

Taxonomic Review of Korean Tettigoniinae (Orthoptera, Tettigoniidae)

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ABSTRACT A taxonomic study of Korean Tettigoniinae (Orthoptera, Tettigoniidae) is presented. Thirteen species are recognized. Among them, *Metrioptera (Zeuneriana) monticola* is described as new and *Tettigonia ussuriana* Uvarov is reported for the first time in Korea. *Metrioptera koreana* (Mori) treated as a junior synonym of *Metrioptera (Sphagniana) ussuriana* Uvarov by Lee (1990) must be needed to reconsider as new states from the previous treatment. A key, photographs of habitus and drawings of key characters of new species are provided.

Key words : Taxonomy, Orthoptera, Tettigoniidae, Tettigoniinae, Korea

적 요 한국산 여치아과(메뚜기목, 여치과)에 대한 분류학적인 검토를 수행하였다. 그 결과, 한국산 여치아과는 총 13종이 밝혀졌으며 이 과정에서 1 신종, *Metrioptera (Zeuneriana) monticola* sp. nov. (산여치: 신칭)과 1 미기록종 *Tettigonia ussuriana* Uvarov (중베짱이: 신칭)이 추가되었다. 한편 *Metrioptera (Sphagniana) ussuriana* Uvarov의 동물이 명으로 처리되었던 *Metrioptera koreana* (Mori)는 분류학적 위치가 불안정하여 재검토가 필요하다. 각 종에 대한 검색표, 표본 사진과 신종의 중요 형질 삽화 등을 작성하였다.

검색어 : 분류, 메뚜기목, 여치과, 여치아과, 한국

As a member of Tettigoniidae (Orthoptera), Tettigoniinae was recognized nearly 920 species in 135 genera throughout the world (Naskrecki and Otte, 1999). Since Walker (1869) first recorded four Korean species, the tettigoniid fauna was known partly by Mori (1933), Cho (1959), Lee (1990) and the others. However there are many problems such as misidentifications, synonyms and dubious names from the past reports.

This paper aims to revise of Korean tettigoniid on the basis of the study of all materials and literatures available. As a result, thirteen species including a new species, *Metrioptera (Zeuneriana) monticola* sp. nov. and a newly recorded species *Tettigonia ussuriana* Uvarov are recognized in Korean fauna. Also, *Metrioptera koreana* (Mori) treated as a junior synonym of *Metrioptera (Sphagniana) ussuriana* Uvarov by Lee (1990) must be needed to reconsider as new states from the previous treatment (See the remarks of *Metrioptera (Sphagniana) ussuriana* Uvarov). Three species, *Metrioptera (Sphagniana) ussuriana* (Uvarov), *Metrioptera* (s. str.) *brachyptera* (Linnaeus), *Atlanticus* (s. str.) *brunneri* Pylnov recorded from North Korea, were

not confirmed in here.

Abbreviations for the depositories and the provinces in Korea are as follows: EU-Ehwa Women's Univ.; GSU-Gyeongsang Univ.; KU-Korea Univ.; NIAST-National Institute of Agricultural Science and Technology; NSM-National Science Museum; SSU-Sungshin Women's Univ.; YNU-Yeongnam Univ.; HB-Hamgyeongbuk-do; GW-Gangwon-do; GG-Gyeonggi-do; CB-Chungcheongbuk-do; CN-Chungcheongnam-do; GB-Gyeongsangbuk-do; GN-Gyeongsangnam-do; JB-Jeollabuk-do; JN-Jeollanam-do; JJ-Jeju-do.

SYSTEMATIC ACCOUNT

Subfamily Tettigoniinae Karny, 1926

Type genus: *Tettigonia* Linnaeus, 1758.

Key to Korean Species and Genera of Tettigoniinae

1. Prosternum unarmed. 2
- Prosternum armed with processes. 7
2. Male cerci surpassing caudal margin of subgenital plate, with inner tooth located distal part. Female subgenital plate elongate, covering more 1/3 of base of ovipositor.

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- (**Genus Eobiana**) *E. engelhardti* (Uvarov)
- Male cerci staying caudal margin of subgenital plate, with inner tooth located basal part from mid. Female subgenital plate short, covering a little of base of ovipositor.
..... (**Genus Metrioptera s. lat.**) 3
3. Pronotum with metazona as wide as twice of prozona. (**Subgenus Sphagniana**) *M. (Sphagniana) ussuriiana* (Uvarov)
- Pronotum with metazona same or slightly broader than prozona. 4
4. Male last abdominal tergite covering half of cerci, base of cercus strongly thick.
..... (**Subgenus Zeuneriana**) *M. (Zeuneriana) monticola sp. nov.*
- Male last abdominal tergite covering base of cerci partly, base of cercus slender and simple.
..... (**Genus Metrioptera s. str.**) 5
5. Microptera. Tegmina very short and hind wings vestigial. Stridulatory apparatus of male partly covered by pronotum.
..... *M. (s. str.) bonneti* (Bolívar)
- Mesoptera. Tegmina and hind wings fully developed. Stridulatory apparatus of male fully exposed from pronotum.
..... *M. (s. str.) brachyptera* (Linnaeus)
6. Prosternal processes short and blunted. Mesosternal lobe shorter than basal width. 7
- Prosternal processes long and spine-like sharply. Mesosternal lobe longer than basal width. 10
7. Fore tibia with two dorso-apical spines.
..... (**Genus Paratlanticus**) *P. ussuriensis* (Uvarov)
- Fore tibia with one dorso-apical spine externally. 8
8. Pronotum shorter than fore femora. Lateral lobe of pronotum with unclear lateral angle. Tegmina longer than pronotum in both sexes. Ovipositor decurved.
..... (**Genus Anatlanticus**) *A. koreanus* **Bey-Bienko**
- Pronotum longer than fore femora. Lateral lobe of pronotum with clear lateral angle. Tegmina shorter than pronotum in male and vestigial in female. Ovipositor recurved.
..... (**Genus Atlanticus**) 9
9. Inner tooth of male cercus situated 1/2 from base.
..... *A. sinensis* Uvarov
- Inner tooth of male cercus situated 1/3 from base.
..... *A. brunneri* Pylnov
10. Fastigium of vertex wider than antennal scape.

