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NEW FOR RUSSIA BUSH CRICKETS (ORTHOPTERA: TETTIGONIIDAE) FROM CRIMEA AND CAUCASUS

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Summary. Three species of bush crickets, *Conocephalus conocephalus* (Linnaeus, 1767), *Incertana incerta* (Brunner von Wattenwyl, 1882), and *Parapholidoptera georgiae* Massa, Buzzetti et Fontana, 2009, are recorded from Russia for the first time.

Key words: Orthoptera, Tettigoniidae, fauna, new records, Crimea, Caucasus, Russia.

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Резюме. Впервые для России приводятся три вида кузнечиков: *Conocephalus conocephalus* (Linnaeus, 1767), *Incertana incerta* (Brunner von Wattenwyl, 1882) и *Parapholidoptera georgiae* Massa, Buzzetti et Fontana, 2009.

INTRODUCTION

The fauna of bush crickets (Orthoptera: Tettigoniidae) of the south part of European Russia and adjacent regions is well studied. The data on Orthoptera of the Transcaucasia (Tarbinsky, 1940; Avakjan, 1981) and Daghestan (Kalacheva *et al*., 2011) was published. Information on the species composition of bush crickets in Crimea was summarized by Pishkin & Visockaya (2011). Though, three new for the Russia species are found in these regions.

MATERIAL AND METHODS

The collections of the Department of Entomology of Lomonosov Moscow State University (MSU) as well as material collected by author were studied. The study of morphological characters was carried out using a Motic SMZ-143-N2GG stereoscopic microscope. The ultrasound detector (Magenta bat-detector Mk5 V2.044) was used, which allows to convert the ultrasonic signals of bush crickets, which are beyond human perception, into an audible sound. The sound signals were digitally recorded using a Roland R-05 recorder (frequency response 0.02–40 kHz, flat response 0.02–20 kHz) with a sampling rate of 96 kHz or using Brüel & Kjær microphone 4135 (frequency response flat up 70 kHz) and amplifier 2606 with a sampling rate of 200 kHz. Amplifier was connected via an analogue-to-digital converter E-14-440 (L-Card, Russia) to a PC. When describing the temporal pattern of song, we used the

terminology proposed in Baker & Chesmore (2020). Photographs were taken by a Canon EOS 6D Mark II digital camera with a Canon MP-E65 lens. Before photographing of the titillators they were dissected, kept overnight in a 10% KOH solution, washed in distilled water and placed in glycerol.

