# RESEARCHES REGARDING THE SPREADING DEGREE OF THE MAIN APHID SPECIES IN EXPERIMENTAL FIELDS FROM STN TIMISOARA

# CERCETARI PRIVIND VIRULENTA PRINCIPALELOR SPECII VECTOARE DE AFIDE DIN CAMPURILE EXPERIMENTALE DE LA STN TIMISOARA

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***Abstract:*** *This paper presents data referring to spreading ability of main aphid species from potato cultivations, for a period of two years 2005-2006. In these two experimental years the number of main aphid species was converted in unit of spreading by estimating the value of species virulence and virus infestation danger. The knowledge of the mobility capacity of the main aphid species from potato cultivations constitutes a basic element of the integrated potato pest control.*

***Rezumat:*** *Lucrarea prezinta date referetoare la capacitatea de transmitere a principalelor specii vectoare de afide din cultura cartofului pe o perioada de doi ani 2005- 2006. In cei doi ani experimentali numarul principalelor specii vectoare a fost transformat in unitati de transmitere prin care se poate aprecia virulenta speciei si pericolul infestarii cu virusuri. Cunoasterea capacitatii de vehiculare a principalelor specii de afide prezente in cultura cartofului constituie un element de baza al combaterii integrate a daunatorilor cartofului.*

***Key words*****:** *potato, aphids, virulence, virus*
***Cuvinte cheie***: *cartof, afide, virulenta, virus*

## INTRODUCTION

Aphids constitute the largest group of plant virus vector, more than 300 viruses are reported to be transmitted by them. They have a complex life history with a high multiplication rate and rapid population development. These properties and their feeding behaviour make them ideally suited for transmitting viruses. J.A de BOKS (1978)

Several viruses causing diseases in potatoes are transmitted by aphids.

The vectors pressure is not dependent only on the abundance of aphids but on the species structure and the dynamics of flight too. As frequency of species with high transmission efficiency is higher and as the flight begins earlier the virus spreading is stronger as a result of the fact that the younger plants are more susceptible to infections.

The scientific literature shows that there are differences regarding the aphid species virulence and that not all forms of the same species are transmitting the viruses in the same way BUIOC (1998). *Myzus persicae* is the most dangerous aphid and have a virulence of 1. In spread of viruses at potatoes the other species have a virulence between 0,1- 0,286 HARTON, (1983) cited by BEDO (1996).

## MATERIAL AND METHODS

The researches have been carried out for a period of two years, 2005-2006 in the experimental field from SD Timisoara. The aphids have been collected using the yellow traps. The samples have been collected every four days. The aphid monitoring began on the 1st of June and lasted until 30th of August.

**RESULTS AND DISCUSSIONS**

In 2005 aphid vector frequency oscillated between 14,5 at *Myzus persicae* and 0,05 at *Rhopalosiphum padi, Rhopalosiphum insertum (table 1).*

*Table 1*

The abundance of main vector species of vector aphids (unit of convection) Timisoara, 2005

| Nr crt. | Specia | Mai | Iunie | Iulie | August | Total | Media |
|---|---|---|---|---|---|---|---|
| 1 | *Myzus persicae* | 6 | 41 | 8 | 3 | 58 | 14,5 |
| 2 | *Aphis nasturti* | 2,24 | 10,92 | 2,52 | 0 | 15,68 | 3,92 |
| 3 | *Aphis frangulae* | 4,6 | 19,4 | 2,4 | 2,8 | 29,2 | 7,3 |
| 4 | *Aulacorthum solani* | 10,8 | 36,2 | 2,6 | 0 | 49,6 | 12,4 |
| 5 | *Phorodon humuli* | 1,35 | 2,55 | 0,15 | 0 | 4,05 | 1,01 |
| 6 | *Macrosiphum euphorbiae* | 10 | 22,3 | 3,1 | 0,1 | 35,5 | 8,87 |
| 7 | *Aphis fabae* | 6,3 | 19,5 | 3,7 | 1,2 | 30,7 | 7,67 |
| 8 | *Acyrtpsiphon pisum* | 0,3 | 1,75 | 0,1 | 0,05 | 2,2 | 0,55 |
| 9 | *Rhopalosiphum insertum* | 0 | 0,05 | 0,15 | 0 | 0,2 | 0,05 |
| 10 | *Rhopalosiphum padi* | 0,04 | 0,16 | 0,02 | 0 | 0,22 | 0,05 |
| 11 | *Brachycaudus helichrysi* | 0,05 | 0,25 | 0,02 | 0,02 | 0,34 | 0,08 |
| | Total: | 41,68 | 154,08 | 22,76 | 7,17 | 225,69 | |

In this year the highest frequency was attained by *Myzus persicae*, with a virulence of 58. *Aulacorthum solani* have a virulence of 49,62 and *Macrosiphum euphorbiae* a virulence of 35,5, the other species present a very small virulence.