Plantular of basitarsus long and largely developed. Male genitalia with two pairs of titillators. Ovipositor with dorsal apex obliquely truncated.

- (**Genus Gampsocleis**) 11
- Fastigium of vertex narrower than antennal scape. Plantular of basitarsus short and rounded. Male genitalia with a pair of titillators. Ovipositor with apex arrowhead-like.
..... (**Genus Tettigonia**) 12
11. Tegmina as long as 2.5~3.5 times of pronotum, with always well-defined dark spots. Ovipositor as long as 2.0~2.1 times of pronotum.
..... *G. sedakovi obscura* (Walker)
- Tegmina as long as more 3.5 times of pronotum, without dark spots or unclear. Ovipositor as long as 2.9~3.3 times of pronotum.
..... *G. ussuriensis* Adelung
12. Fastigium of vertex as wide as 0.6~0.7 times of antennal scape. Tegmina as long as 3.1~4.3 times of pronotum, with apex staying hind femoral knee. *T. ussuriiana* Uvarov
- Fastigium of vertex as wide as 0.7~0.8 times of antennal scape. Tegmina as long as 4.9~5.3 times of pronotum, with apex more surpassing hind femoral knee. *T. dolichoptera* Mori

Genus *Eobiana* Bey–Bienko, 1949

Type species: *Decticus japonicus* Bolívar, 1890. Yezo, Japan.

1. *Eobiana engelhardti engelhardti* (Uvarov)

애여치 (Figs. 18–20)

Metrioptera engelhardti Uvarov, 1926. Ann. Mag. Nat. Hist. 9(17): 281, fig. 7. Russky Island near Vladivostok, Russia; Lee, 1990: 112.

Metrioptera (Eobiana) engelhardti: ESK and KSAE, 1994: 49.

Eobiana engelhardti engelhardti: Storozhenko and Yamasaki, 1993: 41, figs. 10–18.

Metrioptera japonica: Cho, 1959: 26, fig. 22. (misidentification)

Metrioptera grisea: Mori and Cho, 1939: 4, fig. 4. (misidentification)

Material examined: 19 specimens from GW, GG and GN.

Biological notes: This species tends to form localized populations more partly as suggested by Storozhenko and Yamasaki (1993). It is likely associated especially with wet habitats in Korea.

Distribution: Korea, China, Russia.

Genus *Metrioptera* s. lat. Wesmael, 1838

Type species: *Gryllus brachypterus* Linnaeus, 1761. Europe.

Subgenus *Sphagniana* Zeuner, 1941

Type species: *Decticus sphagnorum* Walker, 1869. Canada.

2. *Metrioptera (Sphagniana) ussuriana* (Uvarov)

우수리여치

Metrioptera ussuriana Uvarov, 1926. Ann. Mag. Nat. Hist. 9(17): 282, fig. 8. Spassky, Primoskaya, Russia: Bey-Bienko, 1931: 674. Mt. Baekdusan, North Korea; Mori, 1933: 54; Mori and Cho, 1939: 4, fig. 3; Cho, 1959: 27; Cho, 1969: 752; Lee, 1990: 113.

Metrioptera (Sphagniana) ussuriana: Storozhenko, 1980: 17, figs. 1, 2.

Sphagniana ussuriana: Storozhenko, 1986: 254.

Sphagniana ussuriana (sic!): Moon and Yoon, 1993: 58.

=? *Metrioptera koreana* Mori, 1933. J. Chosen Nat. Hist. Soc. 16: 54. pl. 2. fig. 3, text-fig. b. Sangsam-bong, Pyeongyang, North Korea; Zeuner, 1941: 43; Cho, 1959: 27, fig. 24; Cho, 1969: 752. (synonymized by Lee, 1990)

Distribution: Korea (Northern part), Russia.

Remarks: Specimen of this species was not examined in this work. Pictures of cercus illustrated by Mori and Cho (1939), Cho (1959, 1969) were quite different with the original description. Therefore their reports were not reliable. *Metrioptera koreana* Mori treated as a junior synonym of *Metrioptera ussuriana* Uvarov by Lee (1990), but the original descriptions did not agree with each other although specimens of this species was not examined in this study, too. Besides, the relationship uncertain in this genus or subgenus because of 1) pronotum widened in metazona and presence of prosternal processes similar to *Anatlanticus* Bey-Bienko, 1951, 2) structure of male cercus very different to *Sphagniana* or *Anatlanticus*, while similar to *Roeseliana* Zeuner, 1941. The types of *Metrioptera koreana* Mori were lost during Korean War (SM. Lee, pers. comm.) though which were deposited in Gyeongseong Imperial University.

