Journal of Species Research 6(2):195-205, 2017

Rediscovery of *Zubovskya morii* (Bey-Bienko, 1931) (Orthoptera: Acrididae), the nearly forgotten endemic grasshopper in North Korea with revised checklist from its type locality, Mount Baekdusan

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Zubovskya morii (Bey-Bienko, 1931) was rediscovered from its type locality, Mount Baekdusan, from materials collected by Bulgarian zoological expeditions to North Korea in the 1970s. This grasshopper species is endemic to North Korea and for the past 85 years was known only from a single holotype male. In the present study we describe the female *Z. morii* for the first time. A revised checklist of Orthoptera at Mount Baekdusan (also known as Changbaishan in China) is also provided. A new synonymy, *Zubovskya longifurcula* (Jin *et al*., 2011), **syn. nov.** for *Zubovskya koreana* Mistshenko, 1952 is proposed here.

Keywords: Baekdusan, Changbaishan, China, North Korea, Orthoptera, *Zubovskya*

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DOI:10.12651/JSR.2017.6.2.195

Introduction

About 70% of the Korean peninsula is covered by mountains, mostly towards the North and East. Among these mountains, the highest is Mount Baekdusan, with a peak altitude of 2,744 m. The mountain was formed by past volcanic activity in the Quaternary Period and is located at the northern part of North Korea bordering Northeast China, so it is also known as Mount Changbaishan in Chinese (Kim, 1989). Presently it is a natural protected area and has been designated as a Biosphere Reserves by UNESCO in China since 1979 and in North Korea since 1989 (UNESCO, 2016).

The first record of the Orthoptera fauna of Mount Baekdusan was published by Bey-Bienko (1931) who reported 15 species from North Korea, including a new species, *Podisma morii* (now *Zubovskya morii*), described on the basis of materials provided by Tamezo Mori (a Japanese naturalist in Korea during Japanese rule) and the species was named after him. Later, Cho (1959, 1969) noted that other materials of *Podisma morii* were deposited in 'Keijo (=Gyeongsung) Imperial University', but destroyed during the Korean War (1950-1953). In fact, the grasshopper specimen was actually collected by Cho Pok-Sung (1905-1971), who took part in the expedition to Mount Baekdusan in 1926 as an assistant of Mori (Lee, 1990).

Since the original description of *Zubovskya morii*, the grasshopper was nearly forgotten, and no reconfirmation based on new materials exists. Although there are a few studies on Orthoptera from both Mount Baekdusan in North Korea and Mount Changbaishan in China, they are just repetitions of the name citing past literatures.

The genus *Zubovskya* comprises 13 species of apterous grasshoppers that are distributed in East Asia, except for one species, *Zubovskya banatica* Kis, 1965, from South-eastern Europe (Eades *et al*., 2016). One member of the genus, *Zubovskya morii* is regarded as a rare indigenous grasshopper in North Korea (Park *et al*., 2014). Storozhenko (1986b) examined the holotype specimen deposited in the Zoological Institute of St. Petersburg and provided more detailed characters of the male genitalia, however, the female characters remained unknown (Storozhenko *et al*., 2015).

Two authors (TK and HS) of this report visited the National Museum of Natural History in Sofia, Bulgaria (NMNHS) to conduct a project entitled "An Inventory of Korean collections deposited in foreign Herbaria and Museums" from April 8th to 16th, 2016. The NMNHS keeps a great deal of North Korean materials as do other museums in Eastern Europe (the Hungarian Natural History Museum, the Institute of Systematics and Evolution of Animals & the Polish Academy of Sciences, and the National Museum of Natural History, Prague, the Czech Republic) (Park and Lee, 1991). During that visiting period, we examined various North Korean insects, including those belonging to the Orthoptera. As a part of the survey, 686 specimens from the NMNHS collection were checked, and we were able to identify 31 species of North Korean Orthoptera. The result is not so beyond what has been known from already published papers on the list of collections by the Polish Academy of Sciences (Gorochov and Kostia, 1993; Kostia, 1993; 1995) and Hungarian Natural History Museum (Kim and Puskas, 2012). But the most interesting finding was the discovery of specimens of the poorly known grasshopper *Zubovskya morii*, of which two male specimens were reconfirmed, despite being slightly damaged by Dermestid beetles, in addition, three female specimens were identified, and are new to science. Through this survey we describe the female *Z. morii* for the first time using three specimens, and also provide a revised description of the male using two specimens. This study will contribute to our knowledge of Orthoptera on Mount Baekdusan. We followed the most comprehensive systematic terminology by Ito (2015) and Storozhenko *et al.* (2015).

Taxonomic Accounts

Family Acrididae MacLeay, 1821
Subfamily Catantopinae Brunner von Wattenwyl, 1893
Tribe Melanoplini Scudder, 1897
Subtribe Miramellina Rehn and Randell, 1963
Genus *Zubovskya* Dovnar-Zapolskij, 1932

***Zubovskya morii* (Bey-Bienko, 1931) (Figs. 1-10, 12-20)**

Korean name. Cham-min-nalgae-mitteoli-mettugi (참민날개밑들이메뚜기)

Podisma morii Bey-Bienko, 1931: 676, Figs. 1, 2 (the mountain Peikto, Northern Korea); Mori and Cho, 1939: 4, pl. 1, Figs. 9-10; Cho, 1959: 176, Fig. 60 (A, B); Cho, 1969: 733, pl. 78.

