

***Culiseta glaphyoptera* (Schiner, 1864): a common species in the southwestern Czech Republic**

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Abstract

Mosquitoes hibernating in underground shelters were studied in the winters of 2003–2004 and 2011–2012 in West Bohemia, Czech Republic. Five taxa were recorded: *Culiseta alaskaensis* (Ludlow, 1906), *Culiseta annulata* (Schrank, 1776), *Culiseta glaphyoptera* (Schiner, 1864), *Culex pipiens* complex and *Anopheles maculipennis* complex. *Culiseta glaphyoptera* was the second most abundant and the second most frequent species. This species hibernated mainly in small numbers, but several mass hibernation shelters with 100–200 specimens were found.

Keywords: Culicidae, *Culiseta glaphyoptera*, Distribution, Czech Republic, Hibernation

Introduction

Culiseta glaphyoptera is ranked among boreal-alpine species with an occurrence restricted to mountainous regions of Central Europe and several finds in the Alps and the Balkans (Kramář, 1958; Minář & Halgoš, 1997; Snow & Ramsdale, 1999). There are only a few records known east and south of the former Czechoslovakia: twelve records from Slovakia (Országh, 2004), three records from Hungary (Tóth, 2004; Tóth & Kenyeres, 2012), four from Romania (Nicolescu *et al.*, 2003), a single record from Ukraine (Gutsevich & Dubitskiy, 1987), one record from Montenegro and Croatia (E. Merdić, unpubl., pers. comm.) and three records from Bulgaria (Bozhkov, 1959).

There are more published records from several regions of the Czech Republic, e.g. from the Jizerské Hory Mountains, the Krušné Hory Mountains (=Ore Mountains), The Hubý Jeseník Mountains (=Altwater Mountains), Českomoravská Vrchovina highlands (all Kramář, 1958), the Lipno Reservoir surroundings (Minář, 1962), northwestern Bohemia (Kramář *et al.*, 1967), Třeboň region (Rettich *et al.*, 1978) and the planned Hněvkovice Reservoir surroundings (Olejníček & Kohn, 1987).

In the most recent Red List of invertebrates of the Czech Republic *Cs. glaphyoptera* is listed as a vulnerable species (VU) and as one of seven rarest species of the Czech Republic (Minář 2005). The situation in Slovakia is similar: *Cs. glaphyoptera* is listed as one of four vulnerable species (Jedlička & Stloukalová, 2001).

In this contribution, the results of a survey of hibernating mosquitoes are presented with special reference to *Cs. glaphyoptera*.

Materials and Methods

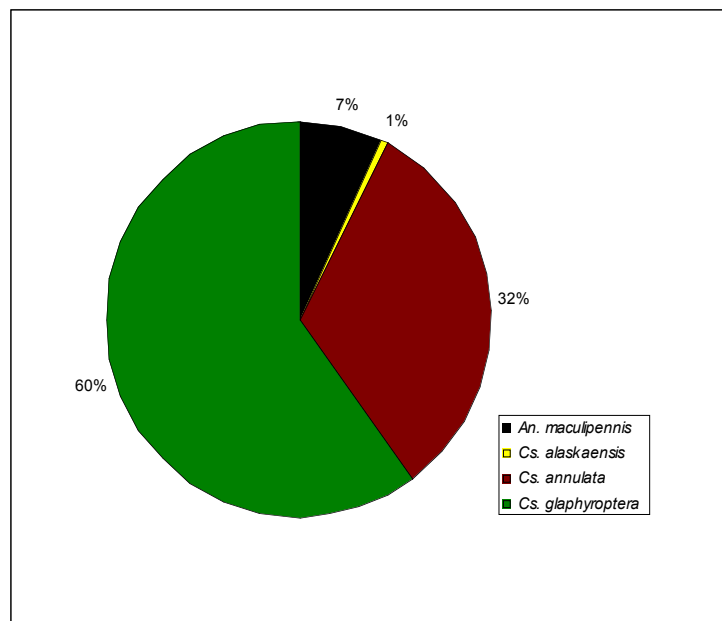
Mosquitoes were collected during the winters of 2003–2004 and, especially, 2011–2012 in cellars, caves and abandoned mines. The material was identified by the author by reference to Kramář (1958) and Mohrig (1969). Voucher specimens are deposited in the collections of the Municipal Museum Mariánské Lázně.

