BIOECOLOGICAL ASPECTS OF FLY OR WORM CHERRIES *Rhagolethis cerasi* L.

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Abstract

Fly or worm cherry attack cherries and sour cherry fruit and degree of attack depends on the baking times of these species. Fruits of early varieties are practically not attacked because at the occurrence of female fruit ripening ends. Much of the eggs are deposited on fruit varieties with middle and late ripening age. The damage are produced by the larvae, which consume the pulp of the fruit around the kernel. Fruits attacked outside show deep cavities. In the years of intensive development of this pest can be attacked 50-60% of cherries and 30% of sour cherry. These fruits cannot be eaten fresh or present and cannot be used for processing. In combating this pest shall apply agrotechnical and chemical measures.

Key words: Cherry tree, sour cherry, *Rhagoletis cerasi L*., biology, phenology, control

In Moldova, with climatic and soil conditions pretty favorable for the growth and fructification of fruit species, pomiculture is one of the main branches of agriculture. Together with many other species, the cherry tree is a fruit species thanks to nutritional, technological and commercial characteristics of fruits. Cherry is a species that grows in the conditions of a simpler agrotechnical, offers consumers the earliest fruits with an aspect and great taste, ensures harvests each year. But to obtain high harvests of fruit with high biological value and high quality, a negative role they have pests and diseases of this crop. In plantations of cherry tree aphid causes regular damage black louse of cherry, cherry leaf wasp, golden weevil of cherry, etc.

Apart from these pests a negative influence on the production of cherry fruit has fly which is also called worm cherries. In the biology of fly cherries a series of particularities are directly depends on the pedoclimatic conditions. Agro-technical measures to combat are not always the most effective, in some cases, the most accessible. For chemical control of fly cherries are allowed a small number of plant protection products. **(**Busuioc M., 2006)

MATERIAL AND METHODS

Experiences related to determining the biological efficiency of the preparation Engeo K SC 247 have been fulfilled in 2013, the plantations of stone fruit crops, of Technology Experimental Station "Condru" Research Institute for Fruit Production. For testing was selected the cherry tree plantation with Hebros variety which has age of 17 and the area of 0.5 ha. The maturation period is the third decade of June or the first decade of July. The planting scheme 4m x 5m with direction lines from North to South. (Lazări I., 2002)

The experience included four versions: two doses of the preparation Engeo K 247 SC (0.15 and 0.2 l/ha), standard and witness. As standard was proposed the insecticide Calypso 480 SC in a dose of 0.3 l/ha recommended in the State Register of plant protection products and fertilizers. The experiments were performed in three repetitions, the location of parcels in land being compact randomized. Each parcel was divided into three trees, having a rectangular shape with a surface area of 60 m^2. For isolation between the parcels of each variable from the elongated part were left 2-3 trees and laterally between repetitions the strip protection made a whole row. Preparation and water consumption required to treat a parcel was calculated based on the consumption norm to 1 ha. The treatments for experimental lot were fulfilled with manual watering can back accommodated to sprinkling trees and fruit trees.

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RESULTS AND DISCUSSIONS

To obtain the highest indices using integrated plant protection in general and cherry culture in part is strictly necessary to forecast population the dynamic development of the pest which implies two steps. During the first stage is determined biological reserve before harvesting the fruits from late ripening varieties. To these and sour cherry are made determinations of the frequency and percentage of fruit attack. At each variety shall keep record of at least three trees, and from each tree at least every three hundred fruits considering that an average of ten fruits attacked to one tree determines the next year a significant reserve, which requires a careful tracking of pests next year. It take into account the biological pest reserve estimated by surveys conducted in the soil around the tree, considering that an average density of 10 pupae hibernating to one tree will cause a strong infestation next year. At the same time take into account the existence of wild cherry and other plants attacked from spontaneous flora nearby.

For the test research in 2013 were not opportunities to determine biological reserves from autumn because the proposals for testing taking place much later, in March. Therefore accessible for us was the second forecasting method, which involves observations from spring on the biology of the pest. From the beginning it was decided to determine the presence of musca in cherry plantation intended for testing.

For this purpose at the end of April were conducted 8 surveys in the soil with the surface of 0.25 m^2 and depth of the 2-15 cm, hibernating pupae was determined evidence and determine their viability. The research results are presented in *table 1*.

