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New data on the distribution and ecology of the earwigs (Insecta, Dermaptera) of Kyrgyzstan

Abstract: An update on the dermapterofauna of Kyrgyzstan is presented. The distribution and ecology of *Oreasiobia fedtschenkoi* have been revised and the presence of *Anechura bipunctata* and *Labidura riparia* is reported for the first time in this country. The habitat, ecology and conservation of these species are discussed in the context of the Kyrgyz area and an identification key for the earwigs of Kyrgyzstan is included.

Riassunto: Nuovi dati sulla distribuzione ed ecologia delle Forficule (Insecta, Dermaptera) del Kyrgyzstan.

Viene presentato un aggiornamento sulla dermatterofauna del Kirghizistan. La distribuzione e l'ecologia di *Oreasiobia fedtschenkoi* sono state riviste e la presenza di *Anechura bipunctata* e *Labidura riparia* vengono segnalate per la prima volta in questo Paese. L'habitat, l'ecologia e la conservazione di queste specie sono discussi nel contesto dell'area del Kirghizistan e viene inclusa una chiave di identificazione per i dermatteri del Kirghizistan.

Key words: Dermaptera, taxonomy, ecology, distribution, conservation.

INTRODUCTION

Kyrgyzstan is a complex and diverse Country in its natural ecosystems, within the Central-Asian area, but still poorly known in its fauna and flora. About 94% of this Country is covered by mountains over 1000 m, and 40% of these peaks are 3000 m above sea level, with many glaciers, covering about 4% of the territory. Kyrgyzstan is however very rich in term of environments, ranging from semi-arid barelands to steppe foothills, mountain forests, sub-alpine and alpine meadows.

In this landscape earwigs are a neglected group of insects among the Kyrgyzstan fauna. At present only one species, *Oreasiobia fedtschenkoi* (de Saussure, 1874), is reported to be present in this country, though other species are reported for "Central Asia" or "Turkestan", a neighboring country with documented earwig diversity (Steinmann, 1989; Haas, 2019). Semenov-Tjan-Shanskij (1935) is the first to report the presence of earwigs in this area (*O. fedtschenkoi* cited for the "kirghis steppe"). Mistshenko (1937) presented the collecting records of

O. fedtschenkoi in Kyrgyzstan in the Osh region and in the valley of the river Gultsha (Alai range). One further record is from the valley of the river Kyzylsuu attributed at the time to the Kashgaria region, now inside the borders of Kyrgyzstan. Later, Sakai (1973) cites this species for Afghanistan, Dzungaria, Kyrgyzstan and Turkestan. *Oreasiobia fedtschenkoi* has subsequently been reported from the Alai valley and the Issik-Kul basin, as the only earwig species of this country in the modern catalogs and atlases of the fauna of Kyrgyzstan (Chelpakova *et al.*, 2011; Lazkov *et al.*, 2016). This information is supported by the main world catalogs of Dermaptera (Steinmann, 1989; Haas, 2019). It must be noted that a second species, *Forficula tomis* (Kolenati, 1846) has been historically reported for Northern Kyrgyzstan, in Tokmok and supposed to be present in the Tien-Shan mountains (Bey-Bienko, 1936) and it is generally reported for Transcaucasia in Steinmann (1989). This specie is however not reported in more recent reports and its presence in Kyrgyzstan at present time should be confirmed.

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To date, there are no published specific investigations on this group of insects in Kyrgyzstan.

In the last two years two scientific expeditions: OS-Tianshanica-2018 and 2019, organized by the World Biodiversity Association and composed by different specialists and students, collected and produced new earwig material and information that increase our knowledge base and understanding of these insects.

This contribution is dedicated to Augusto Vigna Taglianti, extraordinary entomologist who extensively studied and improved the knowledge on Dermaptera, especially on high altitude populations, even in the most remote localities.

