RESEARCH REGARDING BIOLOGY AND ECOLOGY OF THE MAIN APHID SPECIES OF POTATO CULTURE

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Abstract:*This paper presents data referring to the life cicle of aphid species from potato cultivations, for a period of three years 2005-2007, from Didactic Station Timisoara and Varfurile County. The knowlege of potato aphid life cicle constitute a basic element of the integrated potato pests control. For the species Myzus persicae, the medium multiannual date of flight towards the potato is 20th May. The species Aphis fabae evolved on the potato in 6 – 9 generations. For the species Macrosiphum euphorbiae the maximum flight was recorded in the second part of June in 2005 and 2006, while in 2007 the maximum flight of the species was recorded in the second part of May. The species Phorodon humuli developed on the potato in 5 – 6 fundatrigenous generations. At Aulacorthum solani, the population development was maximum in May and June, the species disappearing from the potato culture in August.*

Key words: *aphids, life cicle, potato*

INTODUCTION

Aphids are one of the most studied entomological groups, as regular pests and especially as virus vector of cultivated plants.

In Romania researches were carried out at ICCP, Brasov by DONESCU (1996), (1997), (1998), (2001) and DRAICA (1996). In the climatic conditions specific for the West zone aphids have characteristic life cycle.

The main species of potato aphids are: *Rhopalosiphum padi* – LINNAEUS, 1758; *Aphis fabae* – SCOPOLI, 1763; *Aphis frangulae* – KALTENBACH, 1845; *Aphis nasturti* – KALTENBACH, 1843; *Brachycaudus helichrysi*– KALTENBACH, 1843; *Macrosiphum euphorbiae* – Thomas, 1878; *Myzus persicae* – Sulzer, 1776; *Acyrthosiphon pisum* – HARRIS, 1776; *Phorodon humuli* – SCHRANK,1801; *Aulacorthum solani* – KALTENBACH, 1843.

Stages or generations succession of a species at the end of which the insect will be in a status identical to the initial one is called biologic cycle.

The biologic cycle of the aphids is complex, heterogeneous, alternating sexual reproduction with the partenogenous one and multiplicative one (from a single fundatrix female an entire population can be formed).

Aphids are reproducing in both a sexual and parthenogentic way. The sexuat form it is only obligatory for the primitive species of aphids. The species which perform their biologic cycle on two host plants have a dioecic cycle *Myzodes persicae*, these are migratory.

MATERIAL AND METHODS

The researches have been carried out for a period of three years, 2005 - 2007 in the experimental field of the Didactic Station Timisoara (STN). The aphids have been collected with the yellow vessel traps on a two days basis. The monitoring of aphids began on 1th of May and lasted until 30th of August.

RESULTS AND DISCUSSIONS

The biological research of the main species of aphids rendered the duration of the whole developmental cycle of the species in the potato culture, as well as the number of generations. For the species *Myzus persicae*, the medium multi-annual date of flight on potatoes is 20th May.

In the years 2005 and 2006, it presented up to 8 virginogeneous generations. In the year 2007, due to the high temperatures which affected negatively the prolificacy of the species, it only had 3 generations on the potato culture (Figure 1).

