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First records of *Chamaesphecia efetovi* O. Gorbunov, 2019, in Krasnodar Territory (Northern Caucasus, Russia) (Lepidoptera: Sesiidae)

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Abstract

Chamaesphecia efetovi O. Gorbunov, 2019, is recorded from Krasnodar Territory (Russia) for the first time. The larvae of this species are oligophagous on *Marrubium* spp. (Lamiaceae), from which *M. peregrinum* L. is widely distributed in the studying area. We investigated 14 biotopes during 2021-2023 with the help of sex attractants and found populations of *Ch. efetovi* in four of them. We have clarified the periods of seasonal and daily activity of this species in the region.
Keywords: Lepidoptera, Sesiidae, *Chamaesphecia, Ch. efetovi*, Krasnodar Territory, North-Western Caucasus, Russia.

Primeros registros de *Chamaesphecia efetovi* O. Gorbunov, 2019, en el Territorio de Krasnodar (Cáucaso Septentrional, Rusia) (Lepidoptera: Sesiidae)

Resumen

Chamaesphecia efetovi O. Gorbunov, 2019, se registra por primera vez en el territorio de Krasnodar (Rusia). Las larvas de esta especie son oligofágicas sobre *Marrubium* spp. (Lamiaceae), de las que *M. peregrinum* L. está ampliamente distribuida en la zona de estudio. Investigamos 14 biotopos durante 2021-2023 con ayuda de atrayentes sexuales atrayentes y hallamos poblaciones de *Ch. efetovi* en cuatro de ellos. Hemos aclarado los periodos de estacional y diaria actividad de esta especie en la región.
Palabras clave: Lepidoptera, Sesiidae, *Chamaesphecia*, *Ch. efetovi*, Territorio de Krasnodar, Cáucaso noroccidental, Rusia.

Introduction

By this publication, we continue our series of articles devoted to the study of the family Sesiidae in the Crimean Peninsula and adjacent territories (Efetov et al. 2012a, 2012b; Efetov & Gorbunov, 2021; Gorbunov, 2019a, 2019b; Gorbunov & Efetov, 1990, 2016, 2018).

Chamaesphecia efetovi O. Gorbunov (Figures 1-2) was described in 2019 from the Crimea, Volgograd Region and Stavropol Territory (Russia). Recently it was recorded from Saratov Region (Anikin & Glinskaya, 2023). This species is also known from Romania, Bulgaria, and Serbia (Efetov & Gorbunov, 2021). As it was assumed that this species can also be distributed in adjacent territories, we decided to investigate Krasnodar Territory (north-western part of the Northern Caucasus, Russia),

where the larval hostplant *Marrubium peregrinum* L. (Lamiaceae) is widely distributed. For this purpose, 14 biotopes (Figure 3) with *M. peregrinum* were studied during 2021-2023.

Abbreviations

The material studied is kept in the following collections abbreviated in the text as:

CKAE Collection of Konstantin A. Efetov, V. I. Vernadsky Crimean Federal University, Simferopol, Crimea
CVIS Collection of Valeriy I. Shchurov, Krasnodar, Russia
COGM Collection of the A. N. Severtsov, Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow, Russia

Methods

The specimens of *Ch. efetovi* were attracted to artificial female sex pheromone for sesiid moth *Synanthedon vespiformis* (Linnaeus, 1761), produced by PHEROBANK®, Wijk bij Duurstede, the Netherlands. Besides many pluses, the application of the female sex attractants has a negative aspect: this method allows to collect mainly males (Can et al. 2019; Can Cengiz et al. 2018; Efetov et al. 2011, 2014a, 2014b, 2015, 2016, 2018, 2019; 2022, 2023; Efetov & Gorbunov, 2021; Gorbunov & Efetov, 2018; Razov et al. 2017; Subchev et al. 2016; Vrenozi et al. 2019). The females (Figure 1) are coming to the attractant extremely rare and were mainly collected by net when flying around the larval hostplant.

The parameters of temperature and humidity in the studied localities were determined using automatic calibrated Testo data loggers (Testo 174H). All our searches were accompanied by the determination and recording of the geographical coordinates of the surveyed areas using Garmin devices. Photos were taken by the first author with a SONY RX100 V camera and by the second author with Nikon COOLPIX AW100 and FUJIFILM FinePix SL260 cameras. The pattern of points in Figure 3 is visualized using Garmin BaseCamp Version 4.7.5 and OziExplorer Version 3.95.6f. The numbers of the points in the Figure 3 (map of the region) are placed in the text in square brackets [1-14].