MATERIALS AND METHODS

During two scientific expedition in Kyrgyzstan (OS-Tianshanica 2018 and 2019) a total of fifteen earwig specimens were collected from different Kyrgyzstan localities, later mounted and examined following Fontana *et al.* (2002) and preserved in the entomological collections of the Museo di Archeologia e Scienze Naturali 'G. Zannato' (MCZ). The expeditions were conducted by car and horseback between the end of April and the beginning of May of both 2018 and 2019. Twenty collecting sites, representing differing environments and altitudes, were utilized to collect three species and update their distribution and male genital anatomy.

RESULTS

Labidura riparia (Pallas, 1773)
Forficula riparia Pallas, 1773
Forficula dentata Fabricius, 1775
Forficula pallipes Fabricius, 1775
Forficula maxima Villiers, 1780
Forficula bilineata Herbst, 1786
Forficula gigantea Fabricius, 1787
Forficula bidens Olivier, 1791
Forficula crenata Olivier, 1791
Forficula erythrocephala Fabricius, 1793
Forficula flavipes Fabricius, 1793
Forficula gigantea Fabricius, 1793
Forficula rufescens Palisot, 1805
Psalis morbida Audinet-Serville, 1831
Forficesila affinis Guérin-Méneville, 1836

Forficesila gigantea Burmeister, 1838
Forficesila suturalis Burmeister, 1838
Forficula bivittata Klug, 1838
Forficesila icterica Audinet-Serville, 1839
Forficesila terminalis Audinet-Serville, 1839
Forficula marginella Costa, 1839
Forficesila riparia Fischer, 1846
Forficula bicolor Motschulsky, 1846
Forficula fischeri Motschulsky, 1846
Forficula amurensis Motschulsky, 1858
Labidura bengalensis Dohrn, 1863
Labidura servillei Dohrn, 1863
Labidura auditor Scudder, 1878
Labidura clarki Kirby, 1891
Labidura granulosa Kirby, 1891
Labidura pluvialis Kirby, 1891
Labidura distincta Rodzianko, 1897
Labidura erythrocephala Bormans, 1900
Apterygida huseine Rehn, 1901
Labidura truncata Kirby, 1903
Labidura dubronyi Borg, 1904
Labidura karschi Borg, 1904
Tomopygia sinensis Burr, 1904
Labidura mongolica Rehn, 1905
Labidura confusa Capra, 1929

TYPE LOCALITY: Irtysh river.

DISTRIBUTION. Cosmopolitan. In Kyrgyzstan this species can be found on the shores of the lake Orto Tokoy in the Kochkor district.

SPECIMENS EXAMINED: Orto Tokoy (42°17'44" N, 75°56'36" E) 1729 m, 23.IV.2019, leg. OS-Tianshanica Team, Coll. MCZ, 3 males, 3 females. Several other specimens were observed in the area, with a high density and gregarious attitude, both as nesting couples or as single individuals, all adults (Figs. 1 and 2).

TAXONOMICAL AND ECOLOGICAL NOTES. This species was found in large numbers only on the shores of the Orto Tokoy, an artificial reservoir on the Chu River in an almost complete bare land (Fig. 3). Adult couples were found actively guarding their nests, often gregarious with other couples or singles. The gregariousness of this species is known to be low in laboratory conditions, if compared to other Dermaptera (Sauphanor & Sureau, 1993; Shepard *et al.*, 1973), and even lower during the adult and reproductive stage (Gomez & Kolliker, 2013) and it is practically unknown in nature. This species has been here observed to aggregate in high numbers

especially under abandoned tires (about 20 individuals were observed under the same tire; Fig. 1), a rather common waste along the roadside verges of Kyrgyzstan. The rubber of the tires may provide some thermal insulation to the extreme climate of this Country and promote aggregation, which may be lower in more temperate areas. Some groups of individuals have been however observed to occasionally aggregate also under wood and beach debris in other warmer regions (e.g. Southern Sicily, B. Massa pers. comm.) and this behavior may be more common than expected. This species has indeed a global distribution but is locally uncommon with fragmented populations.

