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ADDITIONS TO THE MOSQUITO FAUNA (DIPTERA: CULICIDAE) OF WROCŁAW, POLAND

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Abstract

The mosquito fauna of the town of Wrocław (Western Poland) was practically unknown until 2003, when evidence for eight species was published. The present research adds a further ten species to the faunal list, thus eighteen mosquito species are now reported from Wrocław: *Aedes cinereus, Ae. vexans*, *Anopheles maculipennis s.l., Culex pipiens s.l., Culiseta alaskaensis, Cs. annulata, Coquillettidia richiardii, Ochlerotatus annulipes, Oc. cantans*, *Oc. caspius, Oc. cataphylla, Oc. communis*, *Oc. dorsalis, Oc. excrucians*, *Oc. flavescens, Oc. geniculatus, Oc. leucomelas and Oc. sticticus*.

Keywords: Mosquito, faunal list, Wrocław, Poland

Introduction

Wrocław is a lowland town that lies in the Oder Valley region of Lower Silesia in western Poland. The town is situated upon the Oder River and it's four tributaries (Ślęża, Bystrzyca, Widawa and Oława rivers) join the main Oder River around the town, forming extensive systems of ditches and ideal mosquito larval habitats. The rivers run down from the Sudety Mountains, and waters tend to rise after heavy rainfall or snow melt. The town is rich in semi-natural wetland habitats, parks and gardens, with many canals, municipal moats, clay pits, lakes and ponds, thus providing suitable environmental conditions for the occurrence of many different mosquito species. The mildness of the Silesian climate, unique in Poland, is also very favourable for mosquito development, as winters are mild and short, spring comes early, and summers are long and warm.

Knowledge of the mosquito fauna of Lower Silesia is incomplete. Prior to 2003, there were only notes on the breeding sites of *Anopheles maculipennis s.l.* in the area of Wrocław and its vicinity and scarce data about control activities against mosquitoes in the 1920s (after Rydzanicz & Lonc, 2003). After the catastrophic floods of July 1997 induced a plague of floodwater mosquitoes, local municipalities decided to implement regular mosquito control programmes using both *Bti* and chemical preparations. As a specialist in mosquito biology, I prepared the basis for the mosquito control efforts including organisation of the monitoring programme and training control personnel. Larvae were collected from 12 sites over three years and eight mosquito species were reported (Rydzanicz & Lonc, 2003, see Table).

Materials & Methods

Adult mosquitoes were collected at nine sites in Wrocław (Szczytnicki Park, Leśnicki Park, Swojec, wet meadow at Kowale upon the Widawa River, Irrigation Fields and in a garden and a cellar of a house situated close to Szczytnicki Park) over five separate days in May & June 1998, June 1999 and October 2006. All adult females collected in green field sites were human landing catches, with the exception of one female *Culiseta alaskaensis* (Ludlow, 1906) which was captured resting on the wall of a house in the midst of climbers. Individuals captured in the house cellar were overwintering there. Mosquitoes were identified using the morphological keys of Skierska (1977).

Results

A total of 167 specimens were collected in ten separate collections over 5 days: 131 specimens from the green field sites listed above, and 36 in the house cellar. The latter included *Anopheles maculipennis* s.l. Meigen, 1818, *Culex pipiens* s.l. Linnaeus, 1758 and *Culiseta annulata* (Schrank, 1776). A total of seventeen species were collected (Table), which include seven of the eight species

reported from larval collections by Rydzanicz & Lonc (2003), including *Aedes vexans* (Meigen, 1830), *Ochlerotatus cantans* (Meigen, 1818), *Oc. communis* (de Geer, 1776), *Oc. sticticus* (Meigen, 1838), *Anopheles maculipennis s.l.* Meigen, *Culex pipiens s.l.* Linneaus and *Culiseta annulata* (Schrank). Exact component members of the Maculipennis and Pipiens Complex are impossible to determine from adult females but efforts are underway to determine these using molecular methods. *Ochlerotatus excrucians* (Walker, 1856), detected as larvae by Rydzanicz & Lonc (2003), was not collected in this recent survey.

Species	Rydzanicz & Lonc (2003)	Herein
Ae. cinereus Meigen, 1818*		*
Ae. vexans (Meigen, 1830)*	*	*
Oc. annulipes (Meigen, 1830)		*
Oc. cantans (Meigen, 1818)*	*	*
Oc. caspius (Pallas, 1771)*		*
Oc. cataphylla Dyar, 1916		*
Oc. communis (de Geer, 1776)	*	*
Oc. dorsalis (Meigen, 1830)*		*
Oc. excrucians (Walker, 1856)	*	
Oc. flavescens (Mueller, 1764)		*
Oc. geniculatus (Olivier, 1791)		*
Oc. leucomelas (Meigen, 1804)		*
Oc. sticticus (Meigen, 1838)*	*	*
An. maculipennis Meigen, 1818*	*	*
Cq. richiardii (Ficalbi, 1889)*		*
Cx. pipiens Linnaeus, 1758*	*	*
Cs. alaskaensis (Ludlow, 1906)		*
Cs. annulata (Schrank, 1776)*	*	*
Number of species reported in each survey	**8**	**17**

Table: Checklist of mosquito species recorded in Wrocław, Poland. *Species implicated in human disease transmission after Wegner (2000).

Ten species are reported herein from Wrocław for the first time, namely *Ae. cinereus* Meigen, 1818, *Oc. annulipes* (Meigen, 1830), *Oc. caspius* (Pallas, 1771), *Oc. cataphylla* Dyar, 1916, *Oc. dorsalis* (Meigen, 1830), *Oc. flavescens* (Mueller, 1764), *Oc. geniculatus* (Olivier, 1791), *Oc. leucomelas* (Meigen, 1804), *Cq. richiardii* (Ficalbi, 1889) & *Cs. alaskaensis* (Ludlow, 1906).

Discussion

This data compliments the first study of Rydzanicz & Lonc (2003) and results in a total of 18 reported mosquito species from Wrocław in western Poland. Given that 17 species were identified from less than 200 individuals collected during only 5 days of sampling, it is feasible that the mosquito faunal list for this area may indeed be much higher. Moreover some of the collections took place soon after a disastrous flood in the region, which is known to reduce species diversity for at least two years (Kubica-Biernat *et al*., 2007).

Mosquito diversity has been examined in four other Polish towns: Gdańsk (Skierska & Lachmajer, 1960; Kubica-Biernat *et al*., 2007), Szczecin (Lachmajer, 1954; Skierska *et al*., 1982) Świnoujście (Łukasiak 1967; Burkiewicz & Grablis, 1981), and Warsaw (Łukasiak, 1956, 1965; Wegner, 1982). In terms of climatic and environmental conditions, Szczecin is the most similar to Wrocław and is situated upon the lower Oder River, close to its mouth into Szczecin Bay. The mosquito fauna of Szczecin comprises 30 species (Wegner, 2000), and it seems likely that some of these will be detected in Wrocław in the future. Most probable species include: *An. claviger, Cx. torrentium, Cx. territans, Oc. cyprius, Oc. detritus* and *Oc. intrudens*.

Ten species reported in Wrocław are known to be competent vectors of different human diseases, including malaria (*An. maculipennis s.l.*), West Nile virus (*Ae. cinereus*, *Ae. vexans, Oc. caspius, Oc. dorsalis, Oc. sticticus, Cq. richiardii, Culex pipiens s.l.*, and other arboviruses (*Cs. annulata, Oc. cantans*) (Table) (Wegner, 2000). Given the potential biomedical importance of these mosquitoes, and others as yet undetected, further long-term studies are required in this area in future.

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