Results

During the survey the material from 97 localities in Western Bohemia and 15 localities in the remainder of the Czech Republic was examined. In the material, the following species were represented: *Culiseta alaskaensis* (Ludlow, 1906), *Culiseta annulata* (Schrank, 1776), *Culiseta glaphyoptera* (Schiner, 1864), *Culex pipiens* complex, and *Anopheles maculipennis* complex.

The most common taxon was *Cx. pipiens* complex, present in almost 88% of localities and occurring often in mass numbers. Apart from these, *Cs. glaphyoptera* represented 60% of the remaining mosquitoes (Figure 1). *Cs. annulata* (32%) was a frequent species, while *Cs. alaskaensis* (1%) and *An. maculipennis* complex (7%) were found only rarely.

Fig. 1. The percentage representation of mosquito taxa in underground shelters in the study area, excluding *Cx. pipiens* complex.



The frequency of all taxa in the study area is shown in Figure 2 and the distribution of *Cs. glaphyoptera* in western Bohemia in 10x12km grids is shown in Figure 3.

Fig. 2. Frequency of individual mosquito taxa in the study area expressed as the percent of occupied localities from all visited localities.

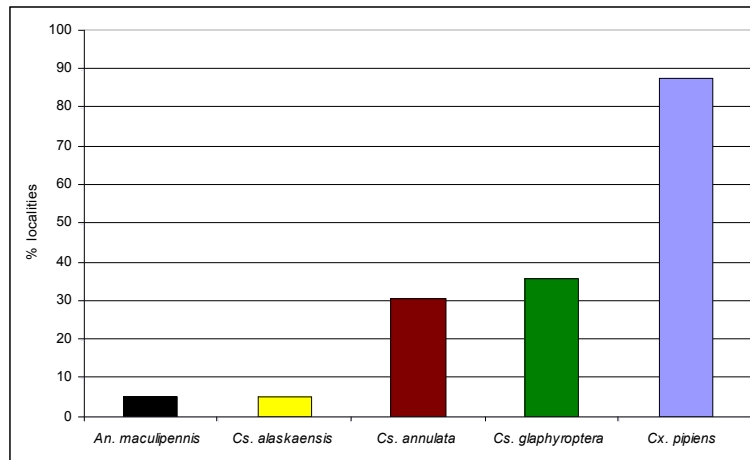
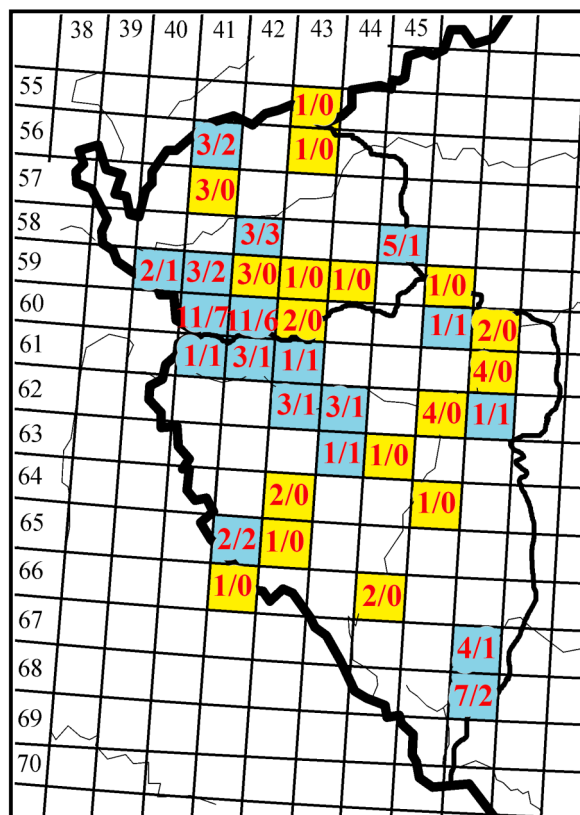