Results

We studied 14 biotopes with *Marrubium peregrinum* L. in Krasnodar Territory (Russia) during 2021-2023 (Figure 3). As *Ch. efetovi* is an univoltine species with flight period in June-July, our investigations were undertaken mainly in these two summer months.

1. Krasnodar Territory, Temryuk District, Taman' Peninsula, western shore of the Tsokur estuary, Lysaya Mountain, Yakhno garden, steppe with bushes, altitude 9 m above sea level, 45º09.480'N, 36º58.198'E, [1] (Figure 4): 23-VI-2022; time of the day 7:30 - 9:35; the air temperature is +23.5…24.9ºC; no specimens attracted, V. I. Shchurov; 09-VII-2022, time of the day 15:50 - 18:15; the air temperature is +32.2…29.0ºC; 8 ♂, 1 ♀ (Figure 1) of *Ch. efetovi* collected (CKAE, CVIS, COGM), V. I. Shchurov, K. A. Efetov & D. A. Govorukha leg. We also observed one specimen ♂ of *Ch. efetovi* caught by the nymph *Hierodula transcaucasica* (Brunner von Wattenwyl, 1878) (Mantidae) on a larval hostplant (Figure 2).

2. Krasnodar Territory, Temryuk District, Taman' Peninsula, southern shore of the Tsokur estuary, dry meadow, altitude 42 m above sea level, 4509.386'N, 3657.277'E, [2], 9-VII-2022, time of the day 12:00 - 12:30; 1 ♂ of *Ch. efetovi* collected (CKAE), K. A. Efetov & D. A. Govorukha leg.

3. Krasnodar Territory, Ust-Labinsk District, near Nekrasovskaya village, Laba River valley, high bank, steppe, 15-VII-2022, [3] (Figure 5), V. I. Shchurov: altitude 74 m above sea level; geographical coordinates 45º07.457'N, 39º 49.027'E; date 2-VII-2022; time of the day 17:45 - 19:20; the air temperature is +31.1…27.9º C; no specimens attracted, V. I. Shchurov, altitude 74 m above sea level;

geographical coordinates 45º07.457'N, 39º49.027'E; date 15-VII-2022; time of the day 17:28 - 17:31, 18:05; the air temperature is +39.8…34.9º C; 3 ♂ of *Ch. efetovi* collected (CVIS), V. I. Shchurov leg., altitude 78 m above sea level; geographical coordinates 45º07.358'N, 39º49.218'E; date 15-VII-2022; time of the day 18:50 - 20:00; the air temperature is +31.6…26.6º C; no specimens attracted, V. I. Shchurov.

4. Krasnodar Territory, Temryuk District, Taman' Peninsula, shore of the Taman' Bay near Sennoy village, steppe, altitude 9 m above sea level, 45º16.568'N, 36º58.195'E, [4], 23-VII-2022, time of the day 17:30 - 18:06; the air temperature is +32.0º C; no specimens attracted, V. I. Shchurov, T. N. Shchurova.

5. Krasnodar Territory, Temryuk District, Taman' Peninsula, shore of the Akhtanizovskiy estuary, Borisoglebskaya Mountain, steppe, altitude 3 m above sea level, 45º16.791'N, 37º06.052'E, [5], 23-VII-2022, time of the day 16:15 - 17:00; the air temperature is +29.7 … 32.5º C; no specimens attracted, V. I. Shchurov, T. N. Shchurova.

6. Krasnodar Territory, Temryuk District, Taman' Peninsula, Temryuk Bay, seaside clay cliffs near Golubitskaya village, steppe, altitude 5 m above sea level, 45º19.744'N, 37º15.826'E, [6], 13-VII-2021, time of the day 15:00 - 15:30, 18:00 - 18:20; no specimens attracted, K. A. Efetov, O. G. Gorbunov, M. S. Efetov.

7. Krasnodar Territory, Yeysk District, southern shore of the Lake Khanskoye, a very large population of *M. peregrinum*, east of Yasenskaya Pereprava village, (Figure 6) altitude 2 m above sea level, 46º14.679'N, 38º18.132'E, [7]: 03-VIII-2022, time of the day 18:00 - 18:20; the air temperature is +29.1º C; no specimens attracted, V. I. Shchurov; 14-VII-2023, time of the day 17:50 - 18:05, strong wind, many males were attracted (more than 15 specimens in the first 5 minutes), 2 ♂ were collected (CVIS), V. I. Shchurov leg.

