THE METEOROLOGICAL CONDITIONS EFFECT ON THE VECTORS APHIDES BY VIRUSES

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Abstract: *The quality of potato yield is influenced directly by the quality of planting material. The majority of aphides species which transmit the potato viruses in northern part of Suceava Plateau on different hosts are developed.*
An important role in the fly aphides frequency has the meteorological conditions, which depend by multiplication and movement facility of them. It was studied 6 aphides species such as: Myzus persicae, Aphis frangulae, Aphis nasturtii, Aphis fabae, Acyrtosiphon pisum şi Rhopalosiphum sp.
The accomplished determinations during three years emphasized that the fly aphides had an increased frequency, when the medium terms during second half of the June and first half of the July were bigger then 18° C, and the pluvial damping level (i.u.p.), did not surpass over twice the precipitations necessary.

Key words: *aphides species, viruses, potato seed*

Introduction

Aphides constitute the largest group of viruses vectors, as transmitted a large number of pathogenic viruses, and therefore the main objective of producers of seed potatoes not only in control of the aphides already installed in crops, but especially given find the most effective means to prevent their elimination (*DANIELA DONESCU, 1997*).

Between aphides and viruses there is a close relationship, meaning that aphides means of spreading viruses, and improve the quality of plants like food support for aphides.

Since the early twentieth century have been investigated on the identification transmission of virus diseases. Oortwijin Botjes (1920) considers that peaches green aphides (Myzus persicae Sulz.) as the main transmitter of the virus in potato and in particular the virus Y (streak), the virus rolling leaves and virus A fact later confirmed by numerous researches upon the vector biology and how the transmission of viruses (MAN S. et al., 1969).

The frequency of primary infection with the virus M to the resistant cultivars was correlated positively with flight aphides *Myzus persicae* Sulz. and *Macrosiphum euphorbiae* during period May-June, when potato plants were young. At the very susceptible and middle resistant cultivars the infections were in direct relationship with flight of species *Aphis fabae* (COJOCARU N., 1987).

County Suceava is regarded as an area favourable and very favourable for the cultivation of potatoes in terms of weather conditions and a favourable area in terms of the types of soil (M. Berindei, 1977).

The natural environment, economic, social and technical framework of Suceava county allowed the organization of "closed zone" in Suceava, when during period 1967-1989 were produced and delivered hundreds of thousands of tons of seed potatoes with biological

value and the adequate phytosanitary state (TRÎMBACIU V., 1975).
Direction of the prevailing winds in the Suceava area northwesterly in May, June and July, the frequency of winds of 2 m/second, producing the danger of passive mobilization of aphides. Thus

Biologic material and research method
This research paper is a study concerning the role of weather conditions on the flight aphides for a period of three years, at the seed potatoes from Suceava area. Have been studied specifically 6 aphides species *Myzus persicae Sulz., Acyrtosiphon pisum, Aphis frangulae, Aphis nasturtii, Aphis fabae and Rhopalosiphum sp*
The aphides flight was followed by the method vessels yellow (Moerike traps) with the addition of water and detergent. Determination of abstractions made in the field of seed potato production from

was done in the years 1963 - 1968, a flight earlier, more intensive of species *Myzus persicae* Sulz., resulting a more active spread of the virus rolling leaves, and a higher infection percentage (*COJOCARU N. şi colab., 1973*).

Suceava, was carried out at I.N.C.D.C.S.Z. Brasov.
The biological pressure exerted by aphides is expressed in units of transmission (UT), bringing to a common denominator the species and their virulence. Not all aphides species transmitted in the same manner the viruses, for example, the most dangerous is *Myzus persicae* Sulz. His virulence is equal to 1. The other aphides species have a lower virulence, between 0.1 and 0.286 UT *(HARTEN von A., 1983, quoted by Bedö E., 1988)*.

Table 1 Vehicular capacity of the various aphides species (*HARTEN von A., 1983*, citat de *BEDÖ E., 1988*)

Nr. crt.	Species of aphides	The transmission unit of viruses
1.	Myzus persicae	**1**
2.	Aphis nasturtii	**0,286**
3.	Aphis frangulae	**0,20**
4.	Aulacorthum solani	**0,20**
5.	Phorodon humuli	**0,15**
6.	Macrosiphum euphorbiae	**0,10**
7.	Aphis fabae	**0,10**
8.	Acyrtosiphon pisum	**0,05**
9.	Rhopalosiphum insertum	**0,05**
10.	Rhopalosiphum padi	**0,02**
11.	Metopophium dirhodum	**0,01**
12.	Brachycanudus helichrysi	**0,01**

Results and discussions
The flight frequency of aphides (total species), a main role is the weather conditions, which depend on the multiplication, of their facility and their movement.
Measured by three years, shows that aphides flight had an increased frequency

in the years 1997 to 1999 (tab. 2), when the decadal average temperatures in the second half of June and first half of July were higher 18o C, while the damping pluvial level (i.u.p.) did not exceed twice the precipitations necessary. (fig. 1, 2, 3).