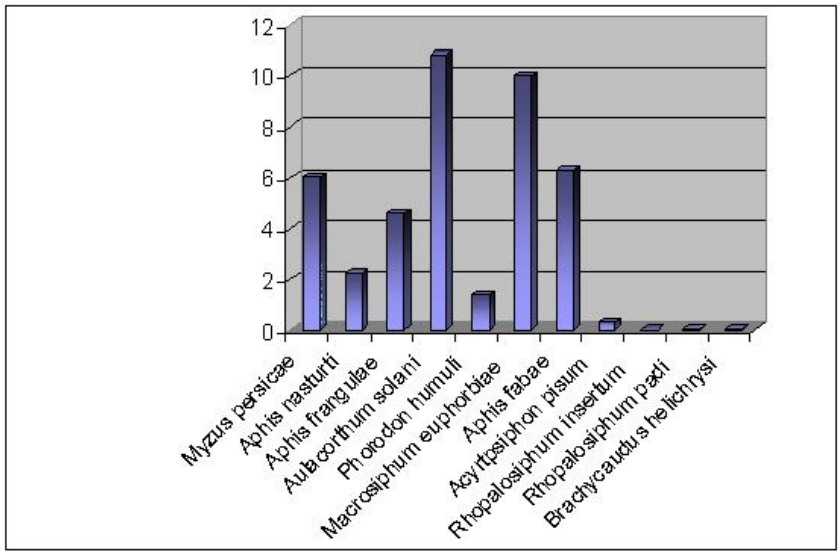


Figure 1: The vehicular capacity a main vector aphid species, May, 2005 Timisoara

May is characterized by a great number of aphid. *Myzus persicae* appear in culture still this mounth. The highest frequency transmission factor have the *Aulacorthum solani, Macrosiphum euphorbiae Aphis fabae, Myzus persicae, Aphis frangulae* and *Aphis nasturti* (figure 1).

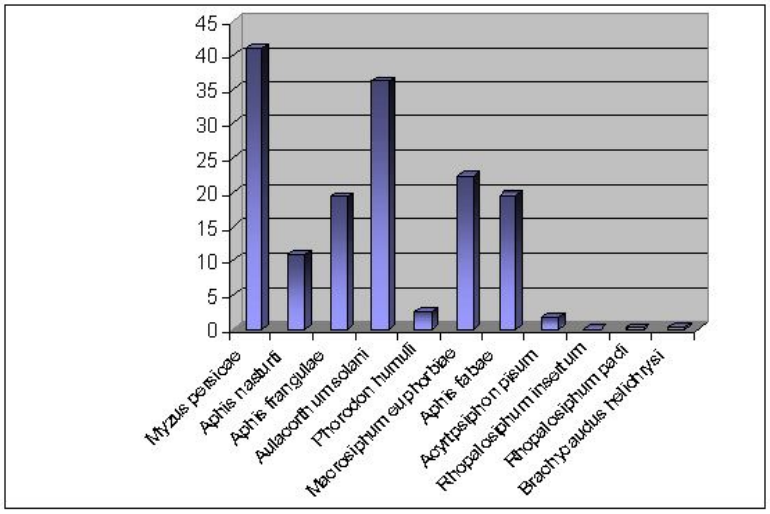

Figure 2: The vehicular capacity a main vector aphid species, June, 2005 Timisoara

In June the vector aphids number was greater then in the other month . The highest frequency transmission factor have the *Aulacorthum solan* with a coefficient of 36,2, *Macrosiphum euphorbiae* with a coefficient of 22,3 *Aphis fabae* with a coefficient of 19,5, *Aphis frangulae* with a coefficient of 19,4, Aphis nasturti with a coefficient of 10,92. (figure 2)

In July the vector aphids number was lower then in the other month.