Subgenus *Zeuneriana* Ramme, 1951

Type species: *Zeuneriana marmorata* Fieber, 1853. Italy.

3. *Metrioptera (Zeuneriana) monticola* sp. nov.

산여치 (신칭) (Figs. 21, 23–28)

Metrioptera brachyptera: Lee, 1990: 112. (misidentification)

Male: Body small sized for the genus. Head relatively short with eyes large prominent. Fastigium of vertex round smoothly, as broad as 2 times of antennal scape dorsally. Notch closed between fastigia of vertex and frons. Antenna as long as about 1.5 times of body length. Pronotum with disc narrowed anteriorly. Median carina distinct in metazona, lateral carina mostly indicated. V-shaped sulcus very clear, separated. Lateral lobe of pronotum round at anterior angle. Posterior margin oblique, slightly sinuate. Mesopteroous. tegmina almost covering abdomen very broadly, but not surpassing beyond abdominal end (Fig. 21). Tegminal apex truncate widely with very weak concave (Fig. 24) or not. Left stridulatory files of CuP vein with about 75 teeth. Right speculum of tegmen large subquadrate. Prosternum unarmed. Fore coxal process small but clear. Fore tibia with three dorso-external spines and six pairs of ventral spines. Middle tibia with two external, four internal spines in dorsum and six pairs of ventral spines. Hind tibia with 25 external, 22 internal spines in dorsum and 8–9 pairs of ventral spines and four apical spurs distally. All femora without any spines or spinules. Plantular of hind tarsus well developed, as long as 0.5 times of basitarsus. Last abdominal tergite forming a pair of small triangular lobes with a small V-shaped incision in median (Fig. 25). Cercus very short and thick, flattened dorso-ventrally, not projecting beyond subgenital plate. Base almost covered by last abdominal plate. Internal tooth of cercus located at base, very short and slender relatively to apical part. Apex hook-like incurved (Fig. 27). Subgenital plate extending beyond cerci, caudal margin with V-shaped median incision. Median and lateral carinae well developed (Fig. 26). Style simple, as long as 4 times of basal width. Titillators large developed comparatively to body size, almost straight apical portion with median elevation dorsally (Fig. 28). Each sides of apical portion with denticles, apex sharply pointed. Basal portion shorter than apical one.

Coloration: General coloration dark brown. Antenna blackish brown. Around eyes and gena with specific patterns of black band linked (Fig. 23). Around of mouthparts black. Lateral lobe of pronotum

tum with marginal pale part posteriorly or unclear. Tegmina brown with black veins.

Female: Similar to male but slightly larger than male in profile. Tegmina a little shorter than male, reside abdominal mid. Ovipositor black moderately curved upward, basal part bright. Subgenital plate covering base of ovipositor, forming a pair of lobes with apices sharply tapering.

Measurements (unit: mm): Length of body male 16.5, female 20.0; pronotum male 4.5, female 5.1; tegmen male 9.7, female 7.6; hind femur male 16.7, female 19.0; ovipositor female 8.5.

Type series: Holotype. Korea: GW-1 male, Mt. Taebaeksan Taebaek, 23 VII 1986, JI. Kim, (SSU). **Paratype.** GW-1 male, Mt. Jeombongsan Inje, 26 IX 1998, TW. Kim, (NIAST); 1 male, Mt. Odaesan, 5 VIII 1983, SM. Lee, (SM. Lee's collection); 1 male, Mt. Seoraksan, 30 VII 1982, WS. Park, (SM. Lee's collection); 1 female, Mt. Odaesan, 30 VIII 2000, SL. An, (NSM). GB-1 male, Mt. Sobaeksan 1 VIII 1991, KS. Jung, (YNU); 2 males, Mt. Sobaeksan, 3 VIII 1994, TW. Moon, (KU).

Type depository: Holotype is deposited in the collection of Insect Resources, Division of Sericulture and Entomology (NIAST). Paratypes are in same place and SM. Lee's collection.

Distribution: Korea (Central, maybe Northern part).

Remarks: This species is mostly similar to *Metrioptera abbreviata* (Serville) from Eurasia, but it can be distinguished by face pattern, shape of stridulatory apparatus, details of male cercus and titillators. All specimens were collected from plains around the peak of mountains in Korea.

Subgenus *Metrioptera* s. str. Wesmael, 1838

Type species: *Gryllus brachypterus* Linnaeus, 1761. Europe.

4. *Metrioptera* (s. str.) *bonneti* (Bolívar)

잔날개여치 (Figs. 14-15)

Platycleis bonneti Bolívar, 1890. An. Soc. Espan. XIX: 326. Yezo, Japan.

Metrioptera bonneti: Furukawa, 1930: 109. Corea; Doi, 1932: 38; Mori, 1933: 54; Cho, 1959: 26, fig. 21; Cho, 1969: 751; Rentz and Miller, 1971: 267.