Table 2 Relations between the intensity of aphides flight and some meteorological parameters

Year	Month	Decade	Total number of aphides	Transmision units (U.T.)	t °C	Precipitations (mm)	i.u.p.
1997	V	3	*18*	1,8	11,8	59	8,4
	VI	1	*48*	4,8	15,3	15	1,1
		2	*69*	8,3	18,2	51	3,4
		3	*135*	23,4	18,6	25	1,3
	VII	1	*311*	42,1	19,6	38	1,7
		2	*117*	13,1	16,8	44	2,1
		3	*289*	46,9	18,7	30	1,1
	VIII	1	*205*	51,3	19,1	13	0,7
		2	*121*	17,5	18,0	1	0,1
1998	V	3	*10*	1,0	13,6	22	1,7
	VI	1	*89*	10,0	20,2	4	0,2
		2	*68*	8,5	16,8	126	7,0
		3	*271*	34,8	18,7	5	0,2
	VII	1	*98*	11,7	16,0	32	3,6
		2	*115*	12,3	18,7	59	2,4
		3	*122*	12,5	22,5	10	0,3
	VIII	1	*38*	3,9	21,6	4	0,1
1999	VI	2	*114*	13,9	21,7	5	0,6
		3	*300*	35,9	17,9	36	0,1
	VII	1	*433*	58,6	22,7	9	1,4
		2	*221*	27,2	19,5	29	0,2
		3	*230*	58,1	20,2	28	1,0
	VIII	1	*45*	13,2	20,1	12	0,9

In 1988, when the above-mentioned average temperature was less than 18° C, and the index damping pluvial was twice as large, emphasized the lowest frequency of flights with a total of 484 samples (Fig. 1), in comparison with 563 samples in 1998 (Fig. 2) and 847 samples in 1999 (fig. 3) .

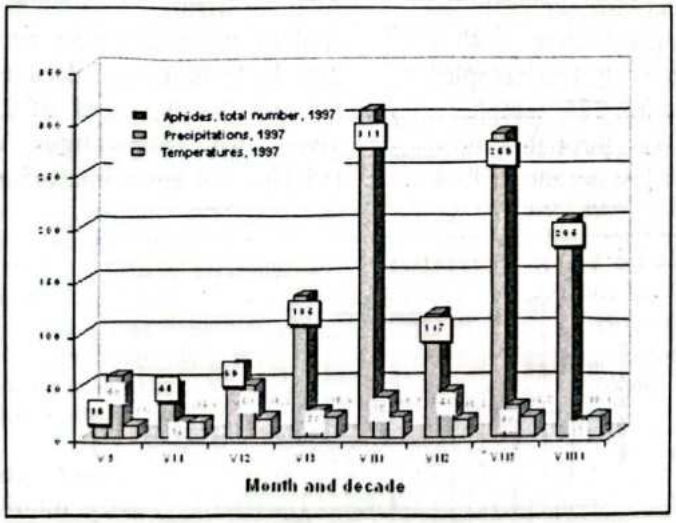

Figure 1 The aphides species frequency, function by some meteorological– Suceava 1997

