae situated below the lower margin of eyes. Tegmen short, almost completely covered by pronotum; in both male and female with speculum. .... Zichyinae (민충이 아과)
- 5(4) the 1st segment of antennae situated between the eyes. Tegmen well developed or short; only in male with spe-

- culum; rarely wings absent.
- 6(11) Tympana slit-like.
- 7(10) Fore tibia with spines not unusually lengthened and not as long as the combined lengths of 1st and 2nd tarsal segments.
- 8(9) Head with front in lateral view plumb or weakly slanted. .... Tettigoniinae (여치 아과)
- 9(8) Front oblique, head in lateral view strongly conical. .... Conocephalinae (썩새기 아과)
- 10(7) Fore tibia with 5-7 long, movable spines, the longest of which is as long as the combined lengths of the 1st and 2nd tarsal segments. .... Hexacentrinae (베짚이 아과)
- 11(6) Tympana open or auriculate (tympanal membrane plainly visible within).
- 12(13) Prosternum unarmed. .... Phaneropterinae (실베짚이 아과)
- 13(12) Prosternum with 2 spine-like projections.
- 14(15) Body small and slender. Male 10th tergite with projections and tooth. .... Meconematinae (어리썩새기 아과)
- 15(14) Body large and robust. Male the 10th tergite unmodified. .... Mecopodinae (철썩새기 아과)
- 16(3) Male wings without stridulatory organs, or wings absent; male cerci usually without tooth; tympanum absent; ovipositor sabre-like (Superfamily Stenopelmatoidae = Gryllacridoidea).
- 17(18) Tarsi depressed, with distinct pulvilli; body in lateral view elongated. .... Family Stenopelmatidae (Gryllacrididae) (어리여치 과)
- 18(17) Tarsi strongly compressed, without pulvilli; body in lateral view horseshoe-like. .... Family Rhabdophoridae (뿔등이 과)
- 19(2) All tarsi 3-segmented; ovipositor spear-like or reduced (Superfamily Grylloidea).
- 20(21) Body larger, 25-45 mm; fore legs modified for digging; ovipositor absent. .... Gryllotalpidae (땅강아지 과)
- 21(20) Fore legs unmodified. Ovipositor present.
- 22(23) Cerci short, thick, segmented. Hind femora very short, oval, less than twice as long as broad. Eyes rudimentary. Very small species, subspherical, apterous. .... Myrmecophilidae (개미살이귀뚜라미 과: 가칭)
- 23(22) Cerci long, soft, covered with irregularly distributed hairs. Hind femora elongate, not less than twice as long as thick. Eyes fully developed.
- 24 (25) Hind tibiae armed above on both margins with minute teeth, but no spines; body scaly, scales easily rubbed off; head strongly inflated anteriorly between antennae. Only one species, *Ornebius kanetataki* (Matsu-

