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CONTRIBUTION TO THE KNOWLEDGE OF THE SINGING CICADAS (AUCHENORRHYNCHA: CICADOIDEA) OF ROMANIA

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Abstract - The fauna of singing cicadas (Cicadoidea) of Romania has been investigated on a single field excursion in 2004 with classic and bioacoustic methods, using recording equipment for sonic range and ultrasonic detectors. Nine species were recorded for Romania in the past: *Lyristes plebejus* (Scopoli 1763), *Cicada orni* Linnaeus 1758, *Cicadatra atra* (Olivier 1790), *Cicadetta tibialis* (Panzer 1798), *Cicadetta montana* s. lat. (Scopoli 1772), *Cicadetta podolica* (Eichwald 1830), *Pagiphora annulata* (Brulle 1832), *Tettigetta brullei* (Fieber 1876), and *Tibicina haematodes* (Scopoli 1763). We discovered 3 additional species: *Cicadatra hyalina* (Fabricius 1798), *Cicadetta brevipennis* Fieber 1876, and *Cicadetta iphigenia* Emeljanov 1996. These are the first records for Romania, for *Cicadetta iphigenia* this is also the first record outside the Crimean Peninsula.

KEY WORDS: Romania, singing cicadas, Cicadoidea, fauna, bioacoustics

Izveček - PRISPEVEK K POZNAVANJU POJOČIH ŠKRŽADOV (AUCHENORRHYNCHA: CICADOIDEA) ROMUNIJE

Na enotedenski terenski ekskurziji v letu 2004 smo raziskovali favno pojočih škržadov Romunije s klasičnimi in bioakustičnimi metodami. Uporabljali smo naprave za snemanje v nam slišnem območju in ultrazvočne detektorje. V literaturi smo za Romunijo našli podatke za 9 vrst: *Lyristes plebejus* (Scopoli 1763), *Cicada orni* Linnaeus 1758, *Cicadatra atra* (Olivier 1790), *Cicadetta tibialis* (Panzer 1798), *Cicadetta montana* s. lat. (Scopoli 1772), *Cicadetta podolica* (Eichwald 1830),

Pagiphora annulata (Brulle 1832), *Tettigetia brullei* (Fieber 1876) in *Tibicina haematodes* (Scopoli 1763), ki smo jih dopolnili s tremi novo odkritimi vrstami: *Cicadatra hyalina* (Fabricius 1798), *Cicadetta brevipennis* Fieber 1876 and *Cicadetta iphigenia* Emeljanov 1996. To so prvi podatki za favno Romunije, *Cicadetta iphigenia* pa je prvič najdena izven polotoka Krim.

KLJUČNE BESEDE: Romunija, škržadi, Cicadoidea, favna, bioakustika

Introduction

The singing cicadas (Auchenorrhyncha, Cicadoidea) of Romania are poorly known. There are published records for 9 species (Alexinschi 1955; Băcescu 1937; Cantoreanu 1960, 1968a, 1968b, 1969, 1971, 1972, 1974, 1975d; Drugescu 1983; Frivaldszky 1865 quoted by Horváth 1889; Horváth 1897; Lörincz 1906; Marcu 1929; Montandon 1897, 1900; Soós 1956; Szilády 1870).

The present paper provides new faunistic data which significantly extend the earlier knowledge about the fauna of singing cicadas in this part of Europe.

Material and Methods

In the year 2004 we investigated the singing cicadas (Auchenorrhyncha: Cicadoidea) of Romania with the use of classical and bioacoustic methods. From June 22nd to 29th, 2004 we visited the Tulcea and Constanța counties. For sound recordings we used microphones sensitive in sonic range (Telinga Pro 5 stereo and Telinga Pro Science - parabola diameter 57 cm) and in ultrasonic range (ultrasonic detector Pettersson D-200) in combination with DAT-recorder Sony TCD-D10 and Solid State recorder Marantz PMD670. Computer programs for the analysis of acoustic data were Canary 1.2.4 and Digidesign ProTools 5.0. With the use of these methods we were able to get much more representative data about the presence and distribution of Cicadoidea.

The specimens collected are preserved in the collections of Slovenian Museum of Natural History (PMSL) in Ljubljana, Slovenia; all sound recordings are stored in the Sound archive of this museum. Selected sound samples are available also on the web pages »Songs of the European singing cicadas«: <<http://www2.pms-lj.si/european-cicadas/>>

Results

Faunistic data collected in Romania from June 22nd to 29th, 2004 are presented below. All recordings, observations and collections have been made by the three authors.