Zubovskya morii: Dovnar-Zapolskij, 1932: 261, 267; Rehn and Rehn, 1936: 6; Storozhenko, 1986a: 290, Fig. 148(1); Storozhenko, 1986b: 57, figs. 10, 63-68; Otte, 1995: 443; Storozhenko and Paik, 2007: 155, Figs. 537-541; Paik *et al.*, 2010: 88; Storozhenko *et al.*, 2015: 215, Figs. 645-650, color plate p. 356 (Figs. 18-20).

Zubovskia (sic!) *morii*: Bey-Bienko and Mistshenko, 1951: 216, Fig. 469; Mistshenko, 1952: 354, Fig. 404g; Lee and Lee, 1984: 64; Yin *et al.*, 1996: 760.

Bienkoa morii: Li *et al.*, 2015: 111.

Diagnosis. Resembles a congener of *Miramella*, but wingless. Distinguishable among the others of *Zubovskya* by its large dimensions and peculiar the shape of male terminalia (Fig. 12). Body feebly pilose, overall coloration dark green or pale brown with wide longitudinal black strips from behind eyes to lateral lobes of pronotum which continues along both lateral sides of abdomen in male, but diminishes from pterothorax and absent on abdomen in female. Male with a narrow median longitudinal dark strip dorsally, brighter and more greenish than female. Hind femora unicolorous, pale yellow with indistinct dark stripes; knees blackish in crescent and basal lower lobe. Hind tibia yellowish with black base. Male cerci wide at base, markedly bent inward, apical third dark black (Fig. 13). Female larger and plumper than male, fore and middle femora more slender than in male. Ovipositor with pointed apex without teeth which is good point distinguished from the other *Zubovskya* species (Figs. 19, 20).

Description. Female (*nova*) (Figs. 3, 4, 6, 8-10, 18-20)

Head. Frons gently inclined downward, vertex and occiput round, a pair of black stripes present behind compound eyes. Interocular distance 2.5 times wider than horizontal diameter of an eye. Vertical diameter of eye as long as subocular furrow. Frontal ridge diminished near clypeal suture. Antennae filiform; middle segments 3.8-4.0 times longer than wide; flagellum 22-segmented.

Thorax. Pronotum without lateral carinae, but a pair of lateral black stripes distinct; median carina present along the whole length of disk and especially distinct in metazona; three sulci well developed, first and second ones interrupted by median carina, third one complete; prozona three times longer than metazona; metazona coarsely punctuate; anterior margin truncated or weakly emarginated in the middle; posterior margin distinctly emarginated in the middle. Lateral lobe of pronotum as long as high, lower margin rather obtusely projected. Prosternal process shortly conical. Mesonotum with truncated hind margin. Metanotum 1.5 times longer than mesonotum, hid margin emarginated in the middle. Sternal plates finely and densely punctuate. Mesosternal interspace two times broader than long. Metasternal interspace two times broader than long. Mesepisternum and mesepimeron, metespisternum and metepimeron blackish along the pleural sutures, more blackish in bases.

Legs. Fore femur as long as pronotum, fore tibia with four pairs of ventral spinules apically. Middle femur



Figs. 1-6. Habitus of *Zubovskya morii* (Bey-Bienko, 1931). 1. Male, dorsal view; 2. Male, ventral view; 3. Female, dorsal view; 4. Female, ventral view; 5. Male, lateral view; 6. Female, lateral view.

slightly longer than pronotum, middle tibia with four pairs of ventral spinules apically. Hind femora slender, 4.8-5.0 times longer than the greatest width; lower genicular lobe with black pattern basally, apical margin bright, crescent blackish; ventral coloration rather variable green or discoloured to reddish. Hind tibia with 10-14 outer and 11 inner dorsal spines, without outer apical spine. All arolia broadly developed, as long as claws.

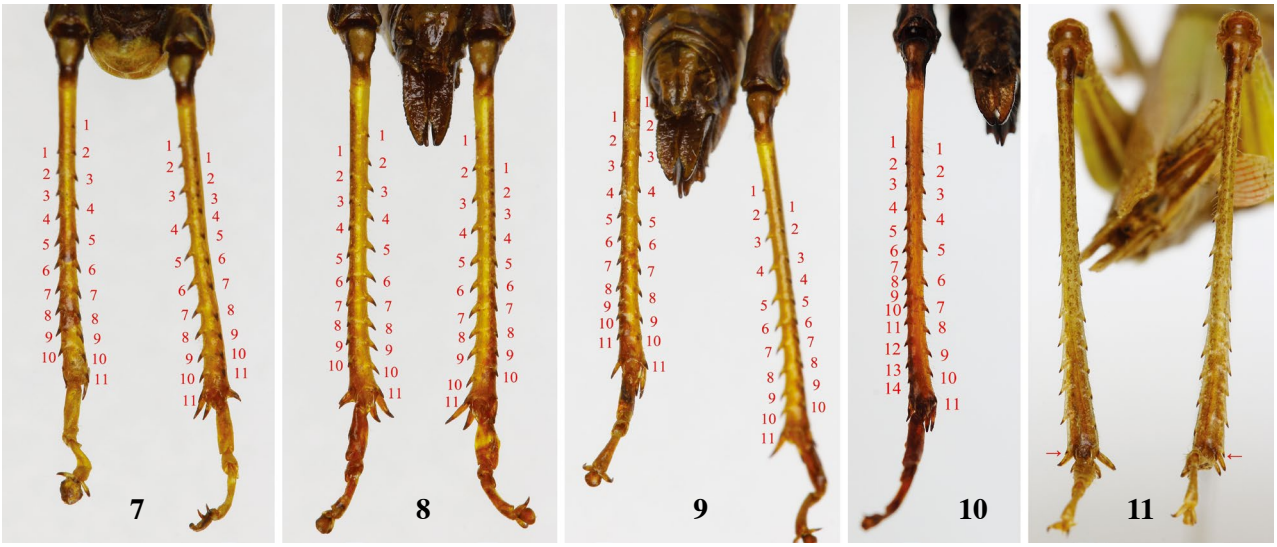
Abdomen. First abdominal tergite with distinct tympanum as large as or slightly larger than spiracle. Lateral tergites with partly blackish hind margins, all spiracles black. Epiproct diamond-shaped, with a medial groove and lateral grooves. Cercus shortly conical, not surpassing apex of epiproct. Subgenital plate rather punctuated, hind margin truncated, with a pair of longitudinal carinae weakly raised on hind margin.