Metrioptera (s. str.) *bonneti*: Storozhenko, 1980: 16; Storozhenko, 1986: 258.

Chizuella bonneti: Furukawa and Shiraki, 1950: 40.

Chizuella bonneti (sic!): Lee, 1990: 111.

Material examined: More than 150 specimens from GW, GG, CB, GB, GN, JB, JN and JJ.

Biological note: Macropterous type (Liu and Jin, 1997).

Distribution: Korea, Japan, China, Russia.

Remarks: Rentz and Miller (1971) observed the population seemed to new species. We also recognized that many Korean samples have variations in size and coloration. However it is shown as localized populations with adaptation to environments.

5. *Metrioptera* (s. str.) *brachyptera* (Linnaeus)

꼬마여치

Gryllus brachypterus Linnaeus, 1761. Fauna Suec. p. 237. n. 868. Europe.

Metrioptera brachyptera: Bey-Bienko, 1931: 674. Mt. Baekdusan, North Korea; Mori, 1933: 54; Mori and Cho, 1939: 4, fig. 5; Cho, 1959: 26, fig. 4; Cho, 1969: 751.

Metrioptera (s. str.) *brachyptera*: Storozhenko, 1986: 257.

Biological note: Egg structure (Hartley, 1964).

Distribution: Korea (Northern part), China, Russia, Mongolia, Palaearctica.

Remark: Specimen of this species was not examined in this work.

Genus *Paratlanticus* Ramme, 1939

Type species: *Atlanticus ussuriensis* Uvarov, 1926.

6. *Paratlanticus ussuriensis* (Uvarov) 갈색여치 (Figs. 1A, 16-17, 22A-D)

Atlanticus ussuriensis Uvarov, 1926. Ann. Mag. Nat. Hist. 9(17): 276, fig. 4. Spassky, Russia; Bey-Bienko, 1931: 673. Mt. Baekdusan, North Korea; Mori, 1933: 54; Mori and Cho, 1939: 4; Tinkham, 1941: 210; Cho, 1959: 25; Cho, 1969: 750.

Paratlanticus ussuriensis: Yamasaki, 1986: 725, figs. 1, 3, 7, 13, 18. Mt. Taebaeksan, GW; Lee, 1990: 113.

=*Paratlanticus palgongensis* Rentz and Miller, 1971. Ent. News, 82: 268, figs. 9-14. Mt. Palgongsan, Daegu, Korea. (synonymized by Lee, 1990)

Paratlanticus palgonensis (sic!): Storozhenko, 1986: 253; Yamasaki, 1986: 726, figs. 2, 4, 8, 10, 14, 16, 19.

Gampsocleis inflata: Mori, 1933: 53; Cho, 1959:

24; Cho, 1969: 749. (misidentification)

Paratlanticus tsushimensis: Tadauchi, 1989: 53. (misidentification)

Material examined: More than 200 specimens from GW, GG, CB, CN, GB, GN, JB and JN.

Distribution: Korea, China, Russia.

Remarks: The differences between *Paratlanticus palgongensis* Rentz and Miller and *P. ussuriensis* (Uvarov) are based on structure of cercus, degree of prominent or excision of terminalia and recognition by coloration or size (Rentz and Miller, 1971; Storozhenko, 1986; Yamasaki, 1986). However variations of these characters are found as follows: 1) inner tooth of cercus with transitional variations (Fig. A-D), 2) titillators identical between the two except size, 3) the other characters with states in succession (Fig. 1. A). Therefore it is advisable that *P. palgongensis* was treated as synonym of *P. ussuriensis* by Lee (1990).

Genus *Anatlanticus* Bey–Bienko, 1951

Type species: *Paradrymadusa uvarovi* Miram, 1940. Ussuriisk, Russia.

7. *Anatlanticus koreanus* Bey–Bienko 우리여치 (Figs. 10–11)

Anatlanticus koreanus Bey–Bienko, 1951. Trud. vsesoyuz. ent. Obshch. Moscow, 43: 144, fig. 8. Hamgyung Prov., North Korea; Storozhenko, 1986: 254.

Metrioptera ussuriana: Lee, 1990: 113. (misidentification)

Material examined: 20 specimens from GW and GG.

Distribution: Korea (Northern, Central part).

Genus *Atlanticus* Scudder, 1894

Type species: *Decticus pachymerus* Burmeister, 1838. S. Carolina, North America.

8. *Atlanticus* (s. str.) *sinensis* Uvarov 좁날개여치 (Figs. 12–13)

Atlanticus sinensis Uvarov, 1924[1923]. Trans. Ent. Soc. Lon. p. 512. pl. XXVIII, figs. 11, 12. Mt. Taipaishan, Shense, China.

Atlanticus chinensis (sic!): Lee, 1990: 113. GW, GG. =*Atlanticus jeholensis* Mori, 1935. Rep. Fir. Sci. Exp. Man. Sec. 5, Div. 1, Part 5, Atr, 17: 6, 15. pl. II, figs. 2, 3. text-figs. 4, 5. Mt. Wulingshan, Jehol, China: Mori and Cho, 1940: 20. Mt. Geumgangsán [Kongo], GW. (synonymized by Bey–Bienko, 1955)

Deracantha transversa: Kim and Nam, 1978: 128. (misidentification)

Material examined: More than 50 specimens from GW, GG, CB, CN and GB.