- mura, 1904) occurs from Korea. ....  
 ..... Mogoplistidae (어리귀뚜라미 과)
- 25(24) Hind tibiae armed above on both margins with large movable spines at least in apical half; body bare or covered with fine hair, and with scattered setae. ....  
 ..... Gryllidae (귀뚜라미 과)
- 26(43) Hind tibia dorsally with large spines, or spines and spinules.
- 27(32) Hind tibiae dorsally with large spines only.
- 28(31) the 2nd tarsal segment unmodified, narrow, as broad as the 1st or 3rd.
- 29(30) Hind tibiae dorsally with 6-8 relatively short spines on each side. The 1st tarsal segment of hind legs dorsally with two rows of denticles. ....  
 ..... Gryllinae (귀뚜라미 아과)
- 30(29) Hind tibiae dorsally with 3-4 spines on each side; the 1st tarsal segment of hind legs dorsally without denticles. .... Nemobiinae (알락방울벌레 아과)
- 31(28) The 2nd tarsal segment depressed, considerably broader than the 1st or 3rd. ....  
 ..... Trigonidiinae (풀중다리 아과)
- 32(27) Hind tibiae dorsally with large spines and small spinules between them, or with spines in apical part and spinules in basal part.
- 33(34) Hind tibia with spines in apical part and spinules in basal part. .... Landrevinae (제주왕귀뚜라미 아과)
- 34(33) Hind tibiae dorsally with large spines and small spinules between them.
- 35(43) Tympana present on both sides of fore tibia; tegmen well developed, covered all abdomen.
- 36(39) The 2nd tarsal segment unmodified, narrow, as broad as the 1st or 3rd.
- 37(38) Internal tympana small; head hypognathous. ....  
 ..... Cachoplistinae (방울벌레 아과)
- 38(37) Internal tympana very large; head prognathous. ....  
 ..... Oecanthinae (긴꼬리 아과)
- 39(36) The 2nd tarsal segment depressed, considerably broader than the 1st or 3rd.
- 40(43) Posterior tibiae with short, subequal external apical spurs; posterior metatarsi short; tegmen of male with well-developed mirror. ....  
 ..... Podoscirtinae (청귀뚜라미 아과)
- 41(40) Posterior tibiae usually armed with three long apical spurs, median longer than the other two, both on internal and external sides; posterior metatarsi long. ....  
 ..... Eneopterinae (큰홀쪽귀뚜라미 아과)
- 42(35) Tympana absent; tegmen short, covers 1/3 of abdomen, with similar venation in both sexes. ....  
 ..... Euscyrtinae (홀쪽귀뚜라미 아과)
- 43(26) Hind tibiae dorsally with small spinules or denticles only. .... Sclerogryllinae (흰고리방울벌레 아과)
- 44(1) Antennae short, 10-30-segmented, usually shorter than 1/2 of body length. Tympanum, if present, situated on the 1st tergite. Ovipositor usually short (**Suborder Caelifera**).
- 45(46) Fore legs modified for burrowing. Hind tarsi 1-segmented. Antennae 10-12-segmented. In Korea female without ovipositor (Superfamily Tridactyloidea). Only one species occurs in the Korean Peninsula.
- 46(45) Fore legs unmodified. Hind tarsi 3-segmented. Antennae more than 12-segmented. Ovipositor present.
- 47(48) Pronotum with long posterior process, surpassing beyond apex of abdomen. The 1st tergite without tympanum. Fore and middle tarsi 2-segmented (Superfamily Tetrigoidea). .... Tetrigidae (모메뚜기 과)
- 48(47) Pronotum unmodified. All tarsi 3-segmented (Superfamily Acridoidea).
- 49(50) External surface of hind femora with irregular sculpture.
- 50(49) Front oblique, head in lateral view strongly conical. ....  
 ..... Pyrgomorphidae (섬서구메뚜기 과)
- 51(52) 3(2) Head with front in lateral view plumb or weakly slanted. .... Pamphagidae (주름메뚜기 과)
- 52(51) 4(1) External surface of hind femora with regular feather sculpture. .... Acrididae (메뚜기 과)
- 53(54) Prosternum without process. ....  
 ..... Acridinae (메뚜기 아과)
- 54(53) Prosternum between fore coxa with strong median process. .... Catantopinae (홍다리메뚜기 아과)

**Suborder Caelifera 메뚜기 아목**  
**Superfamily Tridactyloidea 줄살메뚜기 상과**  
**Family Tridactylidae 줄살메뚜기 과 (벼룩메뚜기 과)**

Small burrowing crickets found commonly upon along sandy or muddy margins of ponds and streams. There are more than 140 species and more or less worldwide in distribution. They are mainly nocturnal and apparently feed upon small particles of vegetable matter. Only one species of *Tridactylus* widely occurs from the Korean Peninsula, including Jeju.

*Xya japonica* (de Haan, 1842) 좁쌀메뚜기 (벼룩메뚜기)

*Gryllus* (*Xya*) *japonica* De Haan. 1842, in Temminck. Verhandel., Orth., p. 238 (Japan).

*Xya obscura* Motschulsky, 1866, Bull. Mosc., 39: 182 (Japan). Treated as a junior synonym of *japonica* by Saussure, 1877: 49(217) and Günther, 1980: 169.

*Xya manchurei* Shiraki, 1936, First Scient. Exped. Mandchoukuo, Tokyo, 1(6): 4 (China: Manchuria). Treated as a jun. syn. of *japonica* by Günther, 1980: 169.