8. Krasnodar Territory, Yeysk District, northern high shore of the Lake Khanskoye, steppe, altitude 1 m above sea level, 46º18.861'N, 38º19.222'E, [8], 03-VIII-2022, time of the day 16:50 - 17:20; the air temperature is +32.2…30.5º C; no specimens attracted, V. I. Shchurov.

9. Krasnodar Territory, Yeysk District, northern shore of the Beysug estuary, sandy embankment between the Lake Khanskoye and the Beysug estuary, steppe under the crowns of *Styphnolobium japonicum* (L.) Schott forest crops, altitude 3 m above sea level, 46º14.068'N, 38º18.615'E, [9], 04-VIII-2022, time of the day 08:05 - 08:45; the air temperature is +27.6…30.2º C; no specimens attracted, V. I. Shchurov.

10. Krasnodar Territory, Tbilisskaya District, near Tbilisskaya village, Kuban' River valley, steppes on a high bank, altitude 87 m above sea level; geographical coordinates 45º21.204'N, 40º 05.927'E, [10], date 15-VII-2022; time of the day 15:50 - 16:25; the air temperature is +35.2…34.9º C; no specimens attracted, V. I. Shchurov.

11. Krasnodar Territory, Pavlovskaya District, near Nezamayevskaya village, Yeya River valley, Glinyanaya gully, refuge of the steppe in the agricultural landscape, altitude 33 m above sea level; geographical coordinates 46º08.037'N, 40º19.655'E, [11], date 8-VII-2022; time of the day 7:00 - 8:00; the air temperature is +22.6…23.6º C; no specimens attracted, V. I. Shchurov.

12. Krasnodar Territory, Uspenskaya District, Stavropol' upland, near Priozyornyy village, steppe on the eastern shore of the Lake Maloye, altitude 323 m above sea level, 44º58.877'N, 41º21.643'E, [12], 29-VII-2022, time of the day 16:04 - 16:24; the air temperature is +35.8…34.3º C; no specimens attracted, V. I. Shchurov.

13. Krasnodar Territory, Uspenskaya District, Stavropol' upland, Nedryemannyy mountain range, Baba Mountain, steppe on the sources of the Zemzyul'ka 1st gully, rare plants of *M. peregrinum*, altitude 587 m above sea level, 44º 55.350'N, 41º 30.394'E, 22-VII-2023, [13], time of the day 17:30 - 18:10; no specimens attracted, V. I. Shchurov, T. N. Shchurova.

14. Krasnodar Territory, Anapa District, the northern shore of the Vityazevskiy estuary to the east of the village of Blagoveshchenskaya, local area of the steppe with rare plants *M. peregrinum*, altitude 1 m above sea level, 45º03.448'N, 37º12.283'E, [14], 03-VIII-2023, time of the day 17:25 - 18:05; the air temperature is +30.2…28.3º C; no specimens attracted, V. I. Shchurov.

Biology

The larvae of *Ch. efetovi* live in the roots of *M. peregrinum* (Gorbunov, 2019b; Efetov & Gorbunov, 2021). This species is on the wing from the end of June to the end of July. Sometimes males arrive to the pheromone in large numbers in a few minutes. Males come to attractants mainly in the late afternoon (but flight of these moths in the region always stopped before 18:15). That is why our attraction were effective only in the afternoon time and did not give results when we studied biotopes in the morning time. Our observations show that the local abundance of *Ch. efetovi* directly depends on the area and density of the *M. peregrinum* population. Obviously, the number of these moths depends on the frequency of steppe fires.

Range of *Ch. efetovi*

Russia: Saratov Region, Volgograd Region, Stavropol Territory, Krasnodar Territory, Crimea; Romania, Bulgaria, Serbia. *Ch. efetovi* is most probably distributed also in adjacent territories, for example, in the other regions of the Northern Caucasus where *M. peregrinum* is present.