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CICADIDAE

Cicadatra hyalina (Fabricius 1798)

Constanța County: Albești, Rezervatie Padurea Hagieni; 26. 6. 2004, recorded and collected

TIBICINIDAE

Cicadetta tibialis (Panzer 1798)

Tulcea County: Horia, General Praporgescu; 25. 6. 2004; recorded and collected

Constanța County: Albești, 2 km E; 26. 6. 2004; recorded and collected

Constanța County: Albești, Rezervatie Padurea Hagieni; 26. 6. 2004; recorded and collected

Cicadetta brevipennis Fieber 1876 (Fig. 1)

Constanța County: Negru Vodă, Rezervatie Padurea Negru Vodă; 26. 6. 2004; recorded and collected

Constanța County: Albești, Rezervatie Padurea Hagieni; 26. 6. 2004; recorded and collected

Cicadetta iphigenia Emeljanov 1996 (Fig. 2)

Constanța County: Basarabi, Rezervatia Naturala Fântânița Murfatlar; 27. 6. 2004; recorded

Tettigetia brullei (Fieber 1876)

Tulcea County: Măcin Mt., Isaccea, Revarsarea; 24. 6. 2004; recorded

Tulcea County: Horia, General Praporgescu; 25. 6. 2004; recorded and collected

Tibicina haematodes (Scopoli 1763)

Tulcea County: Măcin Mt., Isaccea, Revarsarea; 24. 6. 2004; singing observed

Tulcea County: Horia, General Praporgescu; 25. 6. 2004; recorded

Constanța County: Albești, Rezervatie Padurea Hagieni; 26. 6. 2004; recorded

Discussion

We recorded and/or collected 6 species: *C. hyalina*, *C. tibialis*, *C. brevipennis* (Fig. 1), *C. iphigenia* (Fig. 2), *T. brullei* and *T. haematodes*. There are published records for three of them: *C. tibialis* (Szilády 1870; Montandon 1897, 1900; Cantoreanu 1960, 1968a, 1968b, 1969, 1972, 1974, 1975d), *T. brullei* (Horváth 1897) and *T. haematodes* (Montandon 1887, 1900; Horváth 1897; Lörincz 1906; Marcu 1929; Cantoreanu 1960, 1968a, 1968b, 1969, 1972, 1975; Drugescu 1983). For *C. hyalina*, *C. brevipennis* and *C. iphigenia* these are first records for the fauna of Romania, for *Cicadetta iphigenia* this is also the first record outside terra typica on Krimean (=Crimean) Peninsula (Emeljanov 1996; Popov 1997).

In the literature we can find records for additional 5 species: *Lyristes plebejus* (Scopoli 1763) (Băcescu 1937; Alexinschi 1955; Cantoreanu 1960), *Cicada orni*

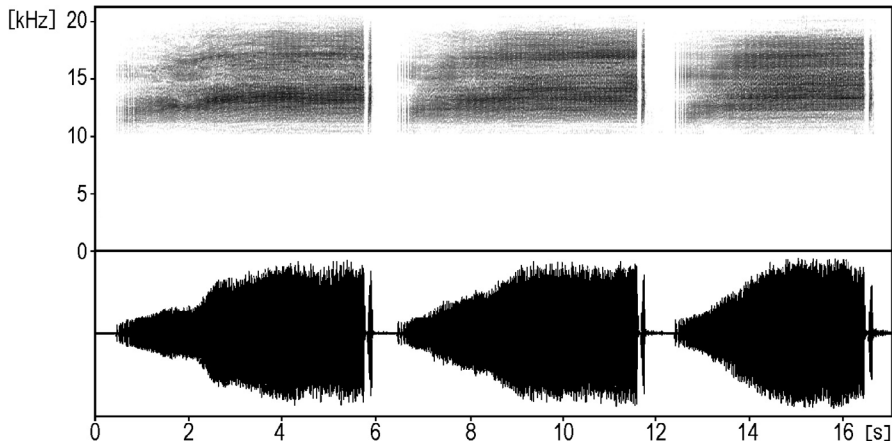


Fig. 1: Spectrogram and oscillogram of a calling song of *Cicadetta brevipennis* Fieber 1876 from the forest reserves Negru Vodă, Romania. Since the microphone was not calibrated, there is no scale on oscillogram Y-axis (valid also for Fig. 2).

Linnaeus 1758 (Horváth 1897; Lörincz 1906; Marcu 1929; Cantoreanu 1960; Drugescu 1983), *Cicadatra atra* (Olivier 1790) (Horváth 1897; Soós 1956), *Cicadetta podolica* (Eichwald 1830) (Horváth 1897; Soós 1956) and *Pagiphora annulata* (Brulle 1832) (Frivaldszky 1865 quoted by Horváth 1889). Altogether 11 species of singing cicadas are registered until now for Romania.

Among the three big European loud singers (*L. plebejus*, *C. orni* and *T. haematodes*) we registered only *T. haematodes*, most probably due to early season. The same may be the case for *C. atra*. To find *P. annulata* and *C. podolica* we either did not visit the suitable habitats or were simply too early.

Citations in the literature of *Cicadetta montana* s. lat. (Scopoli 1772) (Szilády 1870; Horváth 1897; Cantoreanu 1971) cannot be assigned to the species level since a definite proof of identity is possible only with bioacoustic or/and molecular methods (Gogala & Trilar 2004). *Cicadetta brevipennis* is the only species of the *C. montana* complex that has been found during our field work (Fig. 1). The species was first acoustically detected, later recorded and also collected in the forest reserves Negru Vodă and Padurea Hagieni. This is the first record for the fauna of Romania and the most eastern locality of the known distribution.