Ovipositor. Dorsal and ventral parts yellowish, lateral parts blackish. Dorsal valves as long as epiproct, outer margins serrated, apices of ovipositor pointed without emargination. Ventral valves longer than basivalvular sclerites; lateral basivalvular sclerite with a thick projection outwardly.

Redescription. Male (Figs. 1, 2, 5, 7, 12-17)

Head. Frons moderately inclined downward, occiput round and blackish; fastigium of vertex weakly depressed, foveolae flat, punctated. Interocular distance narrower than horizontal diameter of eye. Vertical diameter of eye 1.2 times longer than subocular groove. Frontal ridge diminished near clypeal suture. Antennae as long as half of body length, middle antennomeres 3.8-4.0 times longer than wide; scape as long as wide; flagellum 22-segmented. Antennal socket as wide as frontal ridge.

Thorax. Pronotum as long as, or slightly shorter than fore femur, anterior margin truncated, posterior margin weakly emarginated in the middle; lateral longitudinal carinae indistinct, median carina distinguishable only in metazona and weakly punctuated; prozona elongated, 3.25 times longer than metazona, three transverse sulci distinct. Lateral lobe of pronotum as deep as pronotal length, upper half with black longitudinal band. Prosternal process shortly conical, sharply pointed. Mesosternal interspace subsquare, as wide as long.



Figs. 7-11. Spination on hind tibiae. 7-10. *Zubovskya morii* (Bey-Bienko, 1931) in Melanoplini; 11. *Oxya sinuosa* Mistshenko, 1952 in Oxyini.

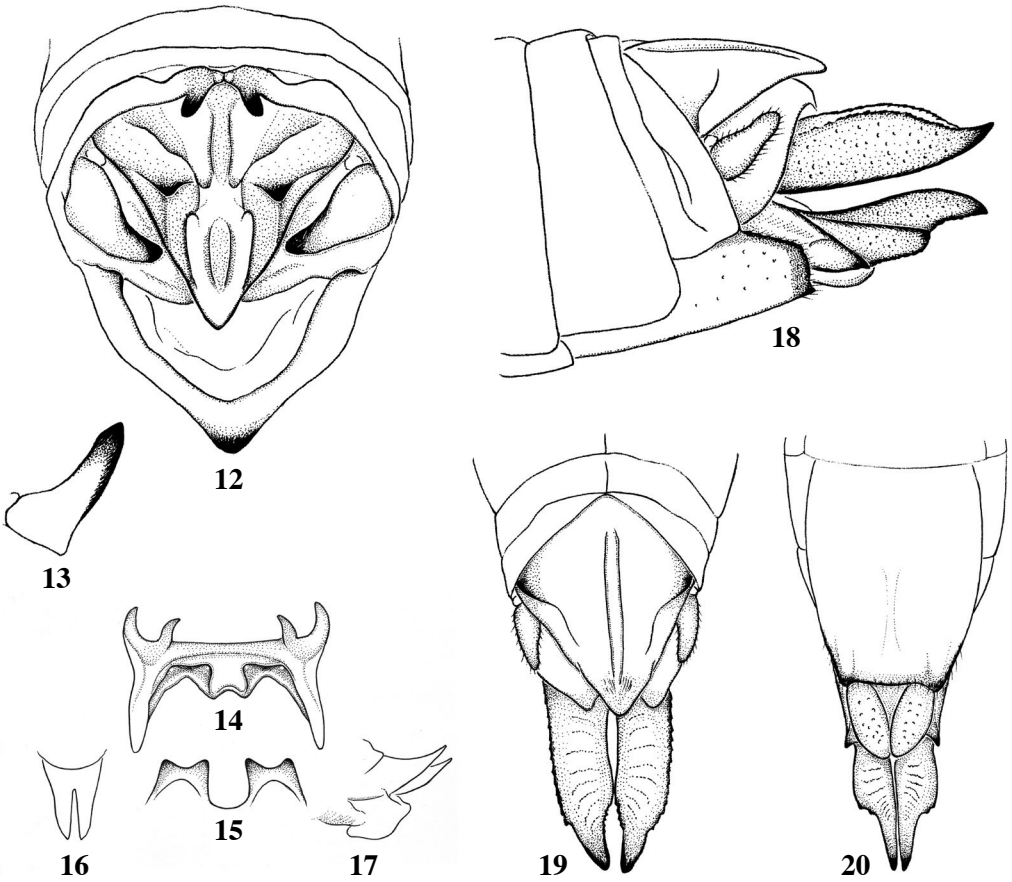
Legs. Fore tibia with 3-4 pairs of ventral spines, middle tibia with 4-6 pairs of ventral spines apically. Hind femora green, five times as long as width; knee blackish with blackish genicular lobes and crescent; hind tibia yellowish with dark base, outer margin with 10-11 dorsal spines, inner margin with 11 dorsal spines, spine base blackish, without outer apical spine; hind basitarsus shorter than the combined length of two other tarsomeres. All arolia well developed, as long as claws.

