SOME ASPECTS OF *MYZUS CERASI* CURVE OF FLIGHT IN THE WEATHER CONDITIONS OF WESTERN ROMANIA

Daniela MINCĂ, Ana – Maria VÎRTEIU, Doru PETANEC

Banat's University of Agricultural Sciences and Veterinary Medicine, Faculty of Agricultural Sciences, Timisoara, Aradului Street, no. 119, RO-300645, Romania, E- mail: gmdanielaminca@yahoo.com

Abstract: *In the present paper were emphasized the results of aphid flight (winged forms) of Myzus cerasi in weather conditions of Western Romania in the period 2007- 2009. Paper originality was given by the fact that the sour cherry was more cultivated in Banat, and the pests were partial studied. In that context, the paper purpose was to bring new contribution to bioecological particularities knowledge of Myzus cerasi species. The curve of flight was followed from winged forms apparition to sour cherry cropping. For curve of flight realization were used two types of adhesive traps: type PAL and type PALz, placed to different altitudes in head of trees. Investigation made during a period of 20 days, with a periodicity of reading to every 24 hours. The danger time for the orchard was of 19 days in the year 2007, respectively 13-30.06, and the maxim stage was taught in 22.06, characterized through a temperature of 24.3 degree C and an atmospheric humidity of 67%. In the year 2008, it observed that the danger time was of 17 days, from 08-25.06, and the maximum level was taught in 20.06, date characterized through a temperature of 22.4 degree C and an atmospheric humidity of 62%. In the same time with curve of flight realization in the year 2009 it observed that danger time for the orchard was also of 17 days, from 11-28.06, the maxim level taught being in 16.06, characterized through a temperature of 25.7 % degree C and a humidity of 55%. The curve of flight of aphid populations, winged forms, in the three years of observations presented in general, a similar evolution registering a gradual increasing of populations in the first decade of June month, followed by a gradual decreasing until the end of period. Experimental data offered bird's eye view on the attack produced by Myzus cerasi on sour cherry orchards and on treatments applying necessity to warning.*

Key words: *aphids, curve of flight, traps*

INTRODUCTION

The sour cherry cropping history was bound to bird cherry (GHENA N., 1970). The age in sour cherry crop could be appreciated as being very old. The first information written were held by Grecian philosophers Xenofon (536 before Christ) and Teophrst (374- 287 before Christ) (www.sfaturi pomicole). The end of XIX century was marked by preoccupations concerning the extending of sour cherry cropping in our country. It was proposed the first species of sour cherry by Hentescu in the year 1880 which might to be engrafted in nursery gardens, among which were remembered the species: Spanish and Regal bitter (FENESANU N., 2004).

After MILITIU (1962) quoted by SIMERIA (1995), sour cherry had therapeutic features improving the digestion and changing the chemical composition of blood and urine, recommending in diet for renal and heart illness. The sour cherry fruits were one of the most health aliments, being necessary in a rational nutritional portion (RUDI, 1976).

MATERIAL AND METHODS

In speciality literature of country and abroad were presented a series of scientific papers which presented the work methodology that could be applied in case of investigations concerning the morphology and aphids biology BALACHOWSKY (1935), FJELDDALEN (1964),

ROTHERAY (1989), SECO (1991), ALFORD (1992), POSTIGO (1993), BUCZACKI (1998), FERARU (2004), TSITSIPIS (2007), HARRINGTON (2008).

In morphology investigations the biological material was collected from the orchards, and the preservation and aphids emplacement on blade was made in laboratory. The curve of flight was followed from the date of winged forms apparition to fruits cropping and that one, caught only the first part of flight, respectively the winged form. Observations made in the field following the climatic factors influence, which were directly dependent by the modification which could turn up in species development. To make a curve of flight it were used different types of adhesive traps, placed at different altitudes in head of trees. In every tree were placed adhesive traps of type PAL and PALz, each one in the head of tree, and in base of it.