Anechura bipunctata (Fabricius, 1781)
Forficula bipunctata Fabricius, 1781
Chelidura anthracina (Kolenati, 1846)
Anechura asiatica Semenov, 1903
Forficula biguttata (Fabricius, 1793)
Forficula fabricii (Fieber, 1853)
Anechura orientalis Krauss, 1900
TYPE LOCALITY: Italy

DISTRIBUTION. Central and East Europe; West and Central Asia. In Kyrgyzstan this species can be found in At-Bašy valley

SPECIMENS EXAMINED: At-Bašy valley (41°12'13"N; 75°45'28"E) 2018 m a.s.l., 28.IV.2019, leg. OS-Tianshanica Team, Coll. MCZ, 2 females, 2 juveniles (Fig. 4).

TAXONOMICAL AND ECOLOGICAL NOTES. This species was found in a single valley with a semi-desert environment (Figs. 3-8) and appears to prefer a warmer environment than other species in the Country. It must be noted that all the specimens collected have a black head and this character is usually referred to *Anechura asiatica* Semenov, 1903 (now in synonymy with *bipunctata*), in contrary to true *A. bipunctata* usually reported with a reddish head. While we respected here the synonymy, further investigations on these populations need to be done to confirm this taxonomy.

Oreasiobia fedtschenkoi (de Saussure, 1874)
Forficula fedtschenkoi de Saussure, 1874
Anechura fedtschenkoi Bormans & Krauss, 1900



Fig. 1. Male and female of *Labidura riparia* guarding their nest in early spring (left) and a single male resting under an abandoned tire in Orto Tokoy (right). Photo R. Battiston.

TYPE LOCALITY: Turkestan

DISTRIBUTION. Central Asia. In Kyrgyzstan this species is present in the Issyk-Kul area, the Alai Valley, in the Smaller Naryn River Valley, and near Kol Ukok lake. SPECIMENS EXAMINED: Kol Ukok lake (42°05'58.0"N 75°53'43.3"E) 3038 m, leg. R. Battiston, Coll. MCZ, 1 male; Smaller Naryn River (41°37'13"N, 76°26'35"E) 2429 m, 24.IV.2019, leg. OS-Tienshanica Team, Coll. MCZ, 2 males 2 females (Figs. 4 and 5).

TAXONOMICAL AND ECOLOGICAL NOTES. Adults of *Oreasiobia fedtschenkoi*, were found during the first OS-Tienshanica expedition in April, near Kol Ukok lake at 3,038 m above sea level in a typical high mountain environment (Fig. 3), with snow still present on the surrounding peaks. Other specimens were located in the Smaller Naryn valley along a riverbank in a snow-covered forest (Fig. 3). We presume this species has a large distribution in Kyrgyzstan. From a morphological point of view, it is interesting

to note that the peculiar shape in the apex of the central parameral plate of *Oreasiobia fedtschenkoi*, depicted

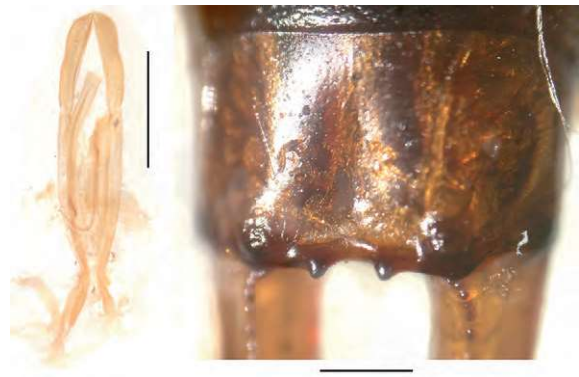


Fig. 2. Male terminalia of *Labidura riparia* from Orto Tokoy: genitalia (left) and supra genital plate (right). Scale bars: 1 mm.