Distribution: Korea, China.

Remarks: With regard to *Atlanticus jeholensis* Mori synonymized to *A. sinensis* Uvarov by Bey–Bienko (1955). However it is need further study based on the types due to it is being only on descriptions and questions of geographical range (Tinkham, 1941).

9. *Atlanticus* (s. str.) *brunneri* Pylnov

북방좁날개여치 (개칭)

Amuria brunneri Pylnov, 1914. Rev. Russe d'Ent. XIV: 109. figs. 3, 4, 5. Ussuriisk, Russia.

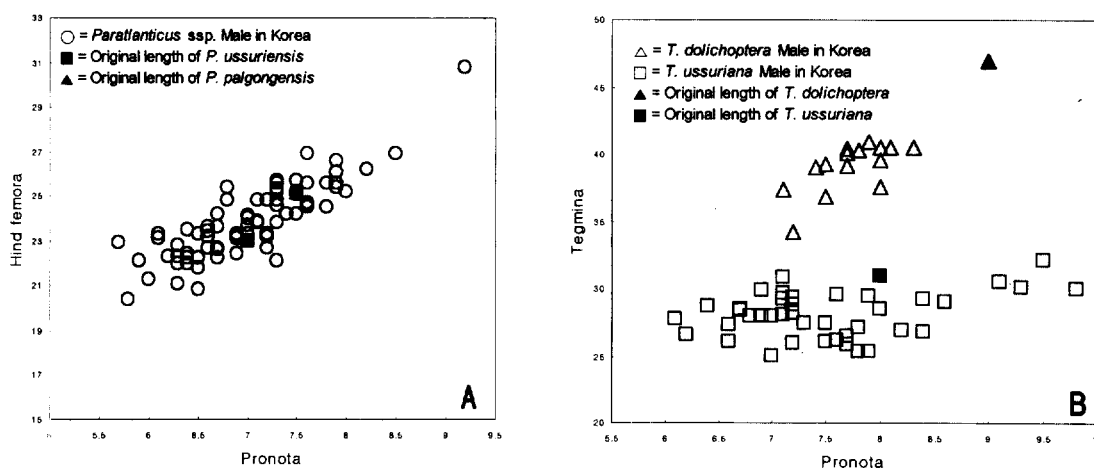


Fig. 1. Scatter diagrams of on the length ratio between hind femora and pronota A: *Paratlanticus* spp.; tegmina and pronota B: *Tettigonia* spp.

Atlanticus brunneri: Mori, 1933: 54. Musanryeong, North Korea; Cho, 1959: 26; Cho, 1969: 751.

Atlanticus brunneri (sic!): Ju, 1969: 16.

Anatlanticus (sic!) *brunneri*: Moon and Yoon, 1993: 57.

Distribution: Korea (Northern part) China, Russia.

Remark: This species was not examined in this study.

Genus *Gampsocleis* Fieber, 1852

Type species: *Locusta glabra* Herbst, 1786. Berlin, Germany.

10. *Gampsocleis sedakovi obscura* (Walker) 여치 (Figs. 2–3)

Decticus obscurus Walker, 1869. Cat. Derm. Salt. Brit. Mus. II: 261. Korea.

Gampsocleis obscura: Uvarov, 1924[1923]: 520, pl. XXVIII, fig. 20; Mori, 1933: 53.

Gampsocleis sedakovi obscura: Dirsh, 1927: 151, figs. 12–15; Bey-Bienko, 1931: 674; Mori and Cho, 1939: 4, fig. 2; Cho, 1959: 23, fig. 17; Cho, 1969: 748; Rentz and Miller, 1971: 266; Storozhenko, 1980: 14; Storozhenko, 1986: 253.

Gampsocleis sedakovi obscura (sic!): Cho, 1963: 163.

Gampsocleis sedakovi obscurus: Furukawa, 1930: 37.

Gampsocleis (sic!) *sedakovi obscurus*: Doi, 1932: 37.

=*Gampsocleis obscura hokusenensis* Mori, 1933. J. Chosen Nat. Hist. Soc. 16: 53. Korea. (synonymized by Lee, 1990)

=*Gampsocleis sedakovi hokusenensis*: Naskrecki and Otte, 1999. (syn. nov.)

Gampsocleis sedakovi: Harz, 1969: 478. South Korea.

Gampsocleis (sic!) *sedakovi*: Masaki, 1936: 272.

Gampsocleis sedakovi sedakovi: Chang, 1935: 70.

Gampsocleis buergeri: Okamoto, 1924: 57; Cho, 1959: 25; Cho, 1969: 750; Lee, 1990: 114. (misidentification)

Gampsocleis burgeri (sic!): Ju, 1969: 17. (misidentification)

Gampsocleis gratiosa: Wu, 1935: 88. (misidentification)

Material examined: More than 90 specimens from HB, GW, GG, CB, GB, GN, JB and JJ.

Biological notes: This species is likely to inhabit sunny marginal area of mountain. Cytotaxonomic study (Kim et al., 1987).

Distribution: Korea, China, Russia.