Abdomen. First abdominal tergite with perceptible tympanum, that is three times larger than spiracle. Last abdominal tergite with a pair of small black furculae as long as their basal width, widely diverged, with triangularly pointed apex. Epiproct triangular, as long as its basal width, with two distinct lateral teeth near the base and a pair of longitudinal carinae toward apex along the median depression. Cercus in profile broadened near the base, with narrowed apex; total length three times longer than basal width, not projected longer than apex of epiproct. Subgenital plate roundly convex in base, shortly conical in apex, hind margin dark black.

Phallic complex. Epiphallus bridge-like, with a pair of distinctly broad lobe-shaped lophi; ancorae short; lophi with hind margin weakly concave from anterior view. Valves of cingulum narrow and pointed apically; apical valves of penis as long as valves of cingulum, smoothly curved up; posterior margin of zygoma round; endophallic membrane large.

Specimens examined. two males and three females, North Korea, Mount Baekdusan (=Pekdusan mountain), alt. 1,200 m, 29 Sep 1973, leg. G.P. Peshev (NMNHS).

Remarks. We observed differences from previous descriptions based on the additional materials examined in this study. All specimens of *Zubovskya morii* have no outer apical spine on hind tibia which is a common character of Melanoplini, even though the presence of the spine has been indicated in some earlier studies. According to the original description by Bey-Bienko (1931), "Hind tibiae with 13 outer and 11 inner spines", however, he did not mention the outer apical spine. Later Mistshenko (1952) examined the holotype and stated, "Hind tibiae with outer apical spine, outer margin with 14, inner margin with 11 spines"(Table 1). Figures regarding these were presented in Storozhenko (1986a, b). In this study, seven hind legs of four specimens from both sexes are examined (Figs. 7-10). As a result, the total number of outer spines is relatively variable within the range of 10-14, while the number of the inner one was constant at 11. In addition, the outer apical spine is not in agreement with the original description. In fact, the spine is so insignificant that Bey-Bienko (1931) ignored it because it was so small, perhaps vestigial; however, Mistshenko (1952) pointed out its presence and added it to the total number of outer spines. Since the presence or absence of an outer apical spine on hind tibia is an important character with which to classify tribes in the Catantopinae (for example, Oxyini) (Fig. 11), *Zubovskya morii* has been treated as special exception in the Melanoplini. Due to this conflict combined with apterous character, the genus *Zubovskya* has been placed in another tribe, Conophymatini (=Conophyminae), in some Chinese studies (Yin, 1982; Li *et al.*, 2006). Furthermore, the genus *Eozubovskya* was established on the basis of the type species of *Zubovskya koreana* based on its small tym-



Figs. 12-20. Terminalia of *Zubovskya morii* (Bey-Bienko, 1931). 12. Male, dorsal view; 13. Left cercus, lateral view; 14. Epiphallus, dorsal view; 15. Epiphallus, anterior view; 16. Genitalia valves, dorsal view; 17. Genitalia valves, lateral view; 18. Ovipositor, lateral view; 19. Ovipositor, dorsal view; 20. Ovipositor, ventral view.

Table 1. Measurements of the studied specimens of *Zubovskya morii*.

Length (in mm)	Body	Pronotum	Hind femur	Hind tibia Number of outer spine	
				Left	Right
Male (holotype)					
Bey-Bienko (1931)	24.2	4.3	11.8	13	13 (?)[1)]
Mistshenko (1952)	"	"	"	14	14 (?)[1)]
Male (Fig. 1)	23.0	4.1	both lost	lost	lost
Male (Figs. 2, 5, 7)	22.7	4.0	11.7	10	11
Female (Figs. 3, 8)	27.5	4.6	12.8	10	10
Female (Figs. 4, 6, 9)	27.1	4.6	12.7	11	10
Female (Fig. 10)	28.1	4.2	12.9	14	lost

[1)] It was unclear whether the holotype specimen had both legs during initial description, but the prior authors indicated hind tibiae (plural) without dividing the sides (left and right). According to photographs of the holotype specimen, there is only one left hind leg (Storozhenko *et al*., 2015).

panum (Li and Yin, 2009). Recently, *Zubovskya morii* was transferred to the genus *Bienkoa* in the Conophyminae using the presence of a vestigial external apical spine (Li *et al*., 2015). However, Storozhenko *et al*. (2015) provided further discussion about the synonymy of *Eozubovskya* with *Zubovskya*, i.e., the most important synapomorphy for higher categorization depends on the genital structures rather than on just a few arguable external body characters. As shown here, the variability in the number of outer apical spines may be the reason why, previous studies on *Zubovskya morii* were focused with this atypical character state. This might be caused by sampling bias based on only one holotype specimen. Therefore, we retained prior combination of *Zubovskya morii* rather than in *Bienkoa* according to Dovnar-Zapolskij (1932).