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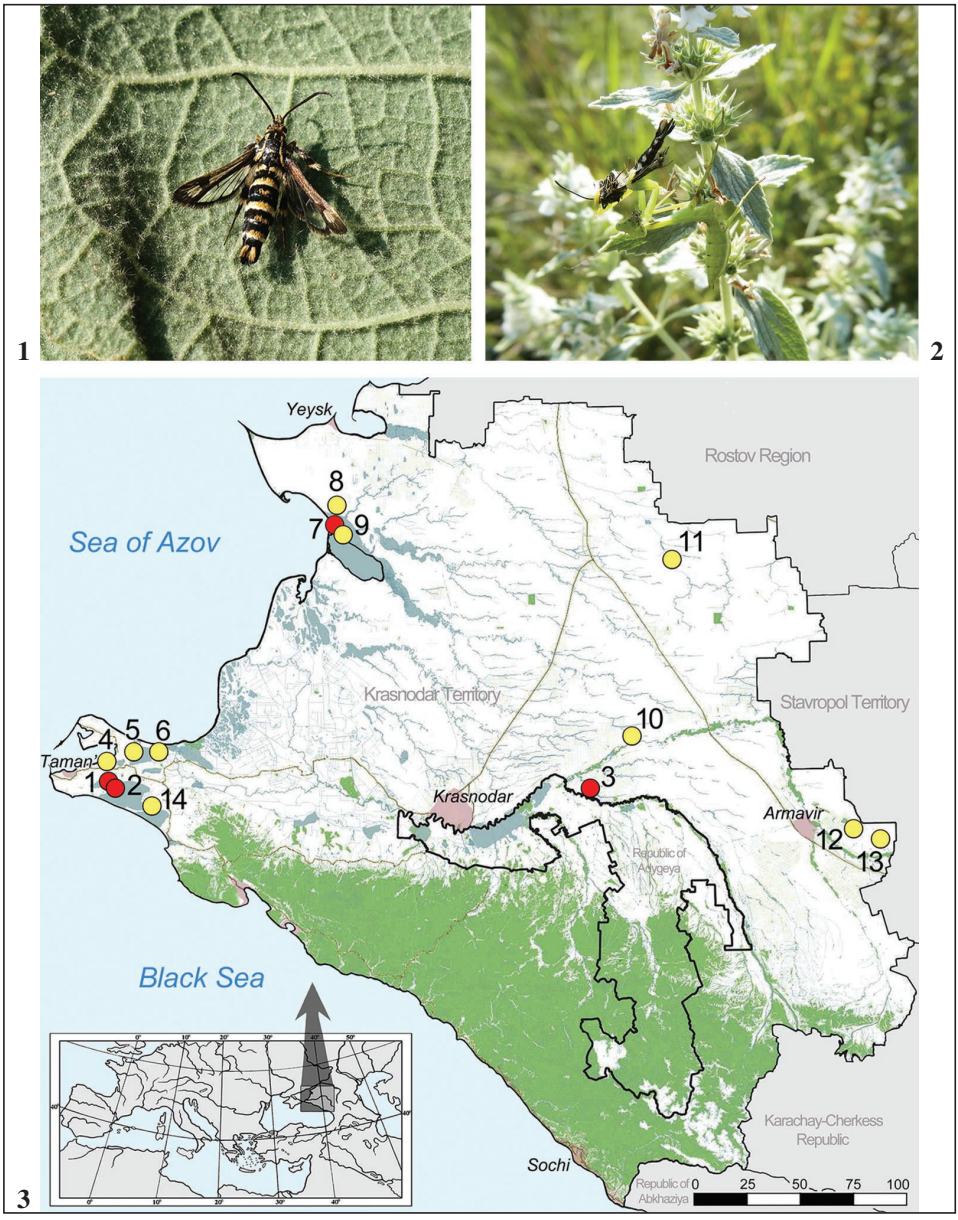

Figures 1-3. 1. Female of *Chamaesphecia efetovi*, Krasnodar Territory, Temryuk District, Taman' Peninsula, western shore of Tsokur estuary, Lysaya Mountain, Yakhno garden, 9-VII-2022 (photo: K. A. Efetov). **2.** The male of *Ch. efetovi* caught by the nymph of *Hierodula transcaucasica* (Brunner von Wattenwyl, 1878) on a larval hostplant. Yakhno garden, 9-VII-2022 (photo: V. I. Shchurov). **3.** Distribution of *Ch. efetovi* in Krasnodar Territory. Dots show studied localities, red dots - localities where this species was found. The numbers of the localities in the Figure 3 are explained in the text and marked with square brackets [1-14].

Figures 4-6. Biotopes in Krasnodar Territory where *Chamaesphecia efetovi* was found. **4.** Temryuk District, Taman' Peninsula, western shore of Tsokur estuary, Lysaya Mountain, Yakhno garden (locality [1]), 2022 (photo: K. A. Efetov). **5.** Ust-Labinsk District, near Nekrasovskaya village, Laba River valley (locality [3]), 2022 (photo: V. I. Shchurov). **6.** Yeysk District, southern shore of Lake Khanskoye, east of Yasenskaya Pereprava village (locality [7]), 2022 (photo: V. I. Shchurov).