*Tridactylus japonicus* de Haan: Doi, 1932, Jour. Chosen Nat. Hist. Soc., 13: 39 (Korea); Kamijo, 1933, Jour. Chosen Nat. Hist. Soc., 15: 50 (Korea); Cho, 1959, Hum. and Sci., Nat. Sci., Korea Univ., 4: 151 (Korea); Cho, 1969, Illustr. ency. fauna and flora of Korea, (10), Ins., 2: 767 (Korea), Chu, 1969, "Check list of Insects", p. 21 (N. Korea).

*Xya japonica* (De Haan): Günther, 1980, Dtsch. Ent. Ztschr., N. F., 27: 169 (catalog); Storozhenko, 1986, Opred. Nasek. dal. vostoka SSSR, 1: 270 (Korea); Paik, 1995, Insects of Quelpart Island, p. 298; Huh et Kwon, 1995, Ins. Koreana Suppl., 5: 8 (Jeju-do).

**Material examined.** 5♂, 3♀, 13-VI-2000, Pyoseon (JFNHM); 3♂, 3♀, 16-VII-2002, Pyoseon (SCNAE).

**Distribution.** Korea, Japan, China, Taiwan, Russian Far East.

**참고.** 몸길이는 5.0-5.5 mm, 몸 빛깔은 흑색으로 광택이 있다. 뒷다리 발목마디 (tarsus)는 1마디, 가운데와 앞다리는 1-2마디이고, 발톱사이에 돌기 (arolium)가 없으며, 산란관도 없다. 뒷다리 넓적마디는 폭이 넓고 짧으며 끝 부분에 여러 개의 짧은 가시가 있다. 물가의 모래땅을 파고 산다. 제주도를 비롯하여 전국에서 5월부터 흔히 볼 수 있으며, 우리나라는 한 종만 분포한다. 우리나라는 Doi (1932)가, 제주도는 Huh and Kwon (1995)이 처음으로 기록했다.

**Superfamily Tetrigoidea 좁쌀메뚜기 상과**

**Family Tetrigidae 모메뚜기 과**

This small grasshopper (generally 10 mm), Tetrigidae is rather easily distinguishable from other grasshoppers by the body shape. Pronotum extended posteriorly outwards, almost covers the whole abdomen and conceals the hind wings. The forewings, tegmina are reduced to small lateral flaps, while the hind wings are well developed. The anterior and middle tarsi of two segments, while the posterior ones with three segments. The claws of tarsi are not provided with an arolium or empodium. The ovipositor similar to that of Acrididae, but valves longer with strong denticles. No tympanal or stridula-

tory organs are found.

The Tetrigidae, members of pygmy grasshoppers or groundhoppers, encompasses nearly 1000 species, distributed throughout the world (Otte, 1997). They live on the ground, particularly in damp muddy situations, but also in rather dry habitats; some scelimenine species, i.e., *Criotettix japonicus* (De Haan), are semiaquatic or aquatic, swimming vigorously.

The following simple key rather easily distinguished the Korean Tetrigidae species, including one predict species.

**Key to the species of Tetrigidae**

- 1(2) Pronotum with distinct lateral spine; the 1st segment of posterior tarsi generally longer than the 3rd (Scelimeninae). Basal part of antennae yellow, apical part dark; median segments of antennae 1.8-2.0 times as long as wide. .... *Criotettix japonicus* (가시모메뚜기)
- 2(1) Pronotum without lateral spine; the 1st segment of posterior tarsi generally not longer than the 3rd (Tetriginae). Antennae unicolorous dark; median segments of antennae 3-5 times as long as wide.
  - 3(6) Hind margin of lateral lobe of pronotum with only lower sinus, tegminal (upper) sinus completely absent (*Formosatettix* Tinkham, 1937).
    - 4(5) Anterior margin of pronotum distinctly triangular near median carina in dorsal view; valves of ovipositor long and narrow. .... *F. robustus* (참볼록모메뚜기: 신칭)
    - 5(4) Anterior margin of pronotum slightly triangular near median carina in dorsal view; valves of ovipositor short and broad. .... *F. larvatus* (볼록모메뚜기)
  - 6(3) Hind margin of lateral lobe of pronotum with two sinuses, upper sinus almost as deep as lower sinus.
    - 7(8) Prozona of pronotum with its width more than 3 times longer than its length (*Euparatettix* Hancock, 1904). Eyes distinctly protruding above vertex of pronotum in lateral view. .... *Euparatettix insularis* (장삼모메뚜기)
    - 8(7) Prozona of pronotum with its width less than 2 times longer than its length.
      - 9(10) Vertex between eyes strongly projecting anteriorly; frons in lateral view, clearly inclined, forming an acute angle with vertex (*Clinotettix* Bey-Bienko, 1933). .... *C. ussuriensis* (북방모메뚜기: 신칭)
      - 10(9) Vertex between eyes moderately projecting anteriorly; frons almost perpendicular or slightly inclined in lateral view (*Tetrix* Latreille, 1802).
    - 11(20) Anterior margin of pronotum in dorsal view straight or only weakly triangular.
    - 12(13) Median carina of fastigium weak, not projecting; hind