Distribution. *Zubovskya morii* is a North Korean endemic species distributed in Mount Baekdusan, although there are a few records of this grasshopper from several mountains in South Korea (Lee and Lee, 1984). All South Korean records were found to be misidentifications of the congener species, *Zubovskya koreana*, when the first author of this report examined additional Korean materials. It would be informative if Mori and



Figs. 21-22. Mount Baekdusan with caldera lake 'Cheonji' on the top (7 July, 2005).

Cho (1939) had left an additional record and figures of *Zubovkya morii* from more southern mountains in Chailbong, Bujeon Plateau (prov. Hamgyengnam-do) in order to understand the actual distribution in North Korea. This species is probably limited to a small range around Mount Baekdusan.

Orthoptera in Mount Baekdusan

Since the first contribution of Bey-Bienko (1931), our knowledge of the Orthoptera in Mount Baekdusan has primarily come from Chinese authors studying the northern slope of the mountain, i.e., Mount Changbaishan. Zhang (1980) first reported Acrididae from Changbaishan in which a total of 27 species were listed, including three genera that have not been assigned to species level. Yang (1980, 1981) and Yang and Qu (1983) listed insect names during preliminary investigations on the northern slope. Many studies were primarily concerned with the description of new species from the type locality of Changbaishan by focusing on the families Acrididae and Tetrigidae (Zhang, 1982; 1984; Jin and Zhang, 1983; Huang, 1987; Liu, 1987; Ren *et al*., 1994; Gong *et al*., 1995; Zhang *et al*., 1995; Ren *et al*., 2003; Wang *et al*., 2004; Yuan *et al*., 2006; Jin *et al*., 2011).

Since 1950, Eastern European expeditions to North Korea have indirectly contributed to our knowledge of Orthoptera in Mount Baekdusan, as Mount Baekdusan has generally been one of the collecting localities (Park and Lee, 1992; Park, 1992) (this study, for example). However, fruitful studies of Orthoptera are relatively scarce compared to other insect orders (Gorochov and Kostia, 1993; Kostia, 1993; 1995; Kim and Puskas, 2012).

After the Korean peninsula was divided into two countries, no considerable studies of Orthoptera were carried out in North Korea. There is only one reference book (of animals) concerning the fauna of Mount Baekdusan (Eo *et al*., 1993). Since the 1980s, Chinese Changbaishan has been regarded as one of the most famous scenic spots for tourism (Kim, 1989), and the first author of this report visited this area in 2005 (Figs. 21, 22). South Koreans have also conducted fieldwork in Chinese Changbaishan in the northwest and published a few entomological reports (Lee, 1990; Chang and Choe, 1992; Paik *et al*., 2007).

Recently, a cooperative project between China (Northeast Normal University) and North Korea (Kim Il Sung Univeristy) resulted in a joint publication by Ko and Choi (2006). In the book, a total of 95 species of Orthoptera are listed, but the list seems rather incomplete due to the inclusion of unavailable synonyms, old combinations, misspellings, and doubtful misidentifications. Therefore, it is necessary to revise the checklist using voucher specimens and information from more recent studies.

It is likely that the richness of the Orthoptera on Mount Baekdusan is currently underestimated. More than 100 species of Orthoptera may occur on Mount Baekdusan if synonymies are checked and missing records are included in all known publication (Table 2). Among these, eight species are known only from the type locality of Mount Changbaishan. Comparing species numbers from Mount Baekdusan to those from the entire Korean peninsula, the proportion of the former is approximately 60% of the latter. Among this total list, composition of the Ensifera is relatively less known than that of the Caelifera. Special attention is needed to clarify the fauna of this monumental mountain in East Asia, and to identify this locality as a potential biological hot spot.

Table 2. Checklist of Orthoptera in Mount Baekdusan (=Changbaishan)