Investigations concerning the curve of flight realization were realized beginning with 2007 until 2009, during 20 days. The traps reading made at every 24 hours. The curve of flight was followed from apparition date of winged forms to the phase of virginogenus winged. Thus the present study contained only the first part of flight, respectively the first winged form, the curve of flight made out only in that form, and in the period from winged form apparition to sour cherry cropping.

RESULTS AND DISCUSSIONS

The curve of flight realization it meant the winged forms (migratory) which went from a tree to another and from a part to another. The curve of flight knowledge was necessary to make the treatments warning, and showing in the same time how much the danger of attack remained in the orchards.

Table 1

Number of adults (winged forms) captured with the help of adhesive traps in the period 13.06- 30.06.2007

Date	Number of captured aphids				Total aphids/traps
	Traps placed to the base of head of tree		Traps placed in the head of tree		
	trap type PAL	trap type PALz	trap type PAL	trap type PALz	
13.06.07	8	22	12	35	77
14.06.07	10	35	15	48	108
15.06.07	10	33	17	58	118
16.06.07	11	39	14	49	113
17.06.07	18	56	22	63	159
18.06.07	21	73	19	78	191
19.06.07	29	61	35	91	216
20.06.07	19	105	36	110	270
21.06.07	19	64	28	121	232
22.06.07	22	98	47	159	326
23.06.07	32	87	45	155	319
24.06.07	29	89	39	78	235
25.06.07	28	78	36	145	287
26.06.07	28	64	27	89	208
27.06.07	15	42	8	54	119
28.06.07	11	51	19	59	140
29.06.07	3	34	11	44	92
30.06.07	3	29	11	34	77
Total aphids	316	1060	441	1470	**3287**

From table 1 resulted that in 2007, the winged form apparition took place in 13.06.2007. Also, it could observe that the biggest density of aphids registered on superior level of head of tree, both on adhesive traps of type PAL, and of PALz type.

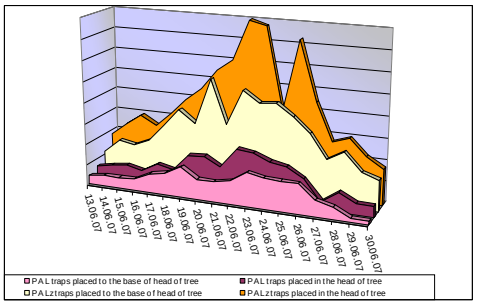


Figure 1. Number of adults captured with the help of traps in different regions of the head of tree in 2007

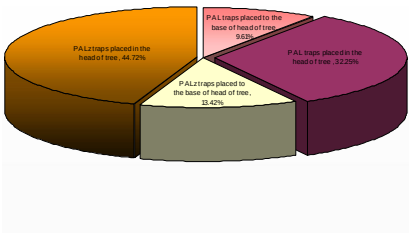


Figure 2. Adults percentage collected with the help of different types of traps from the total of captured species in 2007

From table 1 and figure 1 it observed that in case of PAL traps placed to the base of tree the biggest number of species registered in 23.06.2007, being of 32 species, and the lowest number registered was in 29 and 30.06.2007 (3 species). In case of PALz traps, placed also on base of head of tree, the maximum of species registered, such as 105, it was in 20.06.2007, and the lowest (22) in 13.06.2007. In case of traps PAL type placed in the head of tree, the maximum of collected species was 47 and was registered in 22.06.2007, and the smallest number, such as 8 species, realized in 27.06.2007.In case of PALz type of traps, placed in the head of tree the maximum number of collected species (159) was collected in 22.06.2007, the smallest number (34) registered in 30.06.2007.

From analysis of collected samples it observed that the biggest percentage of insects, 45.5% registered in case of trap PALz type placed in the head of tree, and the lowest percentage (9.76%) signaled to traps PAL type placed to the base of stalk. Thus, we concluded that the highest percentages registered to traps PALz type, indifferently if it were placed to the base or in the head of tree (figure 2). In the same time with the curve of flight realization, it observed that time danger for the orchard, was of 19 days, respectively from 13- 30.06.2007.