Remarks: *Decticus obscurus* Walker has been treated subsequently as a subspecies of *Gampsocleis sedakovi* (Fischer-Waldheim) by Dirsh (1927). Manchuria in China is considered as original region where subdividing two subspecies (Bey-Bienko, 1930), it however is necessary to reconsider placement of subspecies as pointed out by Rentz and Miller (1970), and Jin and Xia (1994).

11. *Gampsocleis ussuriensis* Adelung 긴날개여치 (Figs. 4–5)

Gampsocleis ussuriensis Adelung, 1910. Hor. Soc. Ent. Ross. XXXIX: 351. Ussuriisk Russia: Furukawa, 1930: 108, figs. 1, 2. Korea; Mori, 1933: 53; Mori, 1935: 4, 15; Furukawa and Shiraki, 1950: 40; Cho, 1959: 24; Cho, 1969: 749; Rentz and Miller, 1971: 267; Storozhenko, 1986: 253; Lee, 1990: 114

Gampsocleis (sic!) *ussuriensis*: Doi, 1932: 37.

Gampsocleis micado (sic!): Okamoto, 1924: 57. (misidentification)

Material examined: More than 110 specimens from GW, GG, CN, GB, GN, JB, JN and JJ.

Biological notes: This species seems to inhabit lowland widely such as river sides or sea shore to mountain area. Individuals of mountainous populations have rather small sized bodies and short tegmina without black spots, while those of lowland populations have large sized bodies and long tegmina with ill-defined black spots.

Distribution: Korea, Japan, China, Russia.

Genus *Tettigonia* Linnaeus, 1758

Type species: *Gryllus* (*Tettigonia*) *viridissimus* Linnaeus, 1758. Europe.

12. *Tettigonia ussuriana* Uvarov 중베짱이 (신칭) (Figs. 1B, 6–7)

Tettigonia ussuriana Uvarov, 1939. Ann. Mag. Nat. Hist. 11 (3): 614. text-fig. Lian-chi-khe River, Maritime Prov., Russia; Storozhenko, 1994: 14, figs. 2, 4, 7, 12, 28.

Tettigonia cantans: Mori, 1933: 52; Cho, 1959: 23; Cho, 1969: 748; Lee, 1990: 115. (misidentification)

Tettigonia orientalis: Doi, 1936: 106. (misidentification)

Korean name: 만주중벚장어 (Cho, 1959); 먹중벚장어 (Ju, 1969); 북방베짱이 (Lee, 1990) under *T. cantans*, 동방중벚장어 (Ju, 1969); 동양중벚장어 (Kim, 1981) under *T. orientalis*.

Material examined: **HB**-2 males, Charyeong [Sharei] Musan, 21 VIII 1922, Okamoto et al., (NIAST); **GW**-1 male, Gojindong Mt. Geonbongsan, 28 VIII 1990, Park, (SSU); 1 male 1 female, Hyangrobong Goseong, 23 VIII 1992, Moon, (KU); 1 male 1 female, Mt. Seoraksan, 9 X 1970, Nam et al., (EU); 1 male, *ibid*, 13 VII 1979, Do, (EU); 1 male 1 female, *ibid*, 30 VII 1982, Lee, (SSU); 1 female, Guryongsa Mt. Chiaksan Wonseong, 30 VII 1975, Kim, (SSU); 1 female, Mt. Jeombongsan Inje, 10 VIII 1983, Moon, (KU); 3 males, *ibid*, 1 X 1995, Kim et al., (SSU); 1 male 1 female, Mulgubi Jinburyeong, 11 VIII. 1979, Yoon, (EU); 2 males, *ibid*, 12 VIII 1980, No et al., (EU); 4 males 1 female, Mt. Gwangdeoksan Cheolwon, 21 IX 1997, Lee et al., (SM. Lee's collection); 8 males 4 females, Mt. Taebaeksan Taebaek, 13 VIII 1999, Kim, (NIAST); 1 female, Mt. Odaesan Hongcheon, 14 X 1973, Kim, (EU); 1 male, Light trap, *ibid*, 10 VIII 1997, Kim et al., (SSU); 2 males, Mt. Baegunsan Hwacheon, 7-8 VIII 1984, Nam et al., (KU); 1 male 1 female, *ibid*, 13-20 VII 1986, Park, (SM. Lee's collection). **GG**-1 female, Eungogae Gwangju, 15 IX 1984, Cho, (SSU); 1 male, Namhansanseong Seongnam, 11 IX 1995, Kim, (SSU); 1 female, Mt. Chukryeongsan Sudong, 6 VIII 1980, Kim, (SSU); 6 males 1 female, Mt. Gwanggyosan Suwon, 1-30 VII 1999, Kim et al., (NIAST); 1 male, *ibid*, 14 VII 2000, Lee, (NIAST); 1 male, Anyang, 18 X 1970, Park, (EU); 2 males 1 female, Mt. Yongmunsan Yangpyeong 28 VII 2000, Kim, (NIAST); 1 female, Mt. Cheondeoksan Sinseo Yeoncheon, 12 VIII 1981, Kim, (SSU); 1 female, Deokjeokdo Incheon, 28 VII 1955, Kim, (EU); 1 female, Mt. Cheonmasan, 5 X 1974, Lee, (EU); 2 males, Paldang, 3 X 1963, Kim, (KU); 1 male, Mt. Cheonggyesan, 12 VIII 1986, Kim, (SSU) **GB**-1 male, Mt. Sudosan, Gimcheon, 16 VI 1996, Choi, (NIAST); 1 female, Mt. Palgongsan Daegu, 11 IX 1998, Park, (SM. Lee's collection); 1 female, Mungeongsaejae, 10 VII 1977, Lee, (SSU); 2 males 1 female, Mt. Sobaeksan Yeongpung, 29 VII 1983, Yoon, (EU); 4 females, *ibid*, 2-4 VIII 1994, Moon et al., (KU); 1 male 1 female, Bulyeong valley Uljin, 1 VIII 1999, Kim, (NIAST); 1 female, Mt. Juwangsang Cheongsong, 30 VII 1983, Jang, (SSU); 1 male, *ibid*, 16 VIII 1990, Lee, (SSU). **GN**-1 female, Mt. Bukbyeongsan Dongbu-myeon Geojedo, 5-6 VIII