	Tettigoniidae	Sources
	Conocephalinae	
1	*Conocephalus fuscus* (Fabricius, 1793)	Storozhenko *et al*., 2015: 46
	Conocephalus discolor (Thunberg, 1815)	Paik *et al*., 2007: 11
	Phaneropterinae	
2	*Holochlora japonica* Brunner-Wattenwyl, 1878	Bey-Bienko, 1954: 113
	Holochlora nawae Matsumura and Shiraki, 1908	Ko and Choi, 2006: 99
3	*Phaneroptera falcata* (Poda, 1761)	Ko and Choi, 2006: 99
4	*Phaneroptera nigroantennata* Brunner von Wattenwyl, 1878	Ko and Choi, 2006: 99
	Phaneroptera nakanoensis Matsumura and Shiraki, 1908	Lee, 1990: 97
	Tettigoniinae	
5	*Anatlanticus koreanus* Bey-Bienko, 1951	Kim and Puskas, 2012: 6
6	*Anatlanticus uvarovi* (Miram, 1940)	Paik *et al*., 2007: 12
7	*Atlanticus brunneri* (Pylnov, 1914)	Storozhenko *et al*., 2015: 70
	Atlanticus jeholensis Mori, 1935	Ko and Choi, 2006: 99
8	*Bicolorana bicolor bicolor* (Philippi, 1830)	Kim and Puskas, 2012: 7
9	*Cizuella bonneti* (Bolivar, 1890)	Paik *et al*., 2007: 12
10	*Decticus verrucivorus verrucivorus* (Linnaeus, 1758)	Lee, 1990: 97
11	*Eobiana engelhardti engelhardti* (Uvarov, 1926)	Storozhenko *et al*., 2015: 79
	Metrioptera hime Furukawa, 1950	Ko and Choi, 2006: 99
12	*Gampsocleis sedekovii obscura* (Walker, 1869)	Bey-Bienko, 1931: 674
	Gampsocleis obscura hokusenensis Mori, 1933	Mori, 1933: 53
	Gampsocleis buergeri (De Haan, 1843)	Ko and Choi, 2006: 99
13	*Metrioptera brachyptera* (Linnaeus, 1761)	Bey-Bienko, 1931: 674
14	*Paratlanticus ussuriensis* (Uvarov, 1926)	Bey-Bienko, 1931: 673
15	*Sphaniana ussuriana* (Uvarov, 1926)	Bey-Bienko, 1931: 674
16	*Tettigonia ussuriana* Uvarov, 1939	Paik *et al*., 2007: 12
	Tettigonia viridissima (Linnaeus, 1758)	Ko and Choi, 2006: 99
	Rhaphidophoridae	
	Aemodogryllinae	
17	*Diestrammena asynamora* (Adelung, 1902)	Lee, 1990: 98
	Gryllidae	
	Gryllinae	
18	*Teleogryllus infernalis* (Saussure, 1877)	Paik *et al*., 2007: 12
	Gryllus chinensis Weber, 1801	Ko and Choi, 2006: 99
	Gryllus mitratus Burmeister, 1838	Ko and Choi, 2006: 99
	Gryllus testaceus Walker, 1869	Ko and Choi, 2006: 99
19	*Velarifictorus aspersus borealis* Gorochov, 1985	Storozhenko *et al*., 2015: 116
	Gryllodes berthellus Saussure, 1877	Ko and Choi, 2006: 100
	Nemobiinae	
20	*Polionemobius taprobanensis* (Walker, 1869)	Paik *et al*., 2007: 12
	Oecanthinae	
21	*Oecanthus longicauda* Matsumura, 1904	Ko and Choi, 2006: 100
	Gryllotalpidae	
	Gryllotalpinae	
22	*Gryllotalpa orientalis* Burmeister, 1838	Paik *et al*., 2007: 13
	Gryllotalpa africana Palisot and Beauvois, 1805	Yang, 1980: 93
23	*Gryllotalpa unispina* Saussure, 1874	Ko and Choi, 2006: 100
	Tetrigidae	
	Tetriginae	
24	*Clinotettix ussuriensis* Bey-Bienko, 1933	Storozhenko and Paik, 2010: 40
	Clinotettix changbaishanensis Wang *et al*., 2004	Type locality
25	*Euparatettix insularis* Bey-Bienko, 1951	Lee, 1990: 97
	Paratettix histricus (Stal, 1861)	Yang, 1980: 94
26	*Formosatettix changbaishanensis* Yuan *et al*., 2006	Type locality
27	*Tetrix bipunctata* (Linnaeus, 1758)	Kostia, 1995: 261