Table 2

Evolution of adults' number of *Myzus cerasi* captured to Dumbravita in the year 2007

Date	Total of aphids	Air temperature (°C)	Atmospheric humidity (%)
13.06.07	77	**21,5**	**69**
14.06.07	108	**23,4**	**64**
15.06.07	118	**24,7**	**62**
16.06.07	113	**21,8**	**72**
17.06.07	159	**23,2**	**59**
18.06.07	191	**23,3**	**65**
19.06.07	216	**25,2**	**54**
20.06.07	270	**25,7**	**56**
21.06.07	232	**26,4**	**51**
22.06.07	326	**24,3**	**67**
23.06.07	319	**23,3**	**68**
24.06.07	235	**23,5**	**52**
25.06.07	287	**25,4**	**55**
26.06.07	208	**26,5**	**53**
27.06.07	119	**20,5**	**63**
28.06.07	140	**20,1**	**51**
29.06.07	92	**20,4**	**48**
30.06.07	77	**21,4**	**53**

From table 2 it observed that the most intense period of flight was in 22.06, characterized trough a temperature of 24.3 degree C and an atmospheric humidity of 67%.

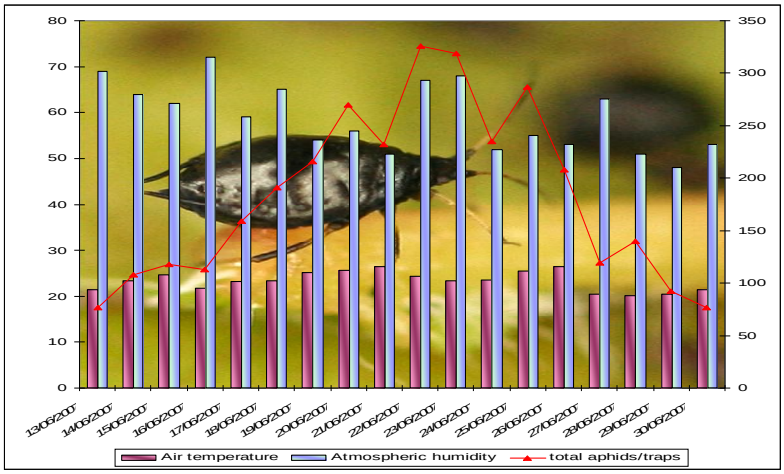


Figure 3. Curve of flight of *Myzus cerasi* aphid during the period 13.06- 30.06. 2007

If investigated the curve of flight schedule, the one of atmospheric humidity and temperature, it observed that had existed a period of 6 days of intense activity of aphids (fig.3). To those points corresponded a high humidity and an average humidity being the best for aphids flight.

Table 3

The number of adults (winged forms) captured with the help of adhesive traps in the period 08.06-25.06.2008

Date	**Number of captured aphids**				**Total aphids/traps**
	Traps placed to the base of head of tree		**Traps placed in the head of tree**		
	trap type PAL	**trap type PALz**	**trap type PAL**	**trap type PALz**	
08.06.08	3	30	5	51	89
09.06.08	8	30	4	55	97
10.06.08	8	41	6	72	127
11.06.08	5	21	7	84	117
12.06.08	3	18	3	43	67
13.06.08	2	15	3	39	59
14.06.08	8	42	12	104	166
15.06.08	11	25	15	124	175
16.06.08	16	45	18	113	192
17.06.08	12	45	18	119	194
18.06.08	9	38	13	97	157
19.06.08	13	36	21	76	146
20.06.08	18	47	23	145	233
21.06.08	14	45	19	134	212
22.06.08	13	34	19	138	204
23.06.08	15	37	17	112	181
24.06.08	9	22	19	127	177
25.06.08	7	22	15	101	145
Total aphids	174	593	237	1734	**2738**

From table 3 it observed that in the year 2008, the apparition of winged form took place in 08.06.2008.