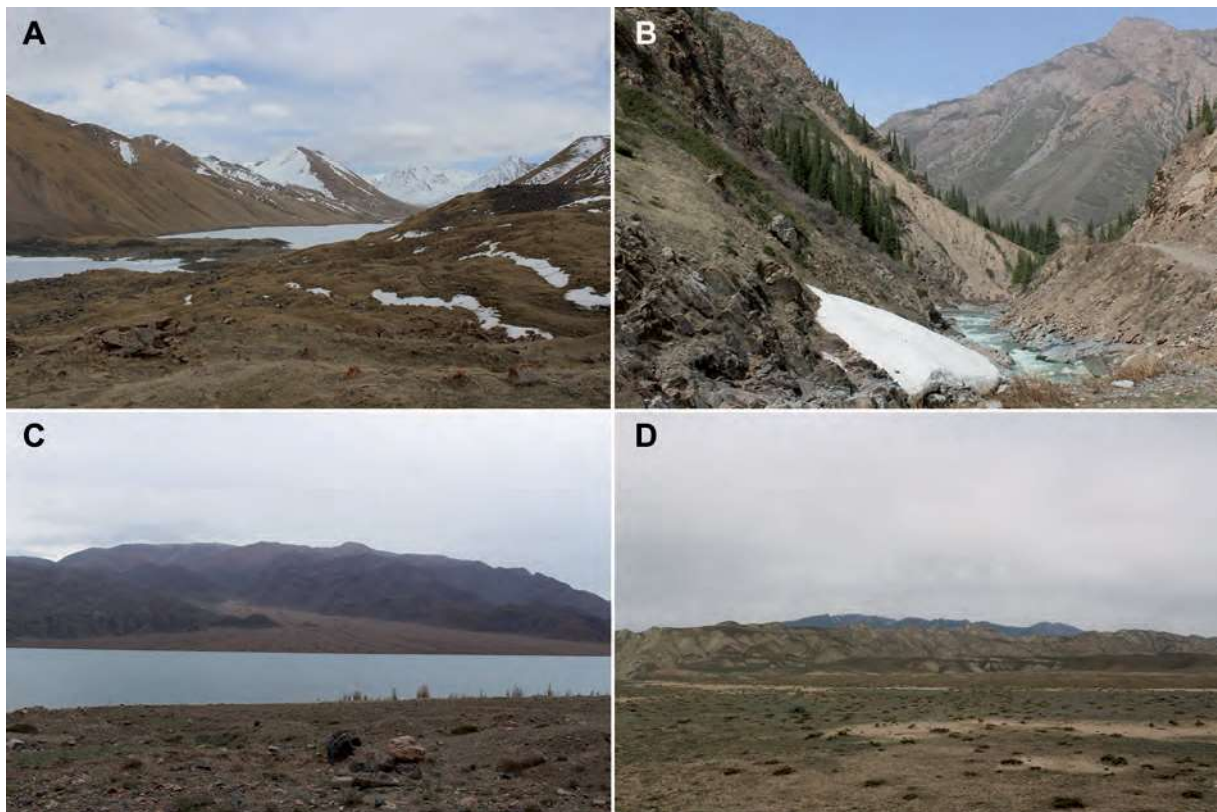


Fig. 3. Habitat of *Oreasiobia fedtschenkoi* (A - Kol Ukok: high mountain, B - Naryn: riverbank), *Labidura riparia* (C - Orto Tokoy: reservoir shores) and *Anechura bipunctata* (D - At-Bašy: semi-desert, bare-land). Photo R. Battiston.

by Steinmann (1989) is variable and can be both triangular or square (Fig. 6). At present, the genus *Oreasiobia* is composed by 6 different species (Hopkins *et al.*, 2021) and this variability should be considered in future taxonomical revisions and updates.

KEY TO THE DERMAPTERA OF KYRGYZSTAN

- 1 Antennae with more than 20 segments
.....*Labidura riparia*
- Antennae with less than 16 segments.....2
- 2 Presence of a white spot on each tegmina and each wing*Anechura bipunctata*
- Presence of a white spot only on each tegmina, wings not or barely visible when folded3

- 3 Proximal-inner side of the male cerci curved and smooth*Oreasiobia fedtschenkoi*
- Proximal-inner side of the male cerci straight and crenulated.....*Forficula tomis*

DISCUSSION

With an extreme continental climate and discontinuous presence of water, this Country is challenging for many species of insects. Despite the historical lack of knowledge, earwigs seem to survive well in this country with a number of species much greater than what previously reported but probably still reduced if compared to other warmer regions. As earwigs in Kyrgyzstan appear resistant to environmental extremes, their distribution may be wider than previously thought (Fig. 7) and historical records need to



Fig. 4. Female of *Anechura bipunctata* over dry soil in the bare-land of the At-Bašy valley. Photo A. Maurici.