Table 2. Continued

28	*Tetrix changbaishanensis* Ren *et al*., 2003	Type locality
29	*Tetrix japonica* (Bolivar, 1887)	Kostia, 1995: 260
30	*Tetrix subulata* (Linnaeus, 1761)	Paik and Storozhenko, 2000: 23
	Formosatettix slivae Kostia, 1993	Type locality
31	*Tetrix tenuicornis* (Sahlberg, 1893)	Paik *et al*., 2007: 13
	Pamphagidae	
	Pamphaginae	
32	*Haplotropis brunneriana* Saussure, 1888	Ko and Choi, 2006: 100
	Pyrgomophidae	
	Pyrgomophinae	
33	*Atractomorpha lata* (Motschulsky, 1866)	Ko and Choi, 2006: 100
	Atractomorpha bedeli Bolivar, 1884	Zhang, 1980: 67
	Atractomorpha heteroptera Bey-Bienko, 1951	Ren, 2001: 12
34	*Atractomorpha sinensis* Bolivar, 1905	Ko and Choi, 2006: 100
	Acrididae	
	Catantopinae	
35	*Anapodisma miramae* Dovnar-Zapolskij, 1932	Yang and Qu, 1983: 257
	Miramella sinense Chang, 1940	Zhang, 1980: 67
36	*Calliptamus abbreviatus* Ikonnikov, 1913	Zhang, 1980: 67
37	*Miramella solitaria* (Ikonnikov, 1911)	Yang and Qu, 1983: 257
	Miramella changbaishanensis Gong *et al*., 1995	Type locality
38	*Ognevia longipennis* (Shiraki, 1910)	Yang, 1980: 94
	Eirenephilus debilis Ikonnikov, 1911	Bey-Bienko, 1931: 678
39	*Ognevia sergii* Ikonnikov, 1911	Zhang, 1982: 72
	Ognevia segii ikonnikovi Rehn and Rehn, 1939	Ko and Choi, 2006: 101
40	*Oxya chinensis* (Thunber, 1815)	Ko and Choi, 2006: 100
	Oxya velox (Fabricius, 1787)	Ko and Choi, 2006: 100
41	*Oxya intricata* (Stal, 1861)	Ko and Choi, 2006: 100
42	*Oxya yezoensis* Shiraki, 1910	Hollis, 1971: 326
	Oxya japonica Willemse, 1925	Ko and Choi, 2006: 100
43	*Oxya maritima* Mistshenko, 1951	Paik *et al*., 2007: 13
	Oxya adentata Willemse, 1925	Zhang, 1980: 67
44	*Podisma aberrans* Ikonnikov, 1911	Zhang, 1984: 35
	Podisma pedestris (Linnaeus, 1758)	Zhang, 1980: 67
45	*Prumna cavicerca* (Zhang, 1982)	Type locality
46	*Prumna mandshurica* Ramme, 1939	Yang and Qu, 1983: 257
47	*Prumna tristis* (Mistshenko, 1951)	Paik *et al*., 2007: 13
	Pimnoa primnoa (Fischer-Waldheim, 1846)	Zhang, 1980: 67
48	*Prumna primnoides* Ikonnikov, 1911	Bey-Bienko, 1931: 678
49	*Shirakiacris shirakii* (Bolivar, 1914)	Zhang, 1980: 67
50	*Zubovskya mistshenkoi* Storozhenko, 1980	Storozhenko, 1998: 6
	Zubovskia striata Huang, 1987	Type locality
51	*Zubovskya morii* (Bey-Bienko, 1931)	Type locality
52	*Zubovskya koeppeni koeppeni* (Zubowsky, 1899)	Bey-Bienko, 1931: 675
53	*Zubovskya koeppeni parvula* (Ikonnikov, 1911)	Zhang, 1980: 67
54	*Zubovskya koreana* Mistshenko, 1952	Kim and Puskas, 2012: 15
	Zubovskya longifurcula (Jin *et al*., 2011), **syn. nov.**[1)]	Type locality
	Acridinae	
55	*Acrida cinera* (Thunber, 1815)	Ko and Choi, 2006: 104
	Acrida lata Motschulsky, 1866	Ko and Choi, 2006: 104
56	*Arcyptera coreana* Shiraki, 1930	Zhang, 1980: 67
57	*Arcyptera orientalis* Storozhenko, 1988	Paik *et al*., 2007: 14
	Arcyptera fusca fusca (Palls, 1773)	Ko and Choi, 2006: 102
	Arcyptera fusca albogeniculata Ikonnikov, 1911	Bey-Bienko, 1931: 675
58	*Chorthippus apricarius* (Linnaeus, 1758)	Ko and Choi, 2006: 103
59	*Chorthippus dubius* (Zubowsky, 1898)	Ko and Choi, 2006: 103
60	*Chorthippus changbaishanensis changbaishanensis* Liu, 1987	Type locality
61	*Chorthippus bilineatus* Zhang, 1984	Type locality

