

Aphid fauna /Hemiptera, Aphidoidea/ on maize crops in Wielkopolska: species composition and increase in numbers

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Introduction

Year by year maize is becoming a more eagerly planted crop in Poland. Global warming and a progress in breeding and biotechnology make it possible for new crops to produce larger yield. Progressing climate changes, imported seeds, increased crops area along with a simplified agro-technology are responsible for the appearance of new pests and an increased significance of other pest species which so far were not so relevant. Recently aphids became important crop pests, their development was accompanied by warm and humid weather conditions. For aphids, which are indirect virus vectors, corn constitutes a perfect nutrient source after cereals have been collected. This results in virus infection of the crops. Research carried out in recent years (PIEŃKOSZ *et al.*, 2005) pointed out to the presence of four aphid species *Metopolophium dirhodum* (Walker, 1849), *Rhopalosiphum padi* (Linnaeus, 1758), *Sitobion avenae* (Fabricius, 1775) and *Rhopalosiphum maidis* (Fitch, 1856) on maize.

The aim of the research was to find out species composition of aphids settling corn crops in Wielkopolska region and to assess the degree of increase in particular species presence.

Material and methods

The research was carried out in the field during growth seasons 2005-2006 on two crops each 1-ha size: Boruja Kościelna near Nowy Tomyśl ('Bzura' cultivar) and Pawłowo near Gniezno ('Grom' cultivar). Winged aphids were collected directly from 100 plants selected diagonally at random. The collected material was identified, counted and preserved and labeled in 75% ethyl alcohol.

Results

During 2005 – 2007 in total 6132 winged specimens were observed to occur on the two corn cultivars: in 2005 – 2717, in 2006 – 3421 (Fig. 1). Among the collected aphids rose-grain aphid (*M. dirhodum*) amounted to the biggest number. This species dominated in two years of observation in 2005 it amounted to 65.40% and in 2006 – 67.34% of all the collected aphids. Numerous specimens of bird-cherry-oat aphid (*R. padi*) were also recorded, 30.4% and 28.1% respectively, with a smaller share of the two remaining species: grain aphid (*S. avenae*) – 3.5 and 3.5%, and corn leaf aphid *R. maidis* – 2.5 and 2.4%.

During the research in both years it was observed that the 'Bzura' cultivar was more susceptible to aphid attack (Fig. 2).

Three peaks of aphid number were recorded during every year of investigations; the highest number of aphids was recorded at the end of September and the beginning of October (Figs. 3-6).

The size of aphid population and times of its appearance were influenced by weather conditions, mainly temperature (Fig. 7).

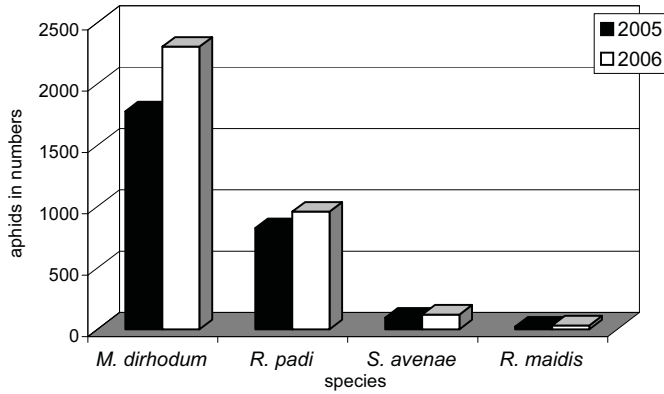


Figure 1. Number of aphids on maize crops in the Wielkopolska region in 2005-2006

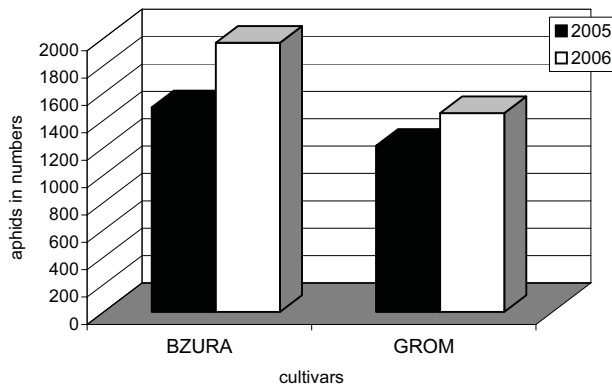


Figure 2. Number of aphids settling 'Bzura' and 'Grom' cultivars in the Wielkopolska region

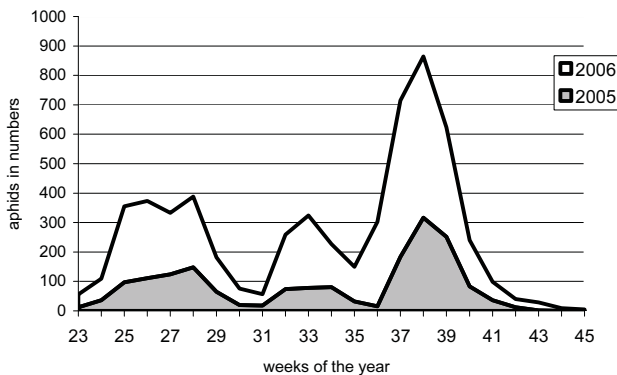


Figure 3. *Metopolophium dirhodum* population dynamics in the Wielkopolska region in 2005-2006