NEW RECORDS

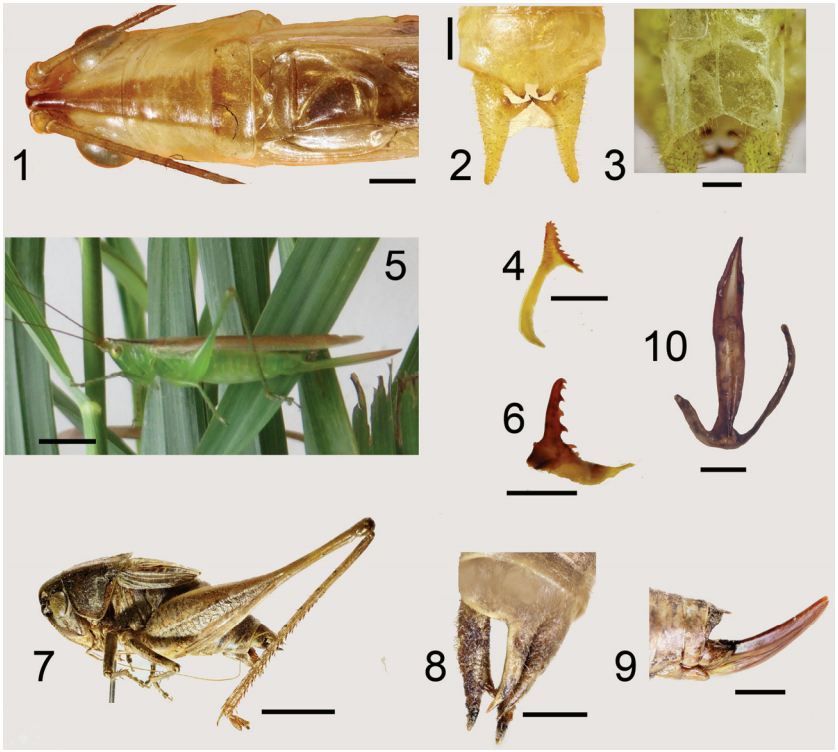
Family Tettigoniidae

Subfamily Conocephalinae

Tribe Conocephalini

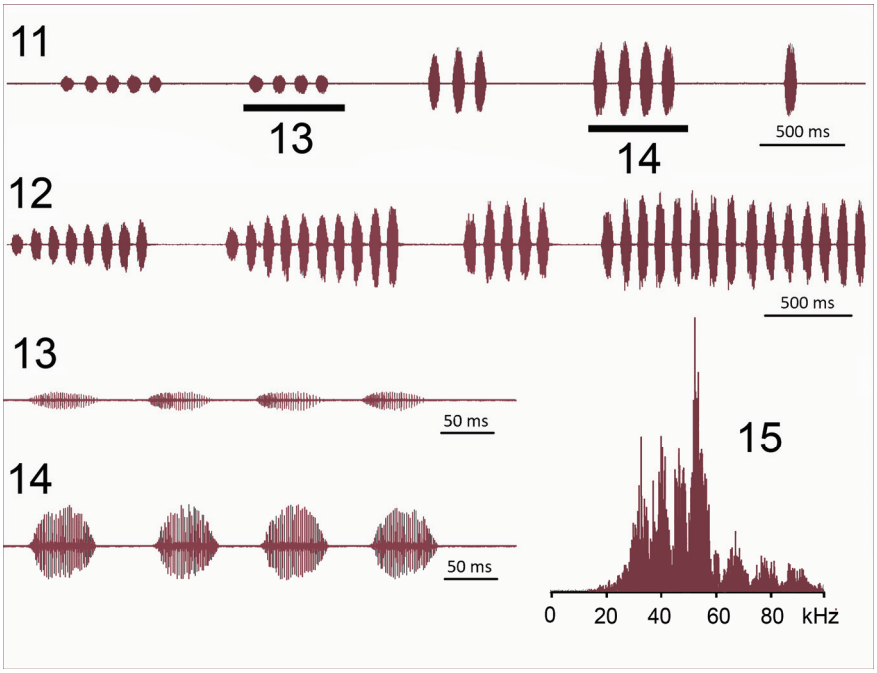
***Conocephalus* (*Conocephalus*) *conocephalus* (Linnaeus, 1767)**
Figs 1-5, 11–15

MATERIAL EXAMINED. Russia: Krasnodarsky krai, vicinity of Adler, vill. Sirius, 43.39° N, 39.98° E, 30 IX. 2023, 3 ♂, 3 ♀ (Korsunovskaya).



Figs 1–10. Tettigoniidae. 1–5 – *Conocephalus conocephalus*: 1 – anterior part of male body, dorsal view; 2 – male apex of abdomen, dorsal view; 3 – male subgenital plate, ventral view; 4 – right titillator, dorsal view; 5 – female, lateral view; 6–9 – *Incertana incerta*: 6 – right titillator, dorsal view; 7 – male, lateral view; 8 – male apex of abdomen, lateral view; 9 – female apex of abdomen and ovipositor, lateral view; 10 – *Parapholidoptera georgiae*, titillators of specimen from Grozny, dorsal view. Scale bars: 1, 8, 9, 10 = 1 mm; 2-4, 6 = 0.5 mm; 5, 7 = 5 mm.

DISTRIBUTION. Russia (new record). North Africa, Europe from Iberian Peninsula to southwestern Balkans, Greece, and Turkey (Harz, 1969; Massa, 2009; Hemp, 2013; Massa *et al.*, 2012; Bazelet & Nasckrecki, 2014).



Figs 11–15. Acoustic signals of *Conocephalus conocephalus* from Adler at 22 °C: 11, 13, 14 – oscillograms of diurnal song, 12 – nocturnal song, 15 – frequency spectrum of the song in linear scale. Lines below the oscillograms are fragments with a higher speed of the song shown in Figures 13 and 14.