Table 2. Continued

62	*Chorthippus montanus* (Charpentier, 1825)	Kim and Puskas, 2012: 18
	Chorthippus longicornis (Latreille, 1804)	Bey-Bienko, 1931: 675
63	*Chorthippus fallax* (Zubowsky, 1900)	Kim and Puskas, 2012: 18
64	*Chorthippus hammarstroemi* (Miram, 1907)	Zhang, 1980: 67
65	*Chorthippus intermedius* (Bey-Bienko, 1926)	Zhang, 1980: 67
66	*Chrysacris changbaishanensis* Ren *et al*., 1994	Type locality
67	*Chrysacris robusta* Lian and Zheng, 1987	Ren, 2001: 136
68	*Chrysochraon dispar major* Uvarov, 1925	Ren, 2001: 145
69	*Euchorthippus pulvinatus* (Fischer-Waldheim, 1846)	Zhang, 1980: 67
70	*Euchorthippus fusigeniculatus* Jin and Zhang, 1983	Type locality
71	*Euchorthippus unicolor* (Ikonnikov, 1913)	Zhang, 1980: 67
72	*Euthystira brachyptera brachyptera* (Ocskay, 1826)	Yang and Qu, 1983: 257
73	*Euthystira luteifemora* Zhang *et al*., 1995	Type locality
74	*Glyptobothrus maritimus maritimus* (Mistshenko, 1951)	Kim and Puskas, 2012: 18
	Chorthippus brunneus (Thunberg, 1815)	Yang and Qu: 1983: 257
	Chorthippus bicolor (Chapentier, 1825)	Bey-Bienko, 1931: 674
75	*Glyptobothrus maritimus huabeiensis* (Xia and Jin, 1982)	Ren, 2001: 107
76	*Gomphocerippus rufus* (Linnaeus, 1758)	Ko and Choi, 2006: 104
77	*Gomphocerus kudia* Caudell, 1927	Kim and Puskas, 2012: 19
	Gomphocerus sibiricus (Linnaeus, 1758)	Zhang, 1980: 67
78	*Megaulacobothrus aethalinus* (Zubowsky, 1899)	Bey-Bienko, 1931: 675
	Chorthippus latipennis (Bolivar, 1898)	Lee, 1990: 95
79	*Mongolotettix japonicus* (Bolivar, 1898)	Bey-Bienko, 1931: 674
80	*Mongolotettix vittatus* (Uvarov, 1914)	Zhang, 1980: 67
81	*Omocestus haemorrhoidalis* (Charpentier, 1825)	Zhang, 1980: 67
82	*Omocestus viridulus* (Linnaeus, 1758)	Kim and Puskas, 2012: 19
83	*Omocestus rufipes* (Zetterstedt, 1821)	Ragge, 1986: 213
	Omocestus ventralis (Zetterstedt, 1821)	Zhang, 1980: 67
84	*Pararcyptera meridionalis* (Ikonnikov, 1911)	Paik *et al*., 2007: 14
	Arcyptera microptera sibirica Uvarov, 1914	Lee, 1990: 94
85	*Podismopsis ussuriensis* Ikonnikov, 1911	Bey-Bienko, 1931: 674
86	*Podismopsis genicularibus* (Shiraki, 1910)	Kim and Puskas, 2012: 19
87	*Podismopsis shareiensis* Shiraki, 1930	Storozhenko *et al*., 2015: 269
	Podismopsis maximpennis Zhang and Ren, 1993	Ko and Choi, 2006: 102
88	*Schmidtiacris schmidti* (Ikonnikov, 1913)	Paik *et al*., 2007: 15
	Oedipodinae	
89	*Angaracris barabensis* (Pallas, 1773)	Ko and Choi, 2006: 102
90	*Bryodemella holdereri* (Krauss, 1901)	Ko and Choi, 2006: 102
91	*Bryodemella tuberculta diluta* (Stoll, 1813)	Bey-Bienko, 1931: 675
	Bryodema tuberculum sibirica Ikonnikov, 1913	Ko and Choi, 2006: 104
92	*Bryodema gebleri gebleri* (Fischer von Waldheim, 1836)	Ko and Choi, 2006: 104
93	*Bryodema luctuosa luctuosa* (Stoll, 1813)	Ko and Choi, 2006: 102
94	*Celes skalozubovi akitanus* (Shiraki, 1910)	Zhang, 1980: 67
95	*Epacromius pulverulentus* (Fischer-Waldheim, 1846)	Paik *et al*., 2007: 16
	Epacromius coerulipes (Ivanov, 1877)	Zhang, 1980: 67
96	*Gastrimargus marmoratus* (Thunberg, 1815)	Kim and Puskas, 2012: 21
97	*Locusta migratoria migratoria* (Linnaeus, 1758)	Kim and Puskas, 2012: 21
98	*Mecostethus alliaceus alliaceus* (Germar, 1817)	Zhang, 1980: 67
99	*Oedaleus infernalis* Saussure, 1884	Zhang, 1980: 67
	Oedaleus infernalis amurensis Ikonnikov, 1911	Yang and Qu, 1983: 257
	Oedaleus manjius Chang, 1939	Ko and Choi, 2006: 102
100	*Stethophyma grossum* (Linnaeus, 1758)	Paik *et al*., 2007: 16
101	*Stethophyma magister* (Rehn, 1902)	Storozhenko and Otte, 1994: 63
	Mecostethus angustatus Zhang, 1984	Type locality
102	*Trilophidia annulata* (Thunber, 1815)	Zhang, 1980: 67
	Trilophidia annulata mongolica Saussure, 1888	Ko and Choi, 2006: 102

[1)] *Zubovskya longifurcula* was originally described in the genus *Eozubovskya* from Chinese Changbaishan based on the key character of the male with a pair of long furculae, but later was synonymized under *Zubovskya* by Storozhenko *et al*. (2015). According to the original description, *Eozubovskya longifurcula* was compared to *Eozubovskya planicaudata* described from Chinese Inner Mongolia, but was not compared to *Zubovskya koreana* known from the Korean peninsula. The distinguished characters of *Zubovskya longifurcula*, i.e., the presence of distinct tympanum and long furculae (except for a little smaller body size) does not significantly differ from *Zubovskya koreana*. Therefore, a new synonym *Zubovskya koreana* Mistshenko, 1952 = *Zubovskya longifurcula* (Jin *et al*., 2011) **syn. nov.** is proposed here.

Acknowledgements

The authors cordially thank Prof. Nikolai Spassov (the director) and Dr. Stoyan Beshkov (the curator) for access to the NMNHS collection, as well as Dr. Dávid Rédei (Nankai University) and Prof. Ren Bin Zong (Northeast Normal University) who provided invaluable help with Chinese literature. Thanks are due to Dr. Sergey Storozhenko (Russian Academy of Science) who provided us with literature and photographs of the holotype specimen of *Zubovskya morii*. We thank Dr. Kang Tae-Hwa (NIBR) who read this manuscript and suggested constructive ideas. Dr. Petar Beron (NMNHS) related to us some interesting experiences during the collecting trips in North Korea, and provided a brief summary of Bulgarian zoologist's expeditions in Palaearctic Asia. This work was supported by a grant from the National Institute of Biological Resources (NIBR), funded by the Ministry of Environment (MOE) of the Republic of Korea (NIBR201607101).

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Submitted: September 5, 2016
Revised: September 28, 2016
Accepted: June 14, 2017