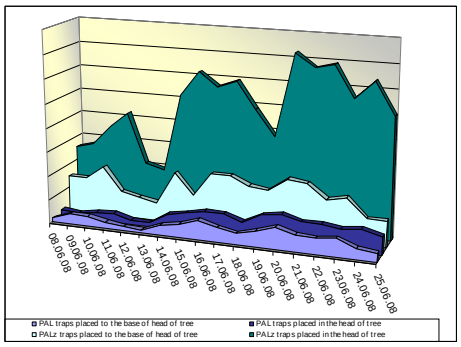


Figure 4. The number of adults captured with the help of traps in different regions of the head of tree in the year 2008

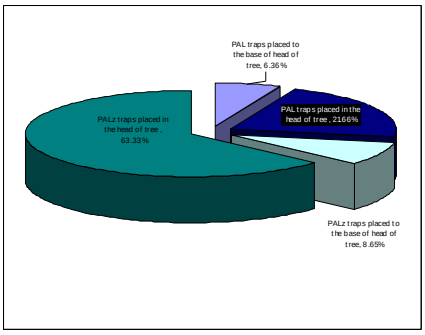


Figure 5. Adults percentage collected with the help of different types of traps from the total of captured species in 2008

From table 3 and figure 4 it observed that in case of PAL traps placed to the base of head tree the biggest number of species registered in 20.06.2008, being of 18 species, and the lowest number registered was in 13.06.2008 (2 samples). In case of PALz traps, also placed to the base of head of tree, the maximum number of species registered, namely 47, was in 20.06.2008, and the lowest (15) in 13.06.2008. In case of traps PAL type placed in the head of the tree, the maximum number of collected species was 23 and registered in date 20.06.2008, and the smallest number, namely 3 species, realized in date of 12 respectively 13.06.2008. In case of traps PALz type placed in the head of tree the maximum number of collected species (145) was in 20.06.2008, the smallest number (39) registered in 13.06.2008.

In conclusion, in the year 2008 the number of maximum of species collected was in 20.06.2008, and the smallest number of species was collected in 13.06.2008, indifferent of type traps and the level of emplacement in the head of tree, that meant the maximum of attack registered in case of *Myzus cerasi* signaled in 20.06.2008.

After investigations made on traps, it observed that the maximum percentage of aphids registered in case of PALz type placed in the head of the tree, and the smallest percentage in case of PAL type placed to the base of stalk (fig 5). Also, from figure 6.5. it could be concluded that the adhesive traps of type PALz, or it were placed in the head of tree, or to the base of its, brought the best results in monitoring *Myzus cersi* species.

After curve of flight realization we could affirm that danger time for the orchard, was between 08- 25.06.2008.

From table 4, it observed that the most intense period of flight was in 20.06, characterized through a temperature of 22.4 degree C and an atmospheric humidity of 62%.

If the schedule of curve of flight was investigated, the one of atmospheric humidity and temperature, it existed a period of 3 days of intense activity of aphids, from 15- 17.06, followed by a significant decreasing, thanks to the weather conditions, an atmospheric humidity over than 70%, that brought a stopped aphids activity (fig.6.). After that period followed a significant increasing, when registered maximum of flight, followed by a continual decreasing until the end of investigated period.

From table 5 and figure 7 it determined that in case of PAL traps placed to the base the number the biggest of species registered in 16.06.2009, being of 47 species, and the

smallest number registered was 12,13 in 27.06.2009 (6 samples). In case of PALz traps, placed also to the base of head of tree, the maximum number of species registered, namely 138, was in 16 and 20.06.2009, and the lowest (8) in 13 and 27.06.2009. In case of PAL traps placed in the head of tree, the number of maximum species collected was 112 and registered in 16.06.2009, and the smallest number, namely 11 species, realized in 13.06.2009. In case of PALz traps, placed in the head of tree the maximum number of collected species (359) was in 16.06.2009, the smallest number (16) registered in 28.06.2009.

