Ceraeocercus Uvarov, a genus recorded in China for the first time
(Orthoptera, Tettigoniidae; Tettigoniinae; Drymadusini)

FEI LIU1, DRAGAN PETROV CHOBAOV3, LIUSHENG CHEN1,4 & CHUNXIANG LIU2,4
1College of Agriculture / Key Laboratory of Oasis Agricultural Pest Management and Plant Protection Resources Utilization, Xinjiang Uygur Autonomous Region, Shihezi University, Shihezi, Xinjiang 832003, China
2Key Laboratory of the Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, Beichen West Road, Chaoyang District, Beijing 100101, China
3Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 1 Tsar Osvoboditel blvd. 1000 Sofia, Bulgaria.
4Corresponding author. E-mail: liucx@ioz.ac.cn

Abstract

Ceraeocercus Uvarov, 1910 of Tettigoniinae; Drymadusini is receded in China for the first time. Ceraeocercus fuscipennis fuscipennis Uvarov, 1910 is documented. Morphology and male calling songs are described and illustrations are provided.

Key words: Tettigoniinae, new record, morphology, song

Introduction

Ceraeocercus was proposed by Uvarov (1910) with the type species, C. fuscipennis Uvarov, 1910. This species was recorded in Middle Asia (Kazakhstan). Sussequently, it was divided into subspecies or races. C. fuscipennis hindukushanus Ramme, was described from West Asia (Afghanistan) (Ramme 1939). Until now, Ceraeocercus only includes a single species with two subspecies, insects which were recorded in the belt of steppefied deserts with wormwood-grassy vegetation and dogrose (Rosa L.) (Agakhanyants 1961; Pokivailov 2017) in Middle and West Asia (Pravdin 1987; Uvarov 1910).

Belongs to the Drymadusa genus group (i.e., current tribe Drymadusini) (Ramme 1939; Karabağ 1961). It is characterized by reduced wings, tegminal markings, branched male cerci, and short and rounded lobes of male tenth abdominal tergite. The former three characters are shared at least with Anadrymadusa except for the typical shape of cerci; in Anadrymadusa and Drymadusa the base of cerci has movably attached lobes, while in Ceraeocercus those are not movable (as with Afrodrymadusa but it has unbranched cerci). Previously, five genera of Drymadusini have been recorded in China, namely, Anatlasticus Bey-Bienko, 1951 (Liu, 2015), Atlanticus Seudder, 1894 (Liu 2013; Cheng et al. 2016), Bienkoxenus Cjechan, 1968 (Bei-Bienko 1951), Mongolodectes Bey-Bienko, 1951 (Liu et al. 2015), and Uvarovina Ramme, 1939 (Heller & Liu 2016). Here we provide new record of Ceraeocercus from Xingjiang, China, with its first song description. Thus, the number of genera of Drymadusini in China rises to six.

Materials and methods

Measurements were made using digital caliper, and the photos were taken with a large depth-of-field 3D Digital Microscope (Keyence VHX-1000C). Male calling songs were recorded in field captivity of Kazakhstan with Pettersson D500 external microphone connected to Tascam DR-680MKII (192 kHz, 24 bit) recorder. Songs were analyzed with the programs Avisoft SASLab Lite and oscillograms were made with Adobe Illustrator CS4. Terminology follows Heller (1988), Ragge and Reynolds (1998) and Kaya et al. (2014). The following terms were used to define the sound files: (i) echeme, an outlined song unit repeatedly produced throughout the song, (ii) echeme period, the
time interval starting from beginning of one repeated unit ending at the beginning of the next scheme including the silent interval in between, (iii) syllable, a simple, undivided transient train of sound waves, (iv) ms, millisecond. The specimens are deposited in Insect Collection of Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS).

**Ceraeocercus Uvarov, 1910 New record to China**


Type species: *Ceraeocercus fuscipennis* Uvarov, 1910

**Diagnosis.** *Ceraeocercus* can be easily distinguished the combination of the following characters: black or brown wings with lighter fenestration, male tenth abdominal tergum with two strongly down-curved broad lobes, bifurcate male cercus, female without bi-concave plate at the base of subgenital plate (from Karabağ 1961).