- femora 3.4-4.0 times as long as broad. ....  
 ..... *T. subulata* (각진모메뚜기)
- 13(12) Median carina of fastigium well developed, projecting beyond the anterior margin of fastigium; hind femora 2.6-3.2 times as long as broad.
- 14(19) Anterior margin of pronotum in dorsal view straight; median carina of pronotum low, developed as well as the lateral carinae.
- 15(16) Ovipositor wide; pronotum feebly swollen. ....  
 ..... *T. japonica* (모메뚜기)
- 16(15) Ovipositor relatively narrow; pronotum not swollen.
- 17(14) Body relatively wide; width of pronotum male 3.4-3.9 mm, female 4.0-4.4 mm. Macropterous form rare. ....  
 ..... *T. macilenta* (가는모메뚜기: 신칭)
- 18(17) Body relatively narrow; width of pronotum male 3.0-3.5 mm. Frequently occurs in macropterous forms. ....  
 ..... *T. minor* (꼬마모메뚜기: 신칭)
- 19(14) Anterior margin of pronotum in dorsal view distinctly triangular; median carinae of pronotum relatively high, developed more than lateral carinae. N. China, Russian Far East. .... [ *T. tenuicornis* (Sahlberg, 1893) ]
- 20(11) Anterior margin of pronotum in dorsal view strongly triangular.
- 21(22) Length of antennae 1.3-1.6 times more than length of fore femur; median segments of antennae 1.8-2.1 times as long as wide. .... *T. bipunctata* (쌍점모메뚜기: 신칭)
- 22(21) Length of antennae 1.8-2.0 times more than length of fore femur; median segments of antennae 3.0-5.3 times as long as wide. .... *T. simulans* (광대모메뚜기)

***Criotettix japonicus* (de Haan, 1842) 가시모메뚜기**

- Acrydium* (*Tetrix*) *bispinosum* var. *japonicum* De Haan, 1842, in Temminck, Verh. Natuur. Geschied. Nederl. Overzee. Bezitt., Zool., Insc., p. 169 (Japan).
- Acanthalobus bispinosus japonicus* (Hann): Hebard, 1924, Trans. Am. Ent. Soc., 50: 210.
- Acanthalobus japonicus* De Haan: Hancock, 1906, Genera Insectorum, 48: 29; Kirby, 1910, Syn. Cat. Orthopt., 3(2): 18; Doi, 1932, J. Chosen Nat. Hist. Soc., 13: 34 (Korea); Cho, 1959, Hum. and Sci., Nat. Sci., Korea Univ., 4: 169 (*Acanthalobus* [sic]) (Korea); Cho, 1969, Illustr. ency. fauna and flora of Korea, (10), Ins., 2: 746 (Korea); Chu, 1969, "Check list of Insects", p. 21 (N. Korea).
- Criotettix bispinosus* Dalman: Shiraki, 1907, Trans. Sapporo Nat. Hist. Soc., 1(2): 158, (nec Dalman, 1818: 77).
- Criotettix japonicus* (De Haan): Günter, 1938, Stettin. Ent.

