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MASS OCCURRENCES OF BLACKFLIES (DIPTERA: SIMULIIDAE) AND CONTROL ACTIONS AGAINST THEM IN POLAND

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ABSTRACT – There are several regions in Poland where blackflies (Diptera Simuliidae) have always occurred in mass numbers, but in the last 15 years a blackfly nuisance has been reported from more and more new areas. The occurrence of simuliids in mass numbers causes numerous fatalities in cattle and horses – only in 1996 at least 809 animal deaths were reported, the next cases were reported in 1997, and every following year the problem arose in the spring. Ornithologists observed that simuliid plagues in newly occupied areas cause total nestling mortality in colonial common gulls. People also suffer from blackfly bites – there are more and more reports of medical cases among people – even among the inhabitants of large towns. In some regions municipal authorities implemented systematic control activities, as was done in several towns along the Oder and Warta Rivers, especially in Gorzów Wielkopolski. In Toruń, blackflies have been controlled for three years now. Since there is no specialist in biological control of blackflies in Poland, mainly chemical methods have been used to control adults. There is therefore a need to start program of teaching specialized teams and then implementing biological control methods in Poland, i.e., with the use of bacterial larvicide preparations based on B.t.i.

KEY WORDS: Simuliidae, black flies, outbreaks, control, Poland

INTRODUCTION

The Simuliidae fauna of Poland is fairly well known, although it has been studied unequally. Relatively more papers refer to mountainous, submontane, and upland areas than to lowlands. Lowland species are less interesting from the faunal point of view. For this reason, they have not been studied as extensively as montane ones, despite the fact that it is the lowland blackfly fauna that causes a threat to animals and people. This gap has been filled (at least regarding the western half of Poland) thanks to the thorough study of simuliids along the Oder River and its tributaries carried out by WERNER (2003) in the late 1990s.

According to the comprehensive elaboration of Polish Simuliidae by NIESIOŁOWSKI AND BOKŁAK (2001) and results of the study of WERNER (2003), 49 species have been recorded in Poland so far. Eleven of them are common in Central Europe. The larvae of 21 species develop only in mountain streams and rivers, 12 of them occurring rarely in Poland. Six species develop mainly in mountain and submontane streams, but can also live in lowland streams. There are four species whose larvae occur in a range of habitats including both mountain and lowland streams and rivers, as well as polluted ones. Eighteen simuliid species develop only in lowland rivers and streams, and four of these are considered rare species. Although montane species make a three fifths of the Polish fauna, the same number of common species has been recorded in lowlands as in montains – there are 14 common lowland species and 14 common montane ones.

MASS OCCURRENCES OF BLACKFLIES IN POLAND

Eight of the blood-sucking simuliids recorded in Poland may occur in mass numbers and cause a threat to humans and animals. They are:

Simulium (Boophthora) erytrocephalum (De Geer)
Simulium (Schoenbaueria) pusillum Fries
Simulium (Schoenbaueria) nigrum (Meigen)
Simulium (Simulium) morsitans Edwards
Simulium (Simulium) noelleri Friederichs
Simulium (Simulium) ornatum Meigen
Simulium (Simulium) reptans (L.)
Simulium (Wilhelmia) equinum (L.)

There are several regions in Poland where blackflies have always occurred in pest numbers. ZWOLSKI (1974) made a detailed analysis of data available from the 19th century to the 1960s and prepared a map of areas affected by massive outbreaks of hematophagous simuliids (Fig. 1). These regions cover a great part of Poland, especially the drainage area of the Warta River and the middle and lower reaches of the Oder in the western districts. Also, the eastern part of the country (middle reaches of the Bug River) and northeastern regions (lakelands) are areas where blackflies have occurred in pest numbers. Pest occurrences of blackflies were common in these areas before the 1970s.

During late 1970s, 1980s, and early 1990s, massive outbreaks were observed rarely and only locally. The problem arose again in the middle of the 1990s in the regions pointed out by ZWOLSKI (1974), as well as in new areas where it never existed before, especially along the middle reaches of the Vistula River (BOKŁAK AND WEGNER, 2003). At the same time, there are some areas earlier subject to outbreaks where the problem has not returned to date (Fig. 1).