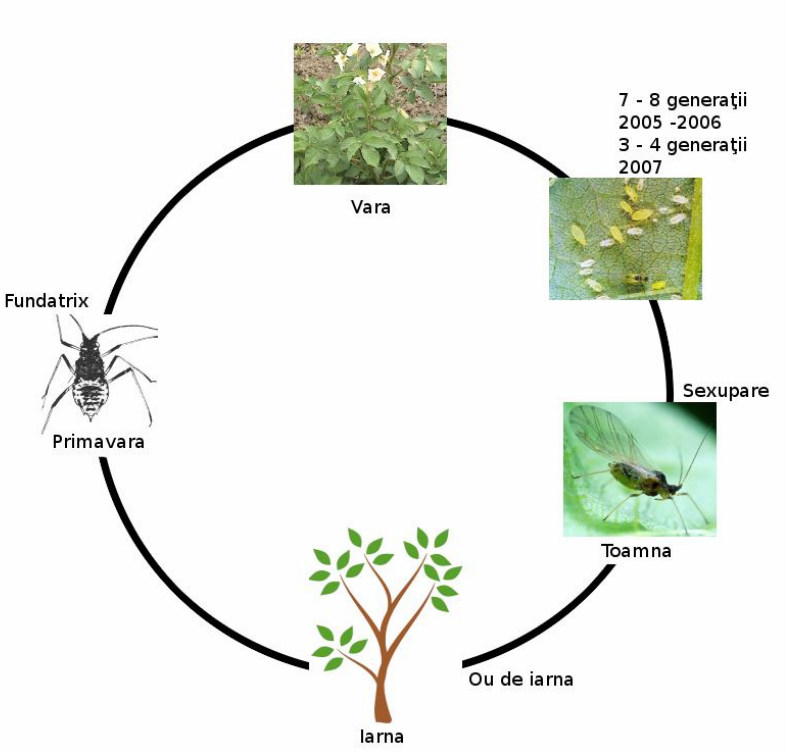

Figure 1. *Myzus persicae* life cycle

Migratory species have holociclyc development. Over-wintering takes place during the egg phase, near the bud formations on *Euonymus europee, E latifolia, E verrucosa, Viburnum opulus* in October - November.

Since the appearance of the second generation, winged aphid leave the host plants and migrate on the secondary host plants: potatoes.

This species is encountered throughout the vegetation period of potato.

In the conditions of the Western Plain, the species *Aphis fabae* evolved on the potato in 8 – 9 generations in the year 2005 – 2006 and in the year 2007 it only presented 6 – 7 generations. The activity of this species is constant throughout the whole vegetation period of the potato, having relatively large populations, and have the maximum of flight in the last part of May and early June.

In the three years of the study, analyzed species *Aphis fabae* has reached the greatest number of individuals in 2007 from the first decade of May and reached the maximum value of 215 individuals in the last decade of the same month, with an abundance of 599 individuals, monthly. In August, due to adverse climatic conditions for growth and development of potato, aphids disappear from the potato culture. In 2006 the maximum flight took place in the last decade when 230 individuals were captured.

Macrosiphum euphorbiae is a polyphagous species having as primary host plant different species of *Rosa.* Potato is one of the most preferred secondary host plant. In Western Plain colonies grow rapidly, with 8 to 12 generations per year, moving on potato 7 to 8 generations in the years 2005 to 2006, in 2007 it had only 5 to 6 generations.

Maximum flight curve recorded in the second decade of June in 2005 - 2006 and for 2007 the species had a recorded flight in the second decade of May.

Macrosiphum euphorbiae is an active species encountered in the potato crop in the second half of May until second decade of August, marking its debut in May 2005 with large populations. In 2007 the species has appeared since the first decade of the month, reaching an extremely large population during this month. Thanks to climatic conditions from this year species disappears in the first decade of July from potato crop.

The species *Phorodon humuli* developed on the potato in 5 – 6 fundatrigenous generations. From the three analyzed years, the species reached extremely high population values in the year 2006, beginning with the second part of May and reaching its highest value in the last part of May. The species *Phorodon humuli* developed on the potato in 5 – 6 fundatrigenous generations. From the three analyzed years, the species reached extremely high population levels in 2006 since the second decade of May and reached the maximum 1440 individuals in the last decade presenting a monthly abundance of individuals (1830) in May. Due to favorable climatic conditions in 2007 the species appeared very early potato crop since the first decade of May recorded the highest frequency of flights this year. In 2005 fewer individuals were captured, and in 2006 we can speak of an invasion of the species in May who presented an abundance of 2071 individuals, representing about 70% of monthly dominance species of aphids.

CONCLUSIONS

For the species *Myzus persicae*, the medium multi-annual date of flight on the potato is 20th May. In the years 2005 and 2006, it presented up to 8 virginogenous generations. In the year 2007, due to the temperature which affected negatively the prolificacy of the species, it only had 3 generations in the potato culture, being found in the potato culture only until the first part of June and not being captured in July and August.

In the conditions of the Western Plain, the species *Aphis fabae* evolved on the potato in 8 – 9 generations in the year 2005 – 2006 and in the year 2007 it only presented 6 – 7 generations. The activity of this species is constant throughout the whole vegetation period of the potato, having relatively large populations and the maximum of flight in the last part of May and June.

For the *Macrosiphum euphorbiae* species, the colonies developed rapidly presenting, on the potato cultures, 7 – 8 generations in the years 2005 – 2006, and only 5 – 6 generations in 2007. The maximum flight was recorded in the second part of June in 2005 and 2006, while in 2007 the maximum flight of the species was recorded in the second part of May.

The species *Phorodon humuli* developed on the potato in 5 – 6 fundatrigenous generations. From among the three analyzed years, the species reached extremely high population values in the year 2006, beginning with the second part of May and reaching its highest in the last part of May.

In the climatic conditions specific for the western region, for the species *Aulacorthum solani*, the population development was maximum in May and June, the species disappearing from the potato culture in August. There were 5 – 6 fundatrigenous generations on the potato.

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