Ztg., 99: 147; Bei-Bienko and Mishchenko, 1951, Opređ. Faune SSSR, 38: 90; Blackith, 1992, Tetrigidae of S. E. Asia, p. 37; Ichikawa, 1994, Jap. J. Ent. 62 (3): 469 (key to species); Yin *et al.*, 1996, A Synonymic Catalogue of Grasshoppers., p. 863; Otte, 1997, Orthoptera Species File, 6: 70; Liang and Zheng, 1998, Fauna Sinica, 12: 81, 241.

**Materials examined.** 2♂, 20-IV-1999; 1♂, 25-IV-1999; 1♀, 26-V-1999, Mt. Myosanbong (300 m) (JFNHM).

**Distribution.** Korea, Japan, N. China.

**Notes.** First record for Korea by Doi (1932). Widely distributed including Jeju-do. Not common.

**참고.** 몸길이는 날개 끝까지 17-20 mm로 몸은 갈색이다. 등은 평평하며, 앞가슴 양쪽에 커다란 가시가 있어서 다른 종과 쉽게 구분할 수 있다. 대개 연못이나 물가에서 흔히 볼 수 있으며, 헤엄을 아주 잘 친다. 제주도를 비롯하여 전국에 분포하지만, 흔하지는 않다. 제주도는 처음으로 기록한다.

***Euparatettix insularis* Bei-Bienko, 1951 장삼모메뚜기**

*Euparatettix insularis* Bei-Bienko, 1951, Opređ. Faune SSSR, 38: 106 (Japan).

*Paratettix histricus* (Stål): Shiraki, 1907, Trans. Sapporo Nat. Hist. Soc., 1(2)[1906]: 7; Kamijo, 1933, J. Chosen Nat. Hist. Soc., 15: 48 (Korea); Cho, 1959, Hum. and Sci., Nat. Sci., Korea Univ., 4: 170 (Korea); Cho, 1969, Illustr. ency. fauna and flora of Korea, (10), Ins., 2: 746 (Korea); Chu, 1969, "Check list of Insects", p. 22 (N. Korea).

*Euparatettix histricus* (Stål): Hebard, 1924, Trans. Amer. Ent. Soc., 50: 210 (Japan).

*Tettix longulus* Shiraki: Doi, 1932, J. Chosen Nat. Hist. Soc., 13: 34 (Korea). Misidentification of *Paratettix histricus* (see Doi, 1933: 88).

*Paratettix histricus* (Stål): Doi, 1933, J. Chosen Nat. Hist. Soc., 15: 88 (Korea); Kim, 1984, Cheju Univ. Jour. Nat. Sci., 18: 200 (Jeju-do).

*Euparatettix insularis* Bei-Bienko: Paik, 1995, Insects of Quelpart Island, p. 297 (Jeju-do); Huh and Kwon, 1995, Ins. Koreana, suppl., 5: 8 (Jeju-do); Yin *et al.*, 1996, Synonymic Catalogue of Grasshoppers., p. 870; Otte, 1997, Orthoptera Species File, 6: 99.

**Materials examined.** 1♂, 9-VIII-1999, Mt. Myosanbong (300 m); 7♂, 5♀, 23-VII-2000, 2♂, 1♀, 29-VII-2000, Ojori (20 m) (JFNHM); 1♀, 24-V-1999, Kosan; 1♂, 3-X-1998, Bomok; 1♂, 24-IV-1999, Samyang (SCNAE); 1♂, 9-VII-1984, Ara, Juju-si (SCNAE).

**Distribution.** Korea, Japan.

**Notes.** First record for Korea by Doi (1932) as *Tettix*

*longulus* Shiraki (misidentification of *insularis*. See Doi, 1933: 88). Later Kamijo (1933) reported it as *P. histricus*. Widely distributed including Jejudo, but seldom.

**참고.** 몸길이는 날개 끝까지 14-19 mm로 몸은 옅은 검정색이다. 제주도를 비롯하여 전국에 널리 분포하며, 논이나 연못 근처나 습기가 많은 밭이나 풀밭에서 산다. 자주 볼 수 있지만, 개체 수는 많지 않다. 성충으로 월동하며, 잘 나른다. 가끔 불빛에 날아온다. 제주도는 Kim (1984)이 처음으로 기록했다.