Fig. 5. Male of *Oreasiobia fedtschenkoi* wandering over humid soil in the river banks of the Smaller Naryn River. Photo R. Battiston.



Fig. 6. Male terminalia of *Oreasiobia fedtschenkoi* from Naryn: genitalia (left), supra genital plate (center) and adult male habitus (right). Scale bars: 1 mm.



Fig. 7. Variability in the apex of the male genitalia of *Oreasiobia fedtschenkoi* in two Smaller Naryn River specimens from the same population (left and center), compared to Steinman, 1989 on the right. Scale bar: 1 mm.

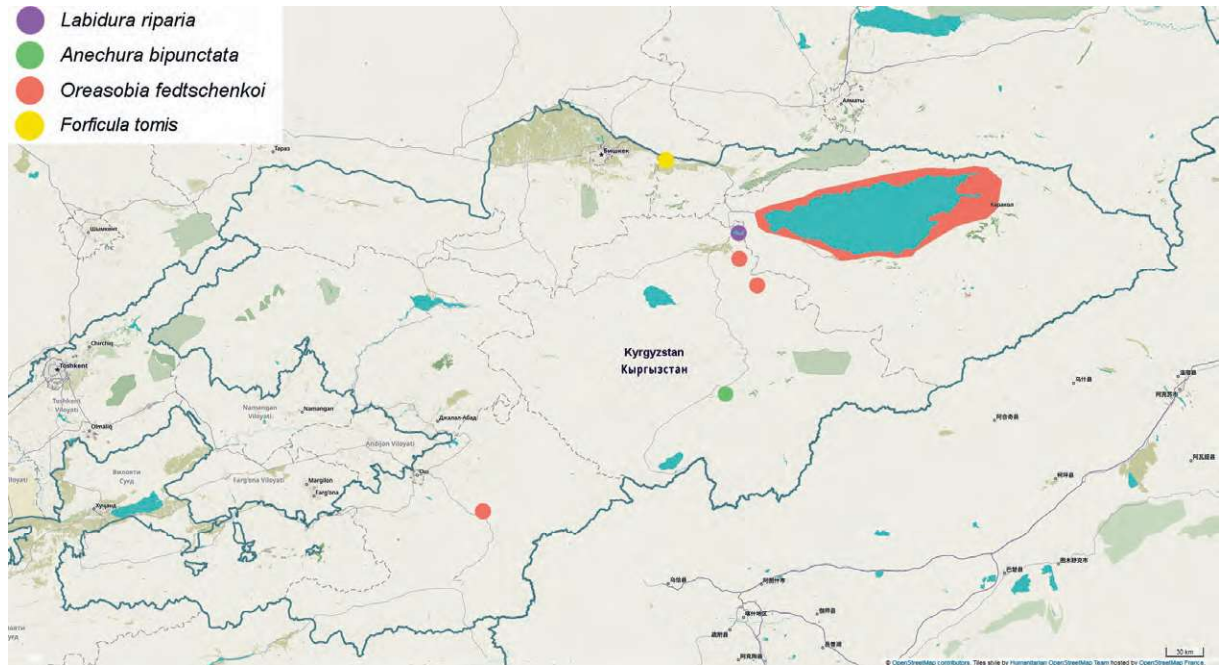


Fig. 8. Updated distribution of the earwig species in Kyrgyzstan with historical and new records. Base-map from the Humanitarian OpenStreetMap Team.

be confirmed, especially for *F. tomis* never encountered during these recent expeditions, but previously reported as abundant and wide spread (Bey-Bienko, 1936). Moreover, the apparent absence of *F. auricularia* Linnaeus, 1758 from Kyrgyzstan, a cosmopolit and adaptable species, usually common and already reported for Central Asia, need to be investigated. Further investigations are encouraged to better define the taxonomy, ecology and conservation of the dermapterofauna of Kyrgyzstan.

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