Thus there are regions where blackflies:

– occurred in pest numbers prior to the 1970s and are also present in pest numbers today (drainage areas of the lower Warta and lower Oder Rivers in Western Poland; and middle reaches of the Bug River along the country's eastern border);

– occurred in pest numbers prior to the 1970s and are abundant today, but do not occur in plague numbers, especially in the northeastern part of Poland (lakelands);

Fig. 1. Regions with mass occurrences of blackflies in Poland. (prior to 1970 - areas covered by horizontal lines (after ZWOLSKI, 1974); regions with numerous or mass occurrence of blackflies at present - gray areas; places of plague occurrences with animal deaths reported – stars)

– occurred in pest numbers prior to the 1970s but cause no problem today (central and southern lined regions on Fig. 1);

– caused no nuisance prior to the 1970s and now occur abundantly, but not in pest numbers (lower Bug River and Narew River in East-Central Poland);

– caused no nuisance prior to the 1970s but now occur in plague numbers (middle and lower reaches of the Vistula River and middle reaches of the Oder River);

– sporadically occur in pest or even in plague numbers.

The emergence of simuliids in mass numbers causes fatalities in cattle and horses – only in 1996 at least 809 deaths were reported, the next cases took place in 1997, and every following year the problem arose in the spring (BOKŁAK AND WEGNER, 2003). In regions always affected by outbreaks, where people are familiar with the problem, farmers keep cattle indoors during the period of pest occurrence. Veterinary authorities recommend that animals be turned out to pasture only at night. Veterinarians offer farmers preservative fatty ointments to be applied to the naked skin of their livestock and various repellents for horses and other animals. As a result, fatalities in these regions are relatively less numerous than those observed in newly affected areas, where the problem is a novel one for farmers.

People also suffer from blackfly bites – there are more and more reports of medical cases among people, mainly among the inhabitants of large towns. In June of 2001, only in Gorzów Wielkopolski every fourth patient seeking help in hospital ambulatories suffered from blackfly bites (PIEKARSKA, 2004). Inhabitants of cities, especially in newly affected areas along the Vistula River (i.e., Warsaw, Włocławek, and Toruń), complain relatively more often than persons familiar with the problem. Medical doctors have been alerted to the extension of this phenomenon (CHOMICZ ET AL., 2001).

Ornithologists observed that simuliid plagues in newly occupied areas along the Vistula River cause total nestling mortality in colonial common gulls, which could be a cause of eradication of this bird species from the region (BUKACIŃSKI AND BUKACIŃSKA, 2000).

CONTROL ACTIVITIES

In some regions, municipal authorities have decided to control blackflies. Systematic control activities were implemented in several towns along the Oder and Warta Rivers, especially in Gorzów Wielkopolski. This is the first town where a method of monitoring was applied (in 2001) with the assistance of biologists for an estimation of the threat. Authorities also use biological control methods with preparations based on *Bacillus thuringiensis* var. *israelensis* (B.t.i.) against larvae, but it is still inadequate and there is a need to control adults as well (PIEKARSKA, 2004). In 2004 authorities of Bytom Odrzański (Oder River) decided to control the insects, and they were followed by authorities of Kostrzyń (Oder) and Nowa Sól (Oder). Authorities of towns situated along the middle reaches of the Vistula River started control actions too. In Toruń (Thorn), blackflies have been controlled for three years now on an area of 170 ha. Since there is no specialist in biological control of blackflies in Poland, mainly chemical methods for controlling adult blackflies are used there. The same problem faced the authorities of Włocławek, who sprayed 160 ha with chemical adulticides. Last year control activities were started in Bydgoszcz. There are other towns interested in developing ways to attack the insects.

There is therefore a need to start a program of teaching specialized teams and then implementing biological control methods in Poland, i.e., with the use of bacterial larvicide preparations based on B.t.i. Basic entomological studies should be carried out in the central and eastern parts of the country, especially in the drainage area of the Vistula River. In order to solve the problem of blackflies in ecologically acceptable ways, collaboration between specialists from different countries would be desirable.

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