***Formosatettix larvatus* Bei-Bienko, 1951** 볼록모메뚜기

*Formosatettix larvatus* Bei-Bienko, 1951, Opred. Faune SSSR, 38: 102 (Japan); Storozhenko, 1981, New data on insects of the Soviet Far East, pp. 6-8; Storozhenko and Ichikawa, 1993, Akitu, N.S., 134: 9; Huh and Kwon, 1995, Ins. Koreana, Suppl., 5: 8 (Korea: Quelpart Is.); Paik, 1995, Insects of Quelpart Island, p. 297 (Jejudo); Yin *et al.*, 1996, A Synonymic Catalogue of Grasshoppers., p. 872; Otte, 1997, Orthoptera Species File, 6: 102.

**Materials examined.** Not available (after Huh and Kwon, 1995).

**Distribution.** Korea, Japan.

**Notes.** First record for Jejudo, South Korea by Huh and Kwon (1995), but has not yet been collected from this island. This species is collected from Mt. Weolaksan (1 ♀, 19-VII-1996) in mainland by the senior author.

**참고.** 우리나라는 Huh and Kwon (1995)이 제주도에서 처음으로 기록했다. 종의 구별은 Storozhenko and Ichikawa (1993)을 참고하기 바란다.

***Tetrix japonica* (I. Bolivar, 1887)** 모메뚜기

*Tetrix japonicus* Bolivar, 1887, Ann. Soc. Ent. Belgique, 31: 263 (Japan).

*Tetrix sibiricus* I. Bolivar, 1887, Ann. Soc. Ent. Belgique, 31: 265 (Siberia). Syn. by Bey-Beinko, 1951, Opred. Faune SSSR, 38: 99.

*Tetrix longulus* Shiraki, 1907, Trans. Sapporo Nat. Hist. Soc., 1(2): 161 (Japan). Syn. by Bey-Beinko, 1951, Opred. Faune SSSR, 38: 99.

*Acrydium sibiricum ussurianum* Bey-Bienko, 1929, Eos, 5: 370, 372 (Vladivostok). Syn. by Bey-Beinko, 1951, Opred. Faune SSSR, 38: 99.

*Tetrix trux* Steinmann, 1964, Acta Zool. Hung., 10: 462 (China: Badeling). Syn. by Storozhenko *et al.*, 1994, New Ent., 43(1/2): 13.

*Tetrix japonicus* (de Haan): Shiraki, 1907, Trans. Sapporo Nat.

Hist. Soc., 1(2): 160; Shiraki, 1910, Acrididen Japans, p. 85; Doi, 1932, J. Chosen Nat. Hist. Soc., 13: 34 (Korea).

*Acrydium japonicum* (Olivier [sic]): Chu, 1969, "Check list of Insects", p. 22 (N. Korea).

*Acrydium japonicum* (Bolivar): Kirby, 1910, Syn. Cat. Orthop., 3(2): 45; Hebard, 1924, Trans. Am. Ent. Soc., 50: 210; Furukawa, 1930, Bull. Biogeogr. Soc. Jap., 1(3): 231 (Korea); Shiraki, 1932, Icon. Ins. Japon. (ed. 1st), p. 2061; Furukawa, 1939, Rept. First Sci. Exp. Manchoukou, Sect. V, Div. I, 5(16): 109, 123, 176; Shiraki, 1950, Icon. Ins. Japon. (ed. 2nd), p. 32; Doi, 1933, J. Chosen Nat. Hist. Soc., 15: 88 (Korea); Kamijo, 1933, J. Chosen Nat. Hist. Soc., 15: 48 (Korea); Cho, 1959, Hum. and Sci., Nat. Sci., Korea Univ., 4: 169 (Korea); Cho, 1969, Illustr. ency. fauna and flora of Korea, (10), Ins., 2: 745 (Korea).