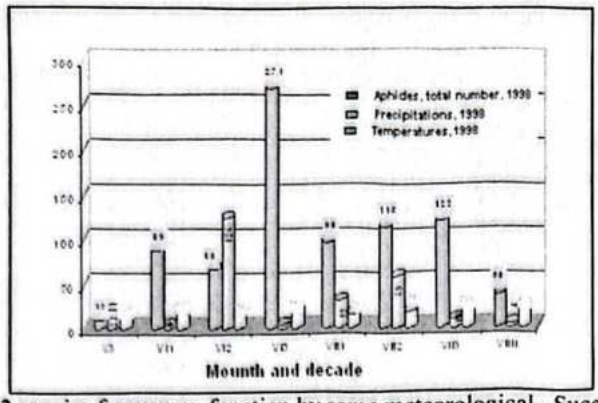

Figure 2 species frequency, function by some meteorological– Suceava 1999

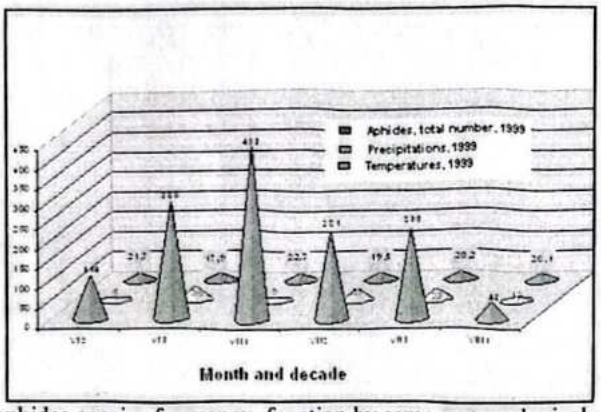

Figure 3 The aphides species frequency, function by some meteorological– Suceava 1999

Maintaining a high thermal regime (20 - 22^0 C) and a scheme hydrous low (iup = 0.1 - 0.9) in late July and early August determining the decrease of aphides propagation rate being associate with a lower flight in 1998 with 160 samples (Fig. 4) and 1999 with 275 samples . Year 1997 was remarked through a more intensive flying in the last decade of June and the first decade of July, culminating with temperatures higher than 18^{0}C in the last decade of July and the first decade of August, when the number of captured aphides were comprise between 205 - 289. In 1998 the last decade of June has reached the threshold of 271 samples, given that temperatures were higher (18.7^{0}C) and low rainfall (5 mm).

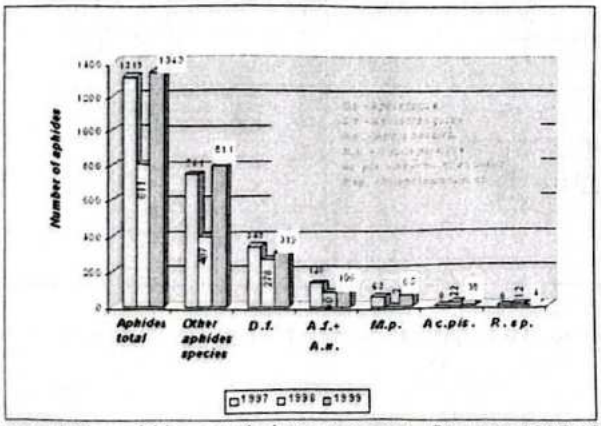

Figure 4 The aphides populatioms structure , Suceava 1997-1999

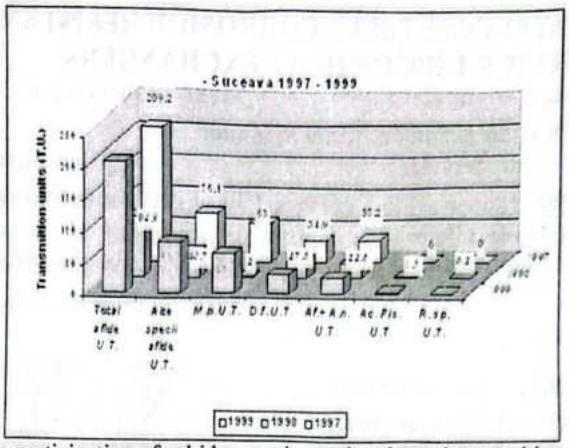

Figure 5 The participation of aphides species to the viruses' transmition exprimed in transmition units

Among the determined species is notes the presence of *Myzus persicae*, in the form of transmission units, being predominantly in 1997, (63 UT) and 1999 with 65 UT. *Aphis fabae* had a constant presence in all the study years as the number of captured samples (278 - 349), but as units of transmission 27.8 - 34.9 UT (Fig. 5). Group of aphides "other species" was obviously on the first place with 407 captured samples in 1988 and culminating with 811 samples in 1999.

Conclusions

The period taken in the study acknowledged that northern part of Suceava Plateau is a source of vectors for transmitting viruses to potato crop seed;
- At the same time it shows the highest frequency of the number of individuals transmitting of the virus diseases, and species *Myzus persicae* was dependent on climatic conditions (eg 1998);
- In the target area the frequency of *Aphis frangulae*, *Aphis nasturtii* and *Aphis fabae* species was less influenced by climatic conditions;
- Space isolation of seed production potato plots, is a measure of basic technology of this crop.

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