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Record of an introduced *Cyrtoxipha* species (Grylloidea: Trigonidiidae) in Europe

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Abstract

In the greenhouses of the "Palmengarten" botanical garden in Frankfurt / Main, Germany, I discovered a cricket that was previously unknown from Europe and which I have identified as *Cyrtoxipha columbiana*. It occurs naturally in the south-eastern United States of America. This is the first record of this species outside of its natural range.

Keywords: botanical garden, *Cyrtoxipha columbiana*, greenhouse, non-native species, synanthropic species,

Zusammenfassung

Nachweis einer importierten *Cyrtoxipha*-Art (Orthoptera: Grylloidea: Trigonidiidae) in Europa. In Gewächshäusern des Palmengarten in Frankfurt am Main entdeckte ich eine für Europa bisher unbekannte Grille, die ich als *Cyrtoxipha columbiana* identifizierte. Sie kommt natürlicherweise im Südosten der Vereinigten Staaten von Amerika vor. Es handelt sich um den ersten Nachweis dieser Art außerhalb ihres natürlichen Verbreitungsgebiets.

Schlüsselwörter: Botanischer Garten, *Cyrtoxipha columbiana*, Gewächshaus, Neozoe, synanthrope Art

Introduction

It is through international trade and traffic that plant and animal species are accidentally distributed or displaced around the world. Among insects, crickets are a superfamily of which astonishing many species are displaced. Examples are *Gryllomorpha dalmatina,* presumably from southern Europe to Germany (Engling & Pfeifer 2020), *Nemobius sylvestris* from Europe to the USA (Woo 2022), and *Homeogryllus* species from Africa to Poland, Belgium and the Netherlands (Żurawlew et al. 2020, Mulder 2022). *Cyrtoxipha gundlachi* was introduced from Florida or the

Caribbean to Ontario (Paiero & Marshall 2014). In 2020 I discovered a *Cyrtoxipha* species in Germany. This is the first published record of this genus in Europe.

Circumstances of discovery

On May 4th, 2020, I visited the greenhouses of the Palmengarten in Frankfurt am Main, Germany, to search for synanthropic orthopteroid insects. I found the cockroaches *Pycnoscelus surinamensis* and *Periplaneta australasiae*, and the cave cricket *Tachycines asynamorus*. These non-native species have been established for years. However, in the wet tropical greenhouse I heard a previously unknown cricket (Fig. 1). I observed more than fifteen nymphs as well as adult individuals. Most of them were moving quickly on broad leaves of a tropical plant, e.g. *Odontonema tubaeforme* and *Mimusops sechellarum*. Fortunately, I managed to catch about five of the nymphs and took them home to rear them to the imaginal stage. One male reached the imaginal stage. On May 9th, 2023, I visited the greenhouses again. The cricket species was still there and seemed to have increased in number. At this day I caught about ten specimen.