**Redescription.** Fastigium of vertex triangular, gradually narrowed towards front, narrower than first antennal segment, dorsally slightly sulcate. Compound eyes nearly hemispherical. Metazona flat, with broadly rounded posterior margin and distinct lateral carina (Fig. 1d), and without median line (Fig. 1c). Prosternum with a pair of spines. Humeral notch distinct.

**Male.** Tenth abdominal tergum split into two very broad lobes, with obvious “V”-shaped incision between. Cercus cylindrical, strongly incurved at middle, bifurcate at apical part ending into sharp spine; comparatively small branch is located on its upper side.

**Female.** Ovipositor slightly shorter than hind femur, regularly down-curved.

**FIGURE 1a–d.** *Ceraeocercus fuscipennis fuscipennis*. a: Habitus of the male in dorsal view; b: habitus of the male in lateral view. c: head and pronotum in dorsal view; d: head and lateral lobe of pronotum in lateral view.

**Coloration.** Generally dark brown with pale yellowish spots. Face uniformly whitish, without continued black fascia between compound eyes; areas near compound eyes and antennal sockets black, or blackish-brown in a few
individuals; front surface of fastigium of vertex and fastigium of frons same colour as face. Tegmen with irregular blackish and creamy-buff spots.

**Included taxa.** *Ceraeocercus fuscipennis fuscipennis* Uvarov, 1910 (Kazakhstan, Tajikistan, Turkmenistan); *C. fuscipennis hindukushanus* Ramme, 1939 (Afghanistan-Banu plain, Tajikistan, Hindu Kush).

**Distribution.** Kazakhstan; Tajikistan; Turkmenistan; Hindu Kush; Afghanistan.

*Ceraeocercus fuscipennis fuscipennis* Uvarov, 1910 New record for China
(Fig. 1–4)


**Type locality:** Inder Lake in Uralsk Region (now Atyrau Province in Kazakhstan).


![FIGURE 2a–b. Stridulatory apparatus of *Ceraeocercus fuscipennis fuscipennis*. a: mirror on right tegmen; b: Stridulatory file on underside of male left tegmen.](image-url)
**Diagnosis.** This subspecies differs from *C. fuscipennis hindukushanus* by length of tegmina and coloration of hind wings. Pronotum narrowing in prozona (Fig. 1c); tegmina not exceeding knee of hind femora, with rounded margins (Fig. 1b); hind wings dark blackish brown, reduced. In the latter species, tegmina extend beyond hind knee, and hind wings are brown with lighter fenestration.

**Redescription.** Pronotal disc narrowing from base to middle part, with straight anterior margin and an indistinct broadly obtuse concavity in middle (Fig. 1c); first transverse sulcus distinct; median sulcus distinctly V-shaped, interrupted by a median line.

Male. Stridulatory file composed of about 49–50 widely-arranged teeth, which gradually become smaller from proximal one third part towards both ends (Fig. 2b). Male right stridulatory area with irregularly pentagonal mirror (Fig. 2a). Fore coxae armed with a fine spine. Fore femora armed with 4 small ventro-anterior spines; fore tibiae with 6 ventro-anterior, 6 ventro-posterior and 3 dorso-posterior spines. Mid femora with 3–4 small ventro-anterior spines; mid tibiae with 6 ventro-posterior, 6 ventro-anterior and 4 dorso-anterior spines. Hind femora armed with 7–8 small ventro-posterior and 9–10 ventro-anterior spines, hind tibiae with numerous spines on each margin plus 2 spurs on each dorsal margin. Epiproct covered by tenth abdominal tergum (Fig. 3a). Cercus up and in-curved and not exceeding subgenital plate (Fig. 3c). Subgenital plate with a long and narrow central “V”-shape cleft in apical half, with conical and obtuse stylus (Fig. 3d).