Table 4

Evolution number of adults *Myzus cerasi* captured to Dumbravita in the year 2008

Date	Total aphids	Air temperature (°C)	Atmospheric humidity (%)
08.06.08	89	**17,8**	**81**
09.06.08	97	**20,1**	**68**
10.06.08	127	**21,5**	**66**
11.06.08	117	**22,3**	**64**
12.06.08	67	**19,7**	**74**
13.06.08	59	**19,1**	**78**
14.06.08	166	**16,1**	**69**
15.06.08	175	**17**	**70**
16.06.08	192	**17,9**	**65**
17.06.08	194	**20,9**	**63**
18.06.08	157	**20,8**	**75**
19.06.08	146	**21,2**	**68**
20.06.08	233	**22,4**	**62**
21.06.08	212	**24**	**60**
22.06.08	204	**24,8**	**59**
23.06.08	181	**26,6**	**55**
24.06.08	177	**27,1**	**57**
25.06.08	145	**27,2**	**55**

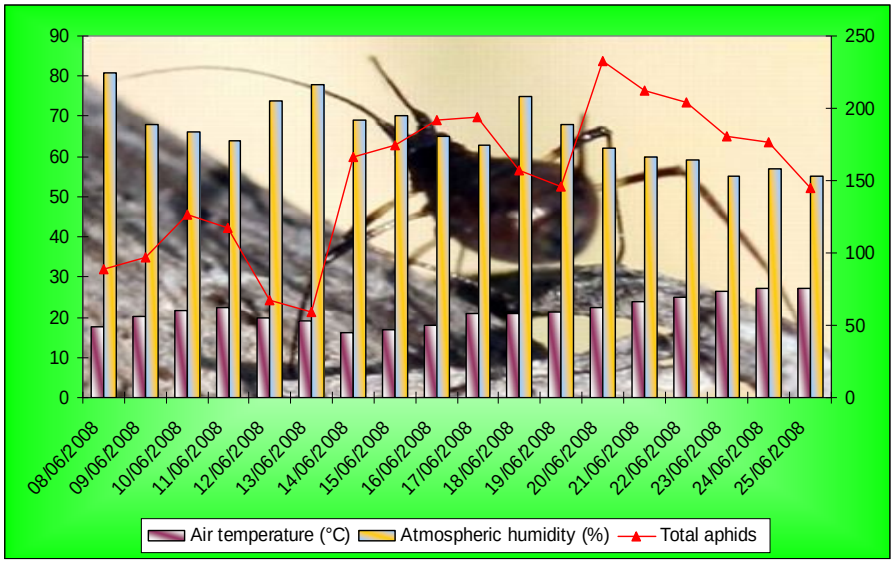


Figure 6. Curve of flight of aphid *Myzus cerasi* during the period 08.06- 25.06.2008

Table 5

Number of adults (winged form) captured with the help of adhesive traps in the period 11.06- 28.06.2009

Date	Number of captured aphids				Total aphids/traps
	Traps placed to the base of head of tree		Traps placed in the head of tree		
	trap type PAL	trap type PALz	trap type PAL	trap type PALz	
11.06.09	8	14	19	50	91
12.06.09	6	11	14	46	77
13.06.09	6	8	11	43	68
14.06.09	26	80	61	208	375
15.06.09	33	95	77	246	451
16.06.09	47	138	112	359	656
17.06.09	29	90	73	233	425
18.06.09	28	79	66	213	386
19.06.09	31	85	78	222	416
20.06.09	39	138	101	357	635
21.06.09	36	94	87	81	298
22.06.09	39	94	81	85	299
23.06.09	35	101	98	109	343
24.06.09	16	52	38	135	241
25.06.09	15	70	40	180	305
26.06.09	8	30	19	75	132
27.06.09	6	8	19	39	72
28.06.09	9	15	16	16	56
Total afide	417	1202	1010	2697	**5326**