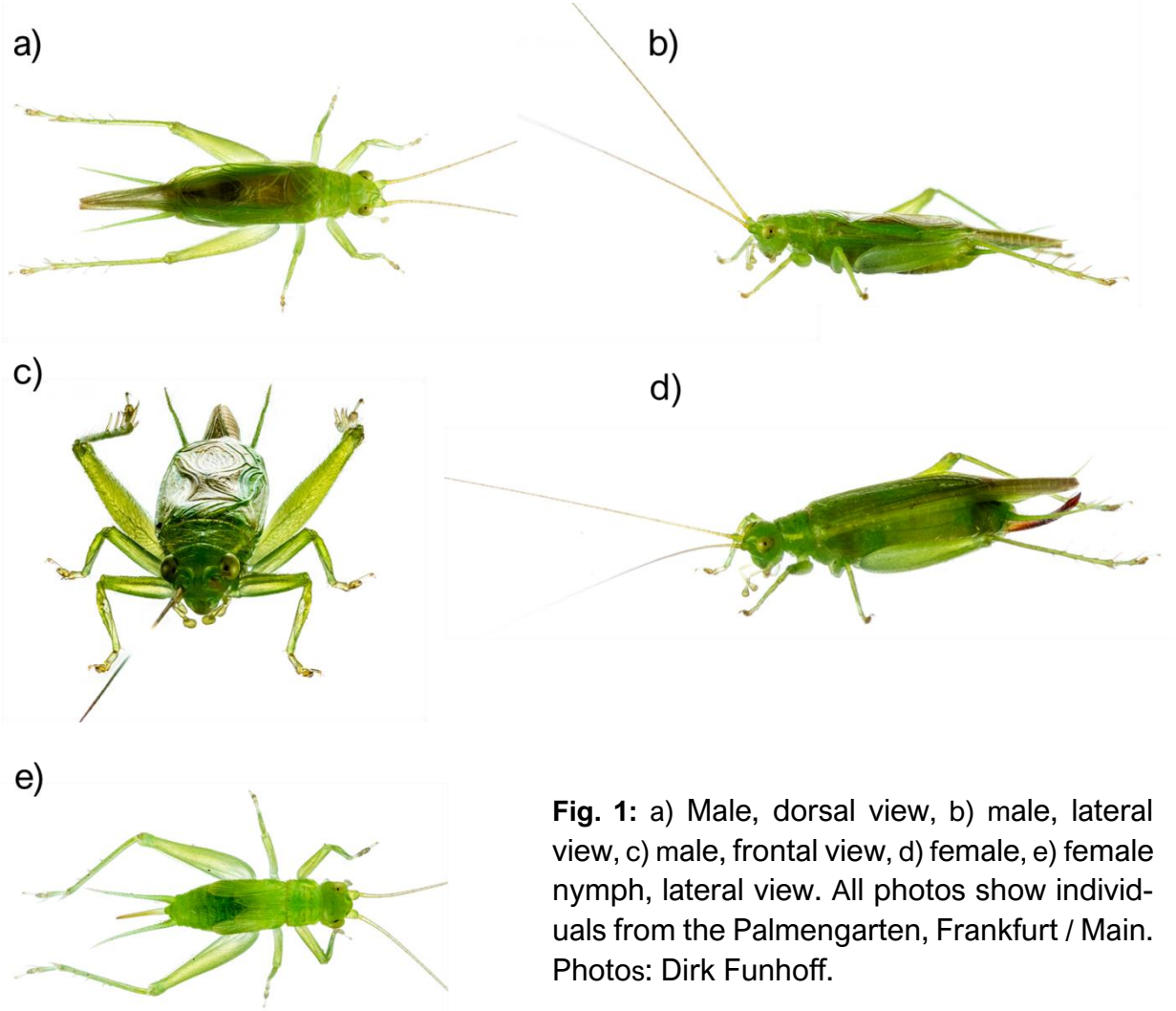

Fig. 1: a) Male, dorsal view, b) male, lateral view, c) male, frontal view, d) female, e) female nymph, lateral view. All photos show individuals from the Palmengarten, Frankfurt / Main. Photos: Dirk Funhoff.

Description of the caught specimens

Adult: Colour: yellow-green in both sexes. Male: Length of the body from front of the head to end of abdomen: 6,5 mm. Total length from front of the head to end of the wings: 10 mm. Hind femur 4.5 mm, tibia 4,8 mm. Female: Length of body from front of the head to end of abdomen: 8 mm. Total length from front of the head to end of the wings: 11 mm. Hind femur 4.8 mm, tibia 4,8 mm. Some specimen are deposited in my private collection.

Calling song: I have recorded the calling song of three males with my smartphone. The oscillograms were made with the software SASLab Lite from Avisoft Bioacoustics. An echeme consists mostly of four or five syllables, sometimes three (Fig. 2). The number of echemes per minute and its duration depend on temperature as shown in Table 1.

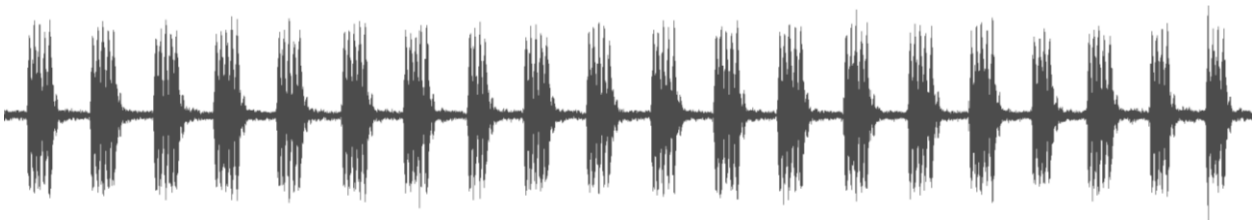

Fig. 6: Oscillogram of 10 sec of a male song, 1.6.2023, 22:52, 24°C.

Tab. 1: Analysis of the song of three different males. Temp = temperature, N = number, D = duration.

Date	Temp	N echemes per minute	D of echeme with four syllables	D of echeme with five syllables
02.08.2023	22°C	94	0,15 s	0,20 s
01.06.2023	24°C	126	0,15 s	0,20 s
19.06.2023	27°C	160	0,13 s	0,16 s

Identifying the genus: Identifying the genus as *Cyrtoxipha* was possible with the key of Brunner von Wattenwyl (1873) and confirmed with the key of Otte & Perez-Gelabert (2009).

Identifying the species: Actually, the genus *Cyrtoxipha* has 28 described recent species (Cigliano et al. 2023). 20 of them were recently described by Otte & Perez-Gelabert (2009). Most of the previously known *Cyrtoxipha* species can be excluded because of the colour or the clearly evident body characters. Unfortunately, only the songs of four species are published (Walker 2022). The song of *C. columbiana* seems to be identical with the song of the Palmengarten specimens. Besides song, coloration and other morphological characters of *C. columbiana* fit very well with the collected specimens. *Cyrtoxipha columbiana* has the largest area of distribution which also makes it the most likely candidate.

Discussion

The genus *Cyrtoxipha* is restricted to the subtropical and tropical parts of America, mainly of the northern hemisphere. Most of the species life on Caribbean islands. Especially the tropical species of the genus *Cyrtoxipha* are less examined and there are surely more species to be discovered than the already known 28 recent species. *Cyrtoxipha columbiana* occurs in the southeast of the United States of America (Walker 2022). The *Cyrtoxipha* species was probably introduced accidently with tropical plants into the greenhouse of the Palmengarten in Frankfurt. Crickets are among the insect groups with a lot of species which are easy displaced. Otte & Perez-Gelabert (2009) mentioned that "crickets colonize oceanic islands better than any other group of Orthoptera". The discovery of the *Cyrtoxipha* species in Frankfurt is further proof for this conclusion.

Acknowledgements

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