Fig. 3. Map of western Bohemia showing localities studied where *Culiseta glaphyoptera* was present (blue background) and absent (yellow background) (number of mapping quadrants/ number of quadrants with *Cs. glaphyoptera*).



Discussion

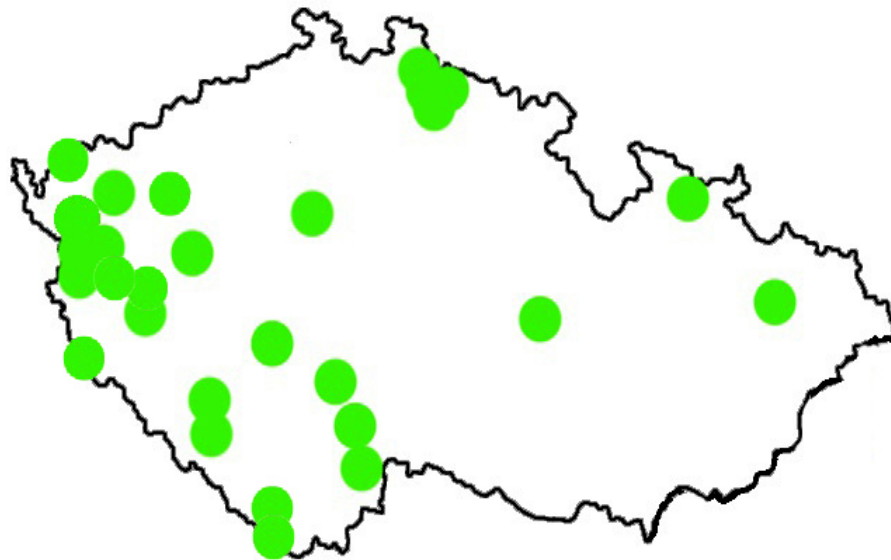
Hibernation of *Cs. glaphyoptera* in underground shelters has been recorded in several countries, but the records are sporadic. Eckstein (1918) published finds from a cave cellar in Mutzig, N.E. France, Martini (1925) from a cave in Lower Austria and Košel (1999, 2004) from several caves in Slovakia.

Minář (1962) carried out a survey of hibernating mosquitoes in the Lipno Reservoir surroundings, CZE. He studied 57 potential shelters (attics, cold buildings, cellars, etc.) and found individuals of *Cs. glaphyoptera* in only nine cold rooms and cold wet cellars.

In western Bohemia, *Cs. glaphyoptera* hibernates also in small numbers, usually up to 10 specimens. However there are three localities where this species has been found hibernating in mass numbers: 105 in a limestone cave, 136 in a cellar of a former gamekeeper's lodge and 201 in a cellar of an old castle.

The exact distribution of *Cs. glaphyoptera* in the Czech Republic is unknown as research has been focused mainly on floodplain regions. According to present knowledge, *Cs. glaphyoptera* inhabits hilly and mountainous regions as well as some cold pond basins. The distribution of *Cs. glaphyoptera* in the Czech Republic is shown schematically in Figure 4.

Fig. 4. Known distribution of *Cs. glaphyoptera* in the Czech Republic.



Conclusions

In western Bohemia, *Cs. glaphyoptera* is the second most common mosquito species hibernating in underground shelters after the *Cx. pipiens* complex, according to both specimen numbers and numbers of occupied localities. With respect to the overall distribution of the species in the Czech Republic and the frequent occurrence in the studied hibernation shelters, it is suggested that *Cs. glaphyoptera* could be removed from the Red list of threatened species in the Czech Republic.

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