The highest frequency transmission factor have the *Myzus persicae, Aphis fabae, Macrosiphum euphorbiae Aulacorthum solani, Aphis frangulae si Aphis nasturti.* (figure 3)

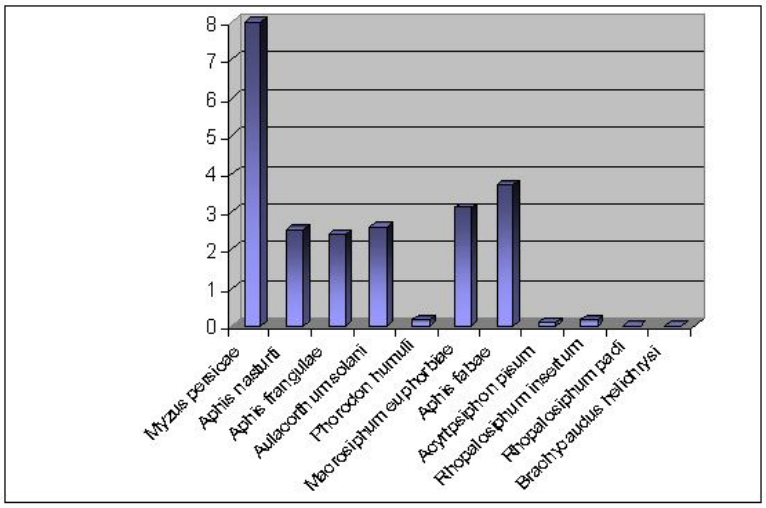

Figure 3: The vehicular capacity a main vector aphid species, July, 2005 Timisoara

August is characterized by least coefficient of transmission (figure 4).

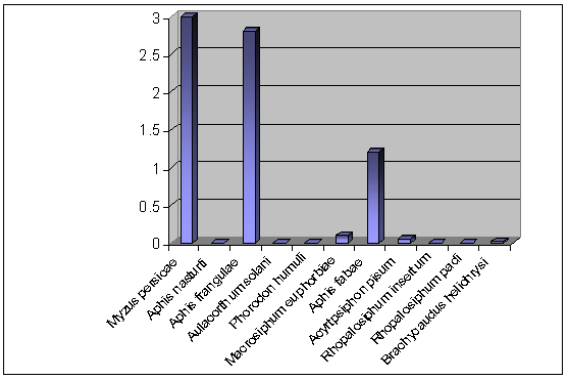


Figure 4: The vehicular capacity a main vector aphid species, August, 2005 Timisoara

In 2006 the aphid vector frequency oscillated between 72,82 for *Phorodon humuli* and 0,05 for *Rhopalosiphum* insertum (table 2).

*Table 2*

The abundance of main vector species of vector aphids (unit of convection) Timisoara, 2006

| Nr crt. | Specia | Mai | Iunie | Iulie | August | Total | Media |
|---|---|---|---|---|---|---|---|
| 1 | *Myzus persicae* | 30 | 28 | 6 | 3 | 67 | 16,75 |
| 2 | *Aphis nasturti* | 77 | 5,04 | 1,12 | 0 | 83,16 | 20,79 |
| 3 | *Aphis frangulae* | 26 | 6,6 | 2 | 1 | 35,6 | 8,9 |
| 4 | *Aulacorthum solani* | 6,4 | 3,4 | 6 | 0 | 15,8 | 3,95 |
| 5 | *Phorodon humuli* | 274,5 | 15 | 1,65 | 0,15 | 291,3 | 72,82 |
| 6 | *Macrosiphum euphorbiae* | 1,5 | 1,3 | 1,3 | 0,2 | 4,3 | 1,07 |
| 7 | *Aphis fabae* | 28,5 | 6,7 | 3,1 | 0,3 | 38,6 | 9,65 |
| 8 | *Acyrtpsiphon pisum* | 0,3 | 0,1 | 0,2 | 0,05 | 0,65 | 0,16 |
| 9 | *Rhopalosiphum insertum* | | 0,15 | 0,05 | 0 | 0,2 | 0,05 |
| 10 | *Rhopalosiphum padi* | 0,24 | 0,42 | 0,02 | 0 | 0,68 | 0,17 |
| 11 | *Brachycaudus helichrysi* | 0,41 | 0,21 | 0,03 | 0,01 | 0,66 | 0,16 |
| | Total: | 444,85 | 66,92 | 21,47 | 4,71 | 537,95 | |

May have the highest frequency transmission factor of 444,85. *Phorodon humuli* have the great virulence of 274,5 (figure 5).