REMARKS. The main morphological characters of studied specimens (Figs 1–5) well agree with those of European (Harz, 1969; Willemse *et al*., 2018) and African ones (Naskrecki & Guta, 2019; Hemp, 2021). In Krasnodarsy krai these bush crickets were caught in an area of about 500 m^2 overgrown with cereals. The population density was quite high: from one to three individuals could be found per 1 m^2. During the daytime, high acoustic activity of males was observed. The captured insects were just as active in the laboratory and cages, as in the wild environment. Males constantly produce songs, and at night their signals became long, similar to trills. These songs are not different from those previously recorded for European (Ragge & Reynolds, 1998) and African specimens (Heller, 2019). A distinctive feature of the songs is the periodic change in the syllable amplitude (Fig. 11), which is less frequent, however, at night (Fig. 12). The structure of soft (Fig. 13) and loud (Fig. 14) syllables is similar. At 22°C, the mean duration of soft closing hemisyllables in short series is 87 ms (SD=8 ms); mean duration of loud closing hemisyllables – 81 ms (SD=6 ms). Syllable repetition rate in daytime songs is 7–8 s^{-1}, in nocturnal signals up to 10 s^{-1}. The frequency spectra of diurnal and nocturnal songs are also similar. They occupy the 15–100 kHz band. Several maxima can be distinguished in the spectra. The dominant one is located

in the range of either 40–50 or 50–60 kHz (Fig. 15). Comparison of acoustic signals of *C. conocephalus* from populations separated by thousands of km indicates the extreme stability of their temporal pattern and frequency characteristics (see, e. g. Heller, 2019). This phenomenon can obviously be explained by similar living conditions (in dense grass, with a high population density). Thus, the signals with similar parameters were formed, ensuring both optimal sound propagation in the biotope and successful recognition of sounds by conspecific specimens.

Subfamily Tettigoniinae

Tribe Platycleidini

***Incertana incerta* (Brunner von Wattenwyl, 1882**
Figs 6–9

MATERIAL EXAMINED. Russia: Western Crimea, near the Sevastopol City, Cape Fiolent, 44.50º N, 33.49º E, IX. 2003, 1♂, 1♀, (Avdonin).

DISTRIBUTION. Russia (new record). Balkan Peninsula (Southeastern Macedonia, the eastern part of continental Greece and adjacent islands, Bulgaria, Romania), coastal regions of Turkey and Syria (Harz, 1969; Willemse, 1984; Ünal, 2009; Chobanov, 2009; Willemse *et al*., 2018).

REMARKS. In Crimea, *Incertana incerta* is a rare bush cricket; it should be classified as a specially protected species and included in the regional Red Book.

Tribe Pholidopterini

***Parapholidoptera georgiae* Massa, Buzzetti et Fontana, 2009**
Fig. 10

MATERIAL EXAMINED. Russia: the Chechen Republic, Tersky Ridge, near Grozny City, 43.54º N, 44.76º E, VII. 1986, 2 ♂ (Tishechkin); Stavropolsky krai, near Pyatigorsk City, Mt Mashuk, 44.05º N, 43.04º E, 12–16.VIII 1996, 2 ♂, 1 ♀ (Benediktov); Daghestan, near Gertma vil., 42.99º N, 46.74º E, 10 VIII 1991, 1 ♂ (Matveev).

DISTRIBUTION. Russia: North Caucasus (new record). Georgia.

REMARKS. *Parapholidoptera georgiae* was described from the Vashlovanis Nature Reserve in Georgia (Massa *et al.*, 2009). This species is similar to *P. noxia* (Ramme, 1930) but differs from the latter in the shape of the female subgenital plate and the male titillators. The specimens stored in the collection of MSU and previously determinate as *P. noxia* actually belong to *P. georgiae*. Currently, four species of the genus *Parapholidoptera*, namely *P. kalashiani* Massa, Buzzetti et Fontana, 2009, *P. georgiae* and *P. noxia*, are found in Georgia, Armenia, Azerbaijan and the Northern Caucasus (Çiplak, 2000; Cigliano *et al*., 2023) but the distribution of the latter species requires verification.