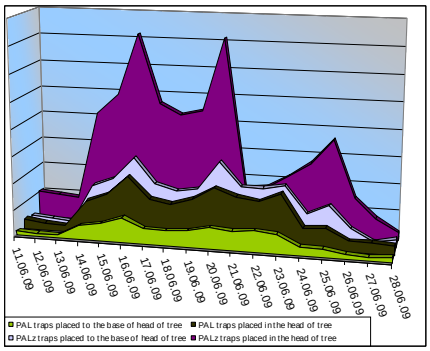


Figure 7. The number of adults captured with the help of traps in different regions of the head of tree in the year 2009

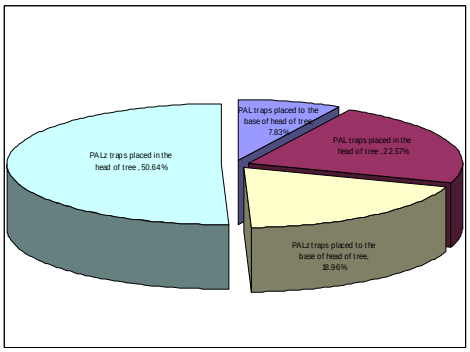


Figure 8. Adults percentage collected with the help of different types of traps from the total of captured species in 2009

In conclusion, in the year 2009 the maximum number of species was collected in 16.06.2009, with exception of PALz traps placed to the base and which resented two dates of collecting with maximum number of species. Data presented had showed that the maxim attack realized by *Myzus cerasi* species was in 16.06.2009. From realized investigations in the year 2009 it determined the maxim percentage of aphids was registered in case of PALz traps placed in the head of tree, and the percentage the smallest one in case of PAL traps placed to the base of head of tree. (fig.8).

It concluded that maxim percentage value of *Myzus cerasi* species was registered with the help of traps of PALz type, indifferently of emplacement, those being recommended in

monitoring of those species of aphids.

After curve of flight realization we could affirm that danger time for the orchard, was between 11-28.06.2009.

From table 6 it observed that the most intense period of flight was in 16.06.2009, characterized through a temperature of 25.7 degree C and an atmospheric humidity of 55%.

Table 6

Evolution number of adults *Myzus cerasi* captured to Dumbravita in the year 2009

Date	Total aphids	Air temperature (°C)	Atmospheric humidity (%)
11.06.2009	91	**21,9**	**75**
12.06.2009	77	**19,5**	**55**
13.06.2009	68	**17,9**	**50**
14.06.2009	375	**20,1**	**54**
15.06.2009	451	**20,6**	**64**
16.06.2009	656	**25,7**	**55**
17.06.2009	425	**22,0**	**62**
18.06.2009	386	**21,6**	**59**
19.06.2009	416	**23,4**	**64**
20.06.2009	635	**25,0**	**63**
21.06.2009	298	**15,5**	**93**
22.06.2009	299	**15,7**	**99**
23.06.2009	343	**17,8**	**82**
24.06.2009	241	**19,1**	**82**
25.06.2009	305	**19,9**	**77**
26.06.2009	132	**19,2**	**85**
27.06.2009	72	**19,2**	**87**
28.06.2009	56	**20,1**	**84**