1995, Jeon, (GSU); 1 male, *ibid*, 29 VIII 2000, Lee et al., (NIAST); 1 female, Waryong-ri Hai-myeon Goseong, 2-3 VII 1994, Jeong, (GSU); 2 males 1 female, Mt. Yeohangsan Jinjeon Hapso Masan, 12-13 VIII 1999, Park et al., (GSU); 1 male, Sannae Milyang, 18-20 VII 1990, Sim, (GSU); 1 female, Naewonsa Sangnam Sancheong, 22 IX 1987, (GSU); 2 males 1 female, Sangbuk Ulsan, 6-8 VII 1992, (GSU); 1 male, Baekmudong Mt. Jirisan, 16 VII 1984, Oh, (GSU); 1 male, Ssanggyesa Hwagae Hadong, 19 IX 1987, (GSU); 2 females, Hamyang, 28-30 VII 1992, Jeon, (GSU); 1 female, Mt. Gayasan Hapcheon, 1 VIII 1989, Han, (KU). **JB**-1 female, Gucheondong Muju, 17 X 1971, Yim, (EU); 1 male, Mt. Deokyusan Muju, 10 VIII 1984, Son; 1 male 1 female, Imsil, 17 X 1970, Han, (EU). **CB**-1 female, Mt. Songrisan Boen, 7 VIII 1990, Lee, (SSU). **JN**-1 female, Dapgok Gwangyang, 9 VIII 1993, Jeong; 1 male, Mt. Baegunsan Gwangyang, 25 VIII 1999, Kim, (NIAST); 1 male, Geomundo Yecheon, 13 VII 1984, Jang, (SSU). **JJ**-1 male 2 females, Gwaneumsa, 4 VIII 1955, Cho et al., (KU); 1 female, *ibid*, 4 VIII 1972, Kim, (SSU); 1 female, Namjeju, 9 VIII 1995, Lee, (NIAST); 2 males, Sangumburi, 31 VII 1980, Paik, (SSU); 2 males, Eorimok, 27 IX 2000, Kim, (NIAST); 1 male, Eoseungsaeng, 29 VII 1972, Kim, (KU); 1 female, Jeju, 18 VII 1966, Park, (KU); 1 male 3 females, *ibid*, 7-8 VIII 1981, (GSU); 1 male 2 females, *ibid*, 5 VII 1986, Im, (NIAST); 1 female *ibid*, 27 VI 1990, An, (NIAST).

Biological note: This species seems to inhabit mountain area, compared with *Tettigonia dolichoptera* Mori.

Distribution: Korea (new record), China, Russia.

Remarks: Korean species recorded as *Tettigonia cantans* Fuessly from Europe or *T. orientalis* Uvarov from Japan are *T. ussuriensis* Uvarov clearly, which are well agree with the revise of Storozhenko (1994). Even localized populations with variations of size and tegminal shape are considered (Figs. 1-B) as subspecies or new species. It is advisable to reserve a species level until more detailed study.

13. *Tettigonia dolichoptera dolichoptera* Mori

긴날개중베짱이 (Figs. 1B, 8-9)

Tettigonia dolichoptera Mori, 1933. J. Chosen Nat. Hist. Soc. 16: 52, fig. a. Seoul, Sinuiju, Korea; Cho, 1959: 23; Cho, 1969: 748; Rentz and Miller, 1971: 266.