*Tetrix japonica* (Bolivar): Bei-Bienko, 1933, Ark. Zool. 25A (20): 9; Bey-Bienko and Mishchenko, 1951, Opred. Faune SSSR, 38: 99; Chogsomzhav, 1972, Ins. Mongolia, 1: 153; Yin, 1984, Insects of Qinghai-Xizang Plateau, p. 16 (Tibet); Storozhenko, 1986, Opred. Nasek. dal. vostoka SSSR, 1: 273; Ichikawa, 1993, Akitu, N.S. 135: 1-2; Storozhenko *et al.*, 1994, New Entomol., 43(1/2): 13 (syn.); Huh and Kwon, 1995, Ins. Koreana, suppl., 5: 8 (Jejudo); Kostia, 1995, Acta Zool. Cracov., 38(2): 260 (N. Korea); Paik, 1995, Insects of Quelpart Is., p. 298 (Jejudo); Moon and Yoon, 1996, Ent. Res. Bulletin (KEI), 22: 52 (Korea); Liang and Zheng, 1998, Fauna Sinica, 12: 174; Yin *et al.*, 1996, A Synonymic Catalogue of Grasshoppers., p. 918; Otte, 1997, Orthoptera Species File, 6: 129.

**Measurements** (in mm). Length of body (from anterior margin of fastigium of vertex to the apex of the posterior process of pronotum) male 7.4-9.1, female 8.8-11.1 (in forma macroptera male 11.8-12.9, female 14.2-15.3); pronotum male 6.7-8.0, female 7.9-10.1 (in forma macroptera male 9.5-10.8, female 11.7-13.4); hind femur male 4.8-6.3, female 5.7-7.1, ovipositor 1.3-1.5.

**Materials examined.** Many specimens collected from Jejudo (JFNHM); 1 ♂, 27-V-1983, Yonggang; 1 ♀, 30-VII-1983, Ara, Cheju City; 2 ♀, 4-VI-1983, Muljangol (SCNAE).

**Distribution.** Korea, Japan, Northern China, Taiwan, Russian Far East, Mongolia.

**Notes.** This species (with numerous *f. macroptera*) is widely distributed in the Korean Peninsula including Jejudo.

**참고.** 몸길이 (수컷: 7.4-9.1, 암컷: 8.8-11.1 mm), 앞가슴등판 길이 (수컷: 6.7-8.0 mm, 암컷: 7.9-10.1 mm), 뒷다리 넓적마디 (수컷: 4.8-6.3, 암컷: 5.7-7.1 mm), 산란관 (1.3-1.5 mm). 우리나라는 Furukawa (1930), 제주도는 Cho (1969)가

*Acrydium japonicum*으로 처음 기록했다. 이 속의 종들은 몸의 형태가 매우 다양해서 등이 불룩하거나 또는 가늘다. 더듬이는 실 모양(filiform)으로 13-15마디이며, 겹눈 바로 밑에 붙어있다. 모메뚜기는 같은 종이라도 다형(polymorphic) 현상을 보여서 날개가 긴(macropterous form) 것, 줄어든(brachypterous form) 것 또는 없는(apterous form) 개체도 있다. 한편, 앞가슴도 줄어든 것도 있다. 앞가슴의 옆쪽 가장자리는 구부러져 있으며, 앞날개는 둥글며, 앞가슴보다 짧다. 이 속은 앞가슴이 뒤쪽으로 뻗어있어서 쉽게 구별할 수 있다. 우리나라에 6종을 기록하고 있지만, 더 자세히 조사하면 더욱 증가할 것으로 생각한다.

***Tetrix minor* Ichikawa, 1993 꼬마모메뚜기(신칭)**

*Tetrix minor* Ichikawa, 1993, Akitu, N.S., 135: 6-7 (Japan); Storozhenko *et al.*, 1994, New Entomol., 43(1/2): 17.

**Material examined.** 1 ♀, 9-VII-1984, Ara-dong (250 m); 1 ♂, 26-VIII-1986, Seonheul-ri (250 m); 1 ♂, 25-IX-1998, Gyrae-ri (400 m); 1 ♂, 1 ♀, 3-IV-1987, Hwasun (60 m); 1 ♀, 2-IV-1994, Gwangpyeong (300 m) (JFNHM); 1 ♂, 1 ♀, 3-IV-1987, Andeok (SCNAE).