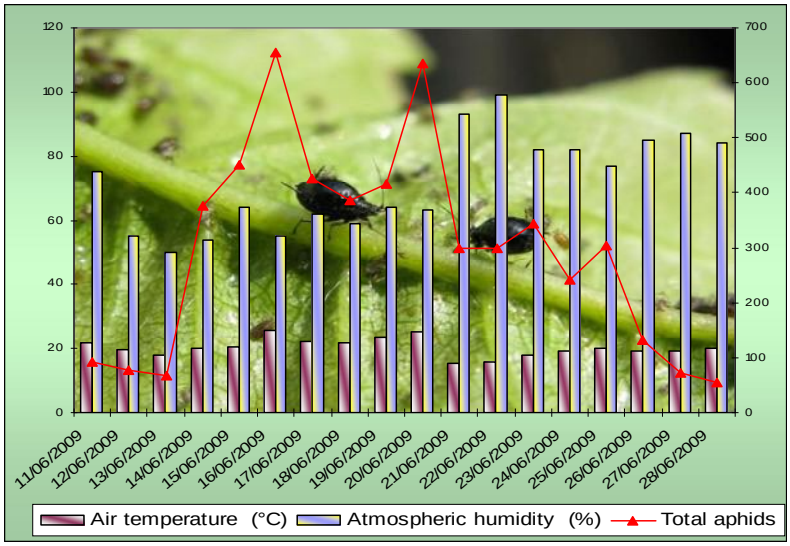
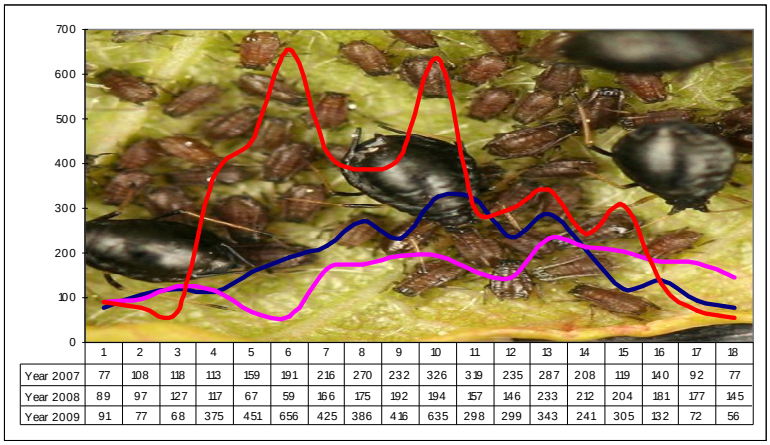


Figure 9. Curve of flight of *Myzus cerasi* aphid during the period 11.06- 28.06.2009

If the schedule of curve of flight would investigate (figure 9), the one of atmospheric humidity and temperature, it had observed that exist a period of 3 days of intense activity of

aphids, from the second decade to third decade of May month, when registered also the head of flight for that species, followed by a significant decreasing, thanks to the weather conditions. After that period it followed a period of insignificant oscillation until the second decade of June month when registered another big number of species, followed by continual decreases until the end of investigated period, with small oscillation in the third decade of June month of 2009, when registered increases, but those were insignificant.

Analyzing the curve of flight of aphids population, winged form, it determined that in the three years of observations those had in general a similar evolution. Thus, those registered a gradual increase of populations in the first decade of observations, followed by a gradual decrease until the end of period (figure 10). Those points corresponded a high temperature and an average humidity being the best for aphids flight.



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Year 2007	77	108	118	113	159	191	216	270	232	326	319	235	287	208	119	140	92	77
Year 2008	89	97	127	117	67	59	166	175	192	194	157	146	233	212	204	181	177	145
Year 2009	91	77	68	375	451	656	425	386	416	635	298	299	343	241	305	132	72	56

Figure 10. Curve of flight of species *Myzus cerasi* during the period 2007-2009

From the schedule it could conclude that the humidity decreasing, temperature increasing had were in strong correlation, with the increase of curve of flight. Aphids flight begun in the same time with the temperature increasing from 18 degree C to 22 degree C and a humidity decreasing from 70% to 50%.

CONCLUSIONS

- Time danger for the orchard in the year 2007, was of 19 days, respectively between the second and third decade of June month (13- 30.06.)
- In the year 2007, the most intense period of flight was in date 22.06., characterized through a temperature of 24.3 degree C and an atmospheric humidity of 67%
- In the year 2008, time danger for the orchard, was between the 1st and 2nd decade of June month (8- 25.06.)
- The most intense period of flight registered in the second decade of June month (20.06), characterized through a temperature of 22.4 degree C and an atmospheric humidity of 62%
- Time danger for the orchard in the year 2009, held from the second decade to the third decade of June month (11- 28.06.2009)
- In the year 2009, the most intense period of flight was constituted in the second decade of June month (16.06.2009), characterized through a temperature of 25.7 degree C and an atmospheric humidity of 55%