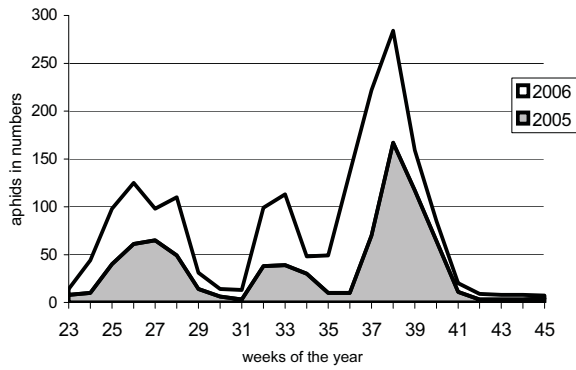


Figure 4. *Rhopalosiphum padi* population dynamics in the Wielkopolska region in 2005-2006

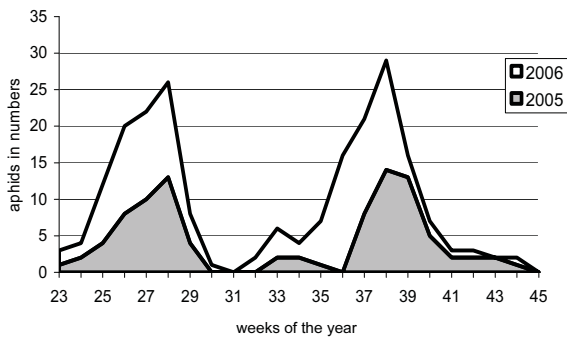


Figure 5. *Sitobion avenae* population dynamics in the Wielkopolska region in 2005-2006

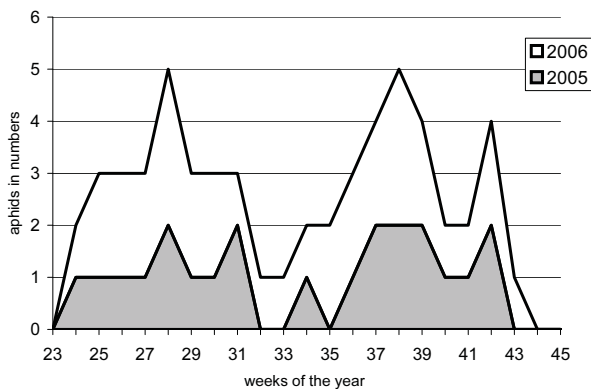


Figure 6. *Rhopalosiphum maidis* population dynamics in the Wielkopolska region in 2005-2006

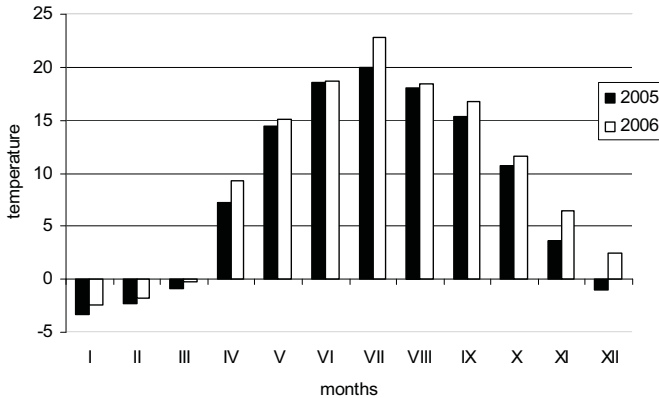


Figure 7. Course of daily mean temperatures in the Wielkopolska region in 2005-2006

Discussion

Maize, just like other cereals, is an attractive host plant for cereal aphid species. Because of a later, than in the case of cereals, harvest of maize it tends to be settled by cereal aphids, which are potential virus vectors. Research carried out in the Institute of Plant Protection in Poznań was concerned with insect catches in Johnson's suction trap (STRAŻYŃSKI, 2006) pointed out to an increase in cereal aphid species, in particular *R. padi*, which has been the most numerous species caught in the past few years. This aphid is responsible for the diseases caused by BYDV, which is a serious virus infection affecting cereals and corn. Temperature influences aphid development directly as well as through the host plant (RUSZKOWSKA, 2006). As a result of research carried out in the Institute of Plant Protection in Poznań it was stated that the minimal daily temperature is 25°C or above for at least three consecutive days causes aphid developmental changes (RUSZKOWSKA, 2002). This species starts then to develop anholocyclically, becomes a permanent virginoparous thus needs exclusively monocotyledons plants (including maize) for its development. Such anholocyclic aphid forms acquire viruses as a result of feeding likely on wild grass, infecting in the autumn the rising seedlings of winter crops.

References

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Fauna mszyc /Hemiptera, Aphidoidea/ na uprawach kukurydzy w Wielkopolsce – skład gatunkowy i nasilenie występowania

Streszczenie

W badaniach prowadzonych w warunkach polowych w Wielkopolsce, w sezonach wegetacyjnych 2005-2006, na dwóch stanowiskach i dwóch odmianach ('Bzura' i 'Grom') stwierdzono obecność czterech gatunków mszyc: *Metopolophium dirhodum* Walk., *Rhopalosiphum padi* L., *Sitobion avenae* F. i *Rhopalosiphum maidis* Fitch. Najliczniejszym gatunkiem był *Metopolophium dirhodum*. Stwierdzono również liczny udział *Rhopalosiphum padi* – głównego źródła wirusów żółtej karłowatości jęczmienia (BYDV).