**Distribution.** Korea, Japan, China (Sichuan), Russian Far East.

**Notes.** New to Korea. This species is widely distributed in the Korean Peninsula. For more information, see Storozhenko *et al.*, 1994.

**참고.** 몸길이 (수컷: 7.9-9.3; 암컷: 8.0-10.0 mm), 앞가슴등판 길이 (수컷: 6.0-9.2, 암컷: 6.0-9.3 mm), 뒷다리 넓적마디 (수컷: 4.7-5.5, 암컷: 5.0-6.0 mm), 산란관 (1.4 mm). 꼬마모메뚜기(신칭)는 우리나라에 처음으로 기록한다. 이 종은 장시형인 개체가 단시형보다 더 많으며, 육지에 분포하는 *T. macilenta* Ichikawa (가는모메뚜기: 신칭)로 오인할 수도 있기 때문에 동정에 주의할 필요가 있다. 그러나 꼬마모메뚜기는 산란관의 길이가 가는모메뚜기보다 작아서 구별할 수 있다.

**Superfamily Acridoidea 메뚜기 상과**

**Family Pyrgomorphidae 섬서구메뚜기 과**

The family Pyrgomorphidae is easily distinguished by a characterized conical head with fastigial furrows, and an elevated median process of the prosternum. A large number of genera in the tropics and subtropics. Most species feed on dicotyledons. In Korea, the following one only species occurs.

***Atractomorpha lata* (Motschulsky, 1866) 섬서구메뚜기**

*Truxalis lata* Motschulsky, 1866, Bull. Sci. Nat. Mosc., 39(1):

181 (China).

*Parena concolor* Walker, 1870, Cat. Derm. Salt. Br. Mus., 3: 506 (Korea). Treated as a jun. syn. of *lata* by Kevan, 1963, Ark. Zool., 16(4): 85.

*Tryxalis diminuta* Walker, 1871, Cat. Derm. Salt. Brit. Mus., 5, Suppl., p. 50 (China). Treated as a jun. syn. of *lata* by Chang, 1924, China J. Sci. Arts, 2: 70.

*Minorissa alata* Thomas, 1874, Bull. U. S. geol. geogr. Surv. Terr., 1: 63 (No type locality). Syn. by Kevan, 1960, Bull. Brooklyn ent. Soc., 55: 36.

*Atractomorpha bedeli* Bolivar, 1884, Anal. Soc. Esp. Hist. Nat., 13: 69 (Japan). Treated as a jun. syn. of *lata* by Kevan, 1963, Ark. Zool., 16(4): 85.

*Atractomorpha heteroptera* Bey-Bienko, 1951, Opred. Faune SSSR, 38: 275 (China). Synonymized by Kevan, 1963, Ark. Zool., 16(4): 8.

*Atractomorpha brevicornis heteroptera* B.-Bienko: Tzyplov, 1970, Ent. Obozr., 49(2): 357 (Korea).

*Atractomorpha lata* (Motschulsky): Bey-Bienko and Mishchenko, 1951, Opred. Faune SSSR, 38: 277 (Korea); Kevan, 1963, Ark. Zool., 16: 85 (syn.); Rentz and Miller, 1971, Ent. News, 82: 256 (Korea); Kevan, 1977, Orthopterorum Catalogus, 16: 379; Otte, 1994, Orthoptera Species File, 3: 35; Paik, 1995, Insects of Quelpart Island, p. 297 (Jejudo); Huh and Kwon, 1995, Ins. Koreana, suppl., 5: 9 (Quelpart Is.); Yin *et al.*, 1996, A Synonymic Catalogue of Grasshoppers., p. 79 (Korea).

**Materials examined.** Many specimens collected from various cites of Jejudo (JFNHM).

**Distribution.** Korea (incl. Quelpart Is.), Japan, China.

**Notes.** The first record for Korea by Walker (1871) as *P. concolor*. Widely distributed in South Korea including Jejudo. Very common.

**참고.** 섬서구메뚜기 종류는 우리나라에 1속 1종만 분포한다. 제주도를 비롯하여 전국에 분포하며, 매우 흔한 종이다. 잡식성으로 가끔 콩과 같은 농작물에 피해를 준다. 제주도는 Kim(1984)이 처음 기록했다.

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