◆ The curve of flight of aphids populations, winged form, in the three years of observations presented in general a similar evolution, registering a gradual increasing of population in the first decade of June month, followed by a gradual decreasing until the end of period

BIBLIOGRAPHY

1. ALFORD D.V., 1992 – *Forbatlas der Obstschälinge Erkenung, Lebensweise und Bekämpfung*, Ferdinand Enke Verlag, Stuttgard
2. BALACHOWSKY A., NESNIL L., 1935 – *Les insects nuisibles aux plantes cultivees*, vol. I – II, Paris
3. BUCZACKI S., HARRIS K., 1998 – *Pests, Diseases and Disorders of Gareden Plants*, Collins Publisher, 2nd edition, ISBN 0 – 00 – 220063 – 5
4. FENEŞANU N., 1995 – *Comportarea unor soiuri de vişin la diferite distanţe de plantare şi formare de coroane*, teză de doctorat
5. FERARU ELENA, MUSTAŢĂ GH., 2004 – *The predators and the parasitoids insects in the colonies of aphids (Homoptera: Aphididae) deleterious to the fruit trees from Vaslui County*, Analele Ştiinţifice ale Universităţii "Al. I. Cuza" Iaşi, s. Biologie animală, tom L, pag. 39 – 50
6. FJELDDALEN J., 1964 – *Aphids Recorded on Cultivated Plants in Norway 1946 – 1962*, Norsk Entomologisk Tidsskrift (Norsk. Ent. Tidskr.), vol. 12: 259 – 295
7. GHENA N., 1970 – *Cireşul şi vişinul*, Ed. Ceres, Bucureşti
8. HARRINGTON R., 2008 – *A comparison of the external morphology of "scent plaques" on the hind tibiae of oviparous aphid (Homoptera: Aphididae)*, Systematic Entomology, vol. 10, Issue 2: 135 – 144
9. PARNIA CORNELIA şi colab., 1985 – *Refacerea potenţialului de rodire a livezilor de vişin şi cireş*, Ed. Ceres, Bucureşti
10. POSTIGO M.M., MELIA A., SECO M. V., BALMORI A., NUNEZ E., NIETO – NAFRIA J.M., 1993 – *Resultados de las capturas de afidos alados (Homoptera, Aphididae) en trampas de succion durante 1991 en Castellon, Leon y Salamanca*, Bol. San. Veg. Plagas, 19: 475 - 483
11. ROTHERAY G.E., 1989 – *Aphid Predators*, The Richmond Publishing Co. Ltd., vol. 11, pg. 77
12. RUDI EVELINA, 1976 – *Contribuţii la studiul compoziţiei chimice a unor clone de vişin din soiurile Crişana şi Mocăneşti*, Lucr. Simpoz. „Cultura cireşului şi vişinului", Caransebeş
13. SECO M.V., DUEÑAS M.E., NUÑEZ E., MELIA A, NIETO J.M., 1991 – *Afidos alados (Hom. Aphidoidea) capturados con trampas de succion en Castellon, Leon y salamanca durante 1990*, Bol. San. Veg. Plagas, 17: 519 - 527
14. SIMERIA GH., 1995 – *Cercetări privind combaterea integrată a bolilor şi dăunătorilor cireşului şi vişinului în condiţiile bazinului pomicol Caransebeş,* teză de doctorat, U.S.A.B., Timişoara
15. TSITSIPIS J., KATIS N., MARGARITOPOULOS J., LYKOURESSIS D., AVGELIS A., GARGALIANOU IOANNA, ZARPAS K., PERDIKIS D., PAPAPANAYOTOU A., 2007 – *A contribution to the aphid fauna of Greece*, Bulletin of Insectology 60 (1): 31 - 38
16. www.sfaturi pomicole.tripod.com/id7.html