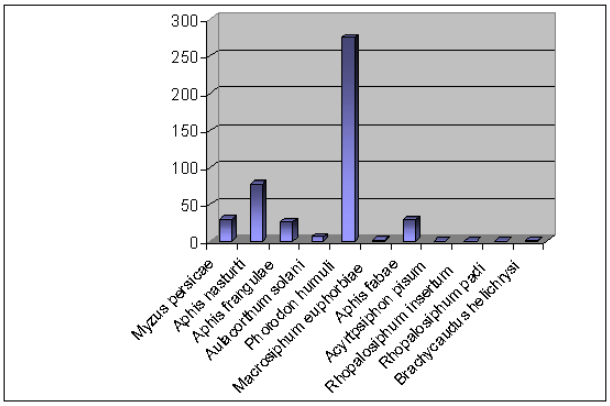


Figure 5: The vehicular capacity a main vector aphid species, May, 2006 Timisoara

In June the frequency transmission factor is in diminution. *Myzus persicae* have a virulence of 28 (figure 6).

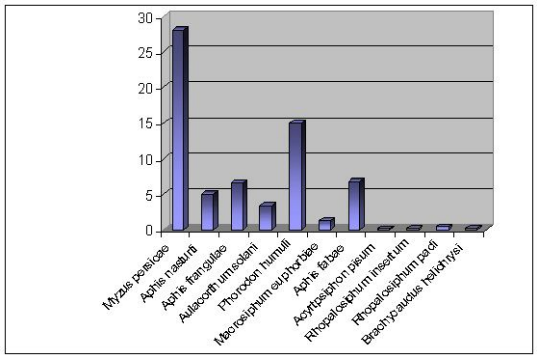


Figure 6: The vehicular capacity a main vector aphid species, June, 2006 Timisoara

In July *Aulacorthum solani* and *Myzus persicae* had the greatest virulence in this month. (figure 7).

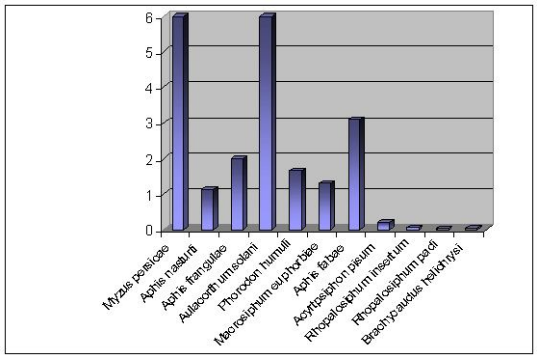


Figure 7: The vehicular capacity a main vector aphid species, July, 2006 Timisoara

August is characterized by a lower coefficient of transmission (figure 8).

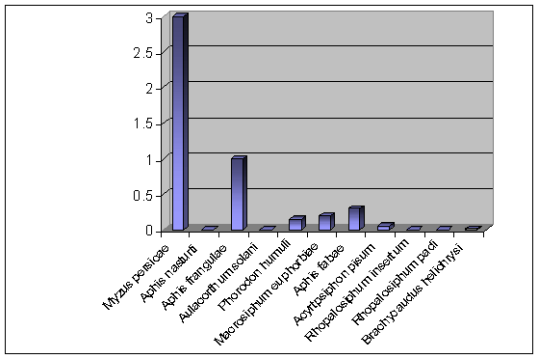


Figure 8: The vehicular capacity a main vector aphid species, August, 2006 Timisoara

**CONCLUSIONS**

The experimental fields from STN Timisoara are characterized by a very high delivery coefficient.

Year 2005, is characterized by a high abundance of all vector species.

From pressure point of view, the most frequent specie was *Myzus persicae*, species present in all potato vegetation time. In this year the highest frequency was attained by *Myzus persicae*, with a virulence of 58. *Aulacorthum solani* have a virulence of 49,62 and *Macrosiphum euphorbiae* a virulence of 35,5, the other species present a very small virulence.

In 2006 aphid spread of disease was oscillated between 72,82 at *Phorodon humuli* and 0,05 at *Rhopalosiphum insertum*.

*Phorodon humuli* species is net superior compared to other species have an annual virulence of 91,3.

Analyzing the relation between population sizes and the spread of diseases at potatoes we can observe that structure and abundance influence the degree of infection with sever diseases.

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