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REFERENCES

Avakjan, T.D. 1981. *Fauna Armenia. Insecta. Orthoptera, bush crickets (Tettigoniidae).* Institute of Zoology, AN Armenian SSR, Erevan. 118 pp. [In Russian]

Baker, E. & Chesmore, D. 2020. Standardisation of bioacoustic terminology for insects. *Biodiversity Data Journal*, 8, e54222. DOI: 10.3897/BDJ.8.e54222

Bazelet, C. & Naskrecki, P. 2014. *Conocephalus conocephalus*. *The IUCN Red List of Threatened Species* 2014: e.T20633459A56178679. DOI: 10.2305/IUCN.UK.2014-3.RLTS.T20633459A56178679.en

Chobanov, D.P. 2009. New records and new synonym of Orthoptera from Bulgaria. *Articulata*, 24(1/2): 79–108. https://www.researchgate.net/publication/263366935

Cigliano M.M., Braun H., Eades D.C., Otte D. 2023. *Orthoptera Species File. Taxonomic database of the world's grasshoppers, locusts, katydids, crickets, and related insects*. Available at: http://Orthoptera.SpeciesFile.org. (Accessed: 20 November 2023).

Çiplak, B**.** 2000. Systematic and phylogeny of *Parapholidoptera* (Orthoptera: Tettigoniidae: Tettigoniinae). *Systematic Entomology*, 25: 411–436. DOI:10.1111/j.1365-3113.2000.00112.x

Harz, K. 1969. *Die Orthopteren Europas. I.* W. Junk B.V. Publishers, The Hague. 749 pp. DOI: 10.1007/978-94-017-2511-8

Heller, K.-G. 2019. Provisional checklist of the Tettigonioidea (Insecta: Orthoptera) from São Tomé & Príncipe with taxonomic remarks, bioacoustical data and the description of new taxa. *Zootaxa*, 4563(1): 41–66. DOI:10.11646/zootaxa.4563.1.2

Hemp, C. 2013. Annotated list of Ensifera (Orthoptera) and further records on Caelifera (Orthoptera) of Mt Kilimanjaro, Tanzania. *Zootaxa*, 3613(4): 301–342. DOI: 10.11646/zootaxa.3613.4.1

Kalacheva, O.A., Abdurakhmanov, G.M. & Pritsepova, S.A. 2011. Fauna and ecological distribution of bush crickets of Daghestan. *The South of Russia: ecology, development*, 4: 122–125. [In Russian]

Massa, B. 2009. Annotated check-list of Orthoptera of Libya. *Journal of Orthoptera Research*, 18(1): 75–93. DOI: 10.1665/034.018.0109

Massa, B., Buzzetti, F.M. & Fontana, P. 2009. New and little known species of the genus *Parapholidoptera* Maran (Insecta, Orthoptera). *Deutsche entomologische Zeitschrift*, 56(2): 243–249. DOI: 10.1002/mmnd.200900021

Massa, B., Fontana, P., Buzzetti, F.M., Kleukers, R. & Ode, B. 2012. *Fauna d'Italia. Orthoptera,* 48. 563 pp.

Pishkin, V. & Visockaya, N. 2011. Ecolo-geograpic review of Orthoptera (Insecta) of Crimea. *Scientific Notes of Taurida V.I. Vernadsky National University*. *Series: Biology, chemistry*, 24(63): 231–239.

Ragge, D.R. & Reynolds, W.J. 1998 *The songs of the grasshoppers and crickets of western Europe*. Harley Books, Colchester, Essex, 591 pp.

Tarbinsky, S.P. 1940. The saltatorian orthopterous insects of the Azerbaidzhan SSR. USSR Academy of Sciences, Moscow–Leningrad. 245 pp. [In Russian]

Ünal, M. 2012. Tettigoniidae (Orthoptera) from Turkey and the Middle East II. *Transactions of the American Entomological Society*, 132(1): 157-203. DOI: 10.3157/0002-8320(2006)132[157:TOFTAT]2.0.CO;2

Willemse, F. 1984. *Catalogue of the Orthoptera of Greece. Fauna Graeciae 1.* Helenic Zoological Society, Athens. 275 pp.

Willemse, L.P.M., Kleukers, R.M.J.C. & Odé, B. 2018. *The grasshoppers of Greece*. EIS Kenniscentrum Insecten & Naturalis Biodiversity Center, Leiden. 439 pp.