Tettigetia brullei is characterized by the highest-pitched song among Palaearctic singing cicadas, hardly audible for the unaided human ear, even at short distance of 1 to 2 m (Popov et al. 1997). Therefore, and due to protective coloration and different forms of escape behaviour, this species was overlooked in the Romanian fauna by previous researchers and was only ones cited for Romania by Horváth (1897) as *Cicadetta transsylvanica* Fieber 1876. *C. transsylvanica* was synonymized with

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Tettigetta pygmaea (Olivier 1790) by Boulard (1973). Boulard later (1995) published the song pattern of *T. pygmaea*, which corresponds nicely with one of the two song phrases described from Slovenia as *T. brullei* by Popov et al. (1997), following the nomenclature of Schedl (1986). We are not sure if the *T. pygmaea* (sensu Boulard) despite similarity in song is identical with *T. brullei* from Slovenia, but we can say with certainty that the song characteristics of Romanian *T. brullei* (sensu Schedl) do not differ from the Slovenian ones.

In General Praporgescu, *T. brullei* was very abundant and co-occurring with *C. tibialis*. It is interesting that the specimens of *C. tibialis* collected in this locality are of normal size, while *T. brullei* was bigger than *C. tibialis*. Material in our collection from various localities showed that *C. tibialis* is usually bigger than *T. brullei*.

Cicadetta iphigenia was described from the Krimean (=Crimean) Peninsula by Emeljanov (1996), while the song is described by Popov (1997) on the basis of the recordings from the same area. Popov (1997) also assumed that the species could be a Krimean endemic.

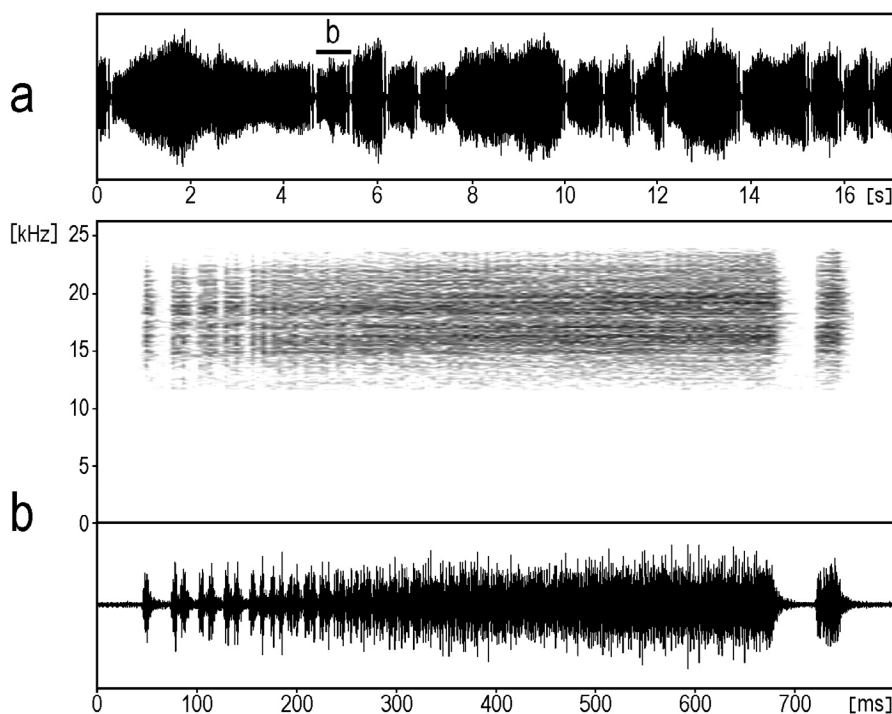


Fig. 2: Song of *Cicadetta iphigenia* Emeljanov 1996 from the nature reserve Fântânița Murfatlar, Romania: a) Oscillogram of a typical song; b – part enlarged below. b) Spectrogram and oscillogram of one phrase (according to Popov 1997).

We recorded two singing males (Fig. 2) in a steppe area in natural reserve Fântânița Murfatlar, Constanța County. Due to unsuitable weather the males stopped singing and we were not able to collect them. Our recordings were long enough for the unambiguous determination of the species. This is the first record for the fauna of Romania and outside terra typica on the Crimean Peninsula (Emelyanov 1996; Popov 1997).

The recorded two males were singing in grass in the last remnants of the steppe habitat of the nature reserve Fântânița Murfatlar, which is filling up with garbage of the neighbouring rubbish dump. It is a matter of a few years, when the habitat will disappear under the garbage.

To complete the fauna of singing cicadas of Romania we need to study additional literature and the material from various museum collections. Also additional field work is needed in order to prove the presence of some species cited in the literature and to clear up the situation in the *C. montana* complex.

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