![FIGURE 3a–d. The male of Ceraeocercus fuscipennis fuscipennis. a: last abdominal tergum in dorsal view; b: right cercus in lateral view; c: abdominal apex in ventral view; d: subgenital plate in ventral view.](image-url)
**FIGURE 4a–d.** The female of *Ceraeocercus fuscipennis fuscipennis*. a: abdominal apex including ovipositor in lateral view. b: last abdominal tergum in dorsal view; c: subgenital plate in ventral view; d: abdominal apex in lateral view.

Female (Fig. 4a–d): Last tergum split into two broadly triangular pointed lobes, with a sharply angular notch between. Epiproct tongue-shaped, visible. Cercus long, conical, regularly incurved, not branched. Ovipositor slender, with slightly enlarged base. Subgenital plate trapezoidal with distinct mid carina and widely triangular notch at apex.

**Coloration.** Pronotum pale brown; lateral lobes with dark brown dorsal margin, and creamy-brown ventral margin. Tegmina creamy-brown with scattered creamy-white and brown spots. Hind wings brown with lighter fenestration. Fore and middle femora uniformly light brown, hind femur light brown with brown marbled upper edge and a series of brown spots along middle of outer surface. Each tarsus with dark brown ventral surface.

**Measurement (mm).** Length of body: male 33.5–41.9, female 36.6–44.8; length of pronotum: male 8.7–9.7, female 9.4–10.4; length of tegmen: male 27.7–29.9, female 29.5–32.9; width of tegmen: male 6.4–7.6, female 7.0–8.5; length of fore femur: male9.2–10.2, female 9.8–10.7; length of middle femur: male 10.4–11.3, female 11.3–12.1; length of hind femur: male 26.3–30.6, female 29.4–31.5; length of ovipositor: 24.9–28.4.

**Song.** The calling song consisted of stereotyped echemes with a regular period (Fig. 5a–d). The frequency of main peak is about 10.32 kHz (Fig. 5d). Each echeme was comprised of 4 syllable groups (Fig. 5c). The important parameters are listed (Tab. 1).

**Distribution.** China, Xinjiang; Kazakhstan; Tajikistan; Turkmenistan.
TABLE 1. Song parameters of *Ceraeocercus fuscipennis fuscipennis* from Kazakhstan.

<table>
<thead>
<tr>
<th>Localities</th>
<th>Coordinates</th>
<th>Habitat</th>
<th>Altitude (m)</th>
<th>Echémé period (ms)</th>
<th>Frequency of main peak (kHz)</th>
<th>Temperature (°C)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mangystau District</td>
<td>N 44.20957, E 53.08589</td>
<td>stony-clay semidesert</td>
<td>160–190</td>
<td>61.74±1.66</td>
<td>10.24</td>
<td>21–22</td>
<td>2016-VI-14</td>
</tr>
<tr>
<td></td>
<td>N 44.13913, E 53.26991</td>
<td>stony canyon with semi-desert vegetation</td>
<td>215</td>
<td>76.67±0.56</td>
<td>10.32</td>
<td>19</td>
<td>2016-VII-03</td>
</tr>
</tbody>
</table>

FIGURE 5a–d. Ozillograms of calling songs of *Ceraeocercus fuscipennis fuscipennis*. a: scheme series during 2S; b: syllable series during 300 milliseconds; c: scheme series (showing syllables per scheme) during 80S; d: power spectrum of the calling song.

Acknowledgements

The study is funded by the National Natural Science Foundation of China (No. 31572308, 31750002) and also supported by a grant (No. Y229YX5105) from the Key Laboratory of the Zoological Systematics and Evolution of the Chinese Academy of Sciences.

References


Zootaxa 4608 (3) © 2019 Magnolia Press · 591

https://doi.org/10.11646/zootaxa.3895.3.3

https://doi.org/10.11646/zootaxa.3647.1.1

https://doi.org/10.11646/zootaxa.3925.2.10

https://doi.org/10.11646/zootaxa.4052.2.11

https://doi.org/10.1134/S0013873817040108