Tettigonia dolichoptera dolichoptera: Storozhenko,

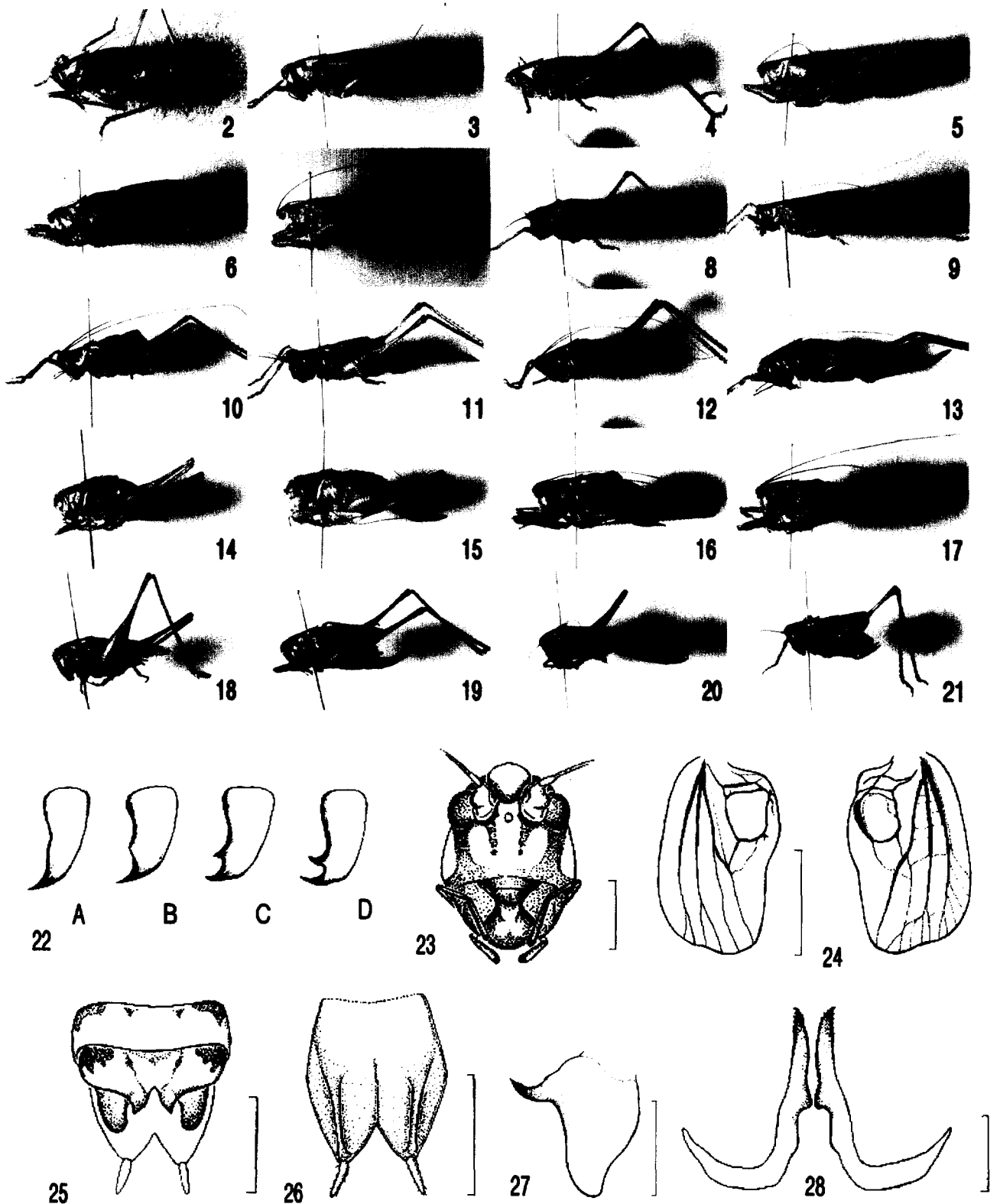


Fig. 2-21. Lateral view of bodies, 2-3. *Gampsocleis sedakovi obscura*; 4-5. *G. ussuriensis*; 6-7. *Tettigonia ussuriana*; 8-9. *T. dolichopectera*; 10-11. *Anatlanticus koreanus*; 12-13. *Atlanticus sinensis*; 14-15. *Metrioptera bonneti*; 16-17. *Paratlanticus ussuriensis* 18-20. *Eobiana engelhardti*; 21. *Metrioptera (Zeuneriana) monticola* sp. nov. (2; 4; 6; 8; 10; 12; 14; 16; 18; 20 (Macropetra); 21. Males, 3; 5; 7; 9; 11; 13; 15; 19. Females); 22. Male cerci of *Paratlanticus ussuriensis* (from A. Mt. Songnisan CB, B. Paldang GG, C. Mt. Gwanggyosan GG, D. Mt. Hambaeksan GW); 23-28. *Metrioptera (Zeuneriana) monticola* sp. nov.; 23. Face; 24. Tegmina; 25. Terminalia; 26. Subgenital plate; 27. Right cercus; 28. Titillators (scales: 5 mm in 24, 2 mm in 23, 25, 26, 1 mm in 27, 28).

1994: 9. South Korea.

Tettigonia viridissima: Doi, 1932: 37; Mori, 1933: 51; Furukawa, 1930: 105; Cho, 1959: 22; Cho, 1969: 747; Storozhenko, 1986: 252. (*part.*); Lee, 1990: 115. (misidentification)

Tettigonia viridissimo (sic!): Uvarov, 1924[1923]: 495. (misidentification)

Material examined: More than 40 specimens from GW, GG, CN, GB, GN and JB.

Biological note: This species seems to inhabit lowland, compared with *Tettigonia ussuriانا* Uvarov, because most specimens were collected generally from vegetations near stream or shore.

Distribution: Korea, Russia.

Remarks: In Korea, this species was treated as a junior synonym of *Tettigonia viridissima* Linnaeus from Europe by Lee (1990). But Storozhenko (1994) revised Korean species clearly as *T. dolichoptera dolichoptera* Mori and described new subspecies *T. dolichoptera maritima* from Russia.

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