Table 1

Results of the determination biological reserve of cherry fly (2013)

No. crt.	The number of pupae					
	Total number, pc.	The number of $1m^2$, pc.	Of these			Alive pupae, %
			dead, pc.	Alive, pc	Pc. at 1 m^2	
1	2	7,5	0	2	6,5	86,67
2	3		1	2		
3	1		0	1		
4	3		0	3		
5	0		0	0		
6	2		0	2		
7	1		0	1		
8	3		1	2		
Total	15	-	2	13		-

The table reveals that biological reserve of fly cherries in the third decade of april is formed by 7.5 pupae/m^2, of which 6.5 pupae, or 86.67% were viable**.** Given index exceeds approximately 3 times the economic damage threshold (2 pupae/m^2). This fact warns that the frequency of pest during the season of 2013 will be very high, and the rationality of using the chemical treatments is quite obvious.

After observations on biological reserve, the biological material collected was buried in a growth box under the tree at a depth of 5 cm to extend researches on the development of pupar stage in order of accurate warning terms of making the first treatment. For a higher accuracy pupae number was increased to 50 pc. by collecting neighboring plots of cherry tree. To follow the evolution of the pest, the observations were fulfilled daily and after emergence of the first adult evidence was performed regularly during the three days. It is well established that the development of fly pupae cherry can be determined by eye color of future adult. Colour pink confesses that started the process of histoliza. Green color of pupae corresponds to histogenesis process, which emphasizes that more than 3-6 days will begin the flight of new adults. The research results are presented in table 2. The table reveals that first pupae with pink eye, the number of five specimens were found on 29 April. In subsequent records the number of pupae with such morphological features has extended to increase and reached a maximum value (eg 42) on 10 May (*table 2*).

First pupae with green eyes (1 ex.) were detected on 7 May. On the same day was found an empty pupa, from which has flown the first adult. The maximum number of pupae with green eyes was detected in 13 to 20 May. Empty pupae were marked from May 7 to June 9, and the maximum number was found in the period from May 12 to June 3.

Based on the results obtained it can be noted that the first chemical treatment warning was necessary performed at 13 to 22 may. These data, however, requires a broader materialize because the pest development depends largely on the temperature of the soil and the environment, air relative humidity and precipitation. It is known

that in the days with rain insect activity is interrupted as long as the leaves are wet. Also during the rains many adults die in the ground before flying into the tree. Therefore to determine adult flight dynamics concomitantly with observations on pest from warning cage on May 5 in the experimental lot were placed three yellow glue traps, which were hung in favorite places of fly cherries on top and sunny of the crown trees.

Table 2

The dynamic development of fly pupae cherries (2013)

Record periods	Total number of pupae, ex.	From these, ex.		The number of empty pupae, ex.	The period of performing the treatmentc
		Pink eyes	Green eyes		
April					
21.04.		0	0	0	
22.04.		0	0	0	
23.04.		0	0	0	
24.04		0	0	0	
25.04		0	0	0	
26.04.		0	0	0	
29.04.		5	0	0	
Mai					
1.05.		14	0	0	
4.05.		29	0	0	
7.05.		45	1	1	
10.05.	50	42	3	2	The emergence of the first adults
13.05.		0	12	5	
16.05.		0	41	6	
19.05.		0	33	14	
22.05.		0	25	22	First treatment
25.05.		0	17	30	
28.05.		0	10	37	
31.05.		0	7	40	Second treatment
June					
3.06.		0	4	43	
6.06.		0	2	45	
9.06.		0	0	47	
12.06.		0	0	0	

From the data of *table 3* shows that the first adults were captured at may 11 to 14. During of 10 days the numerical value of the flies has gradually increased and accounted maximum (5.3 adults/ trap) on 20 May. From the data obtained revealed that the first chemical treatment was warned and was done on 20 May. This sprinkling resulted in an essential reduction of the number of flies captured in the following records. Thus on May 23 were captured only 2.3 ex. which is 2.3 times less than the previous evidence.

The efficacy of the preparation, but has proved to be short-lived because in this period were rains which have negatively influenced at concentration of the preparation.

This explains the increase again in the number of adults who have formed at 26 to 29 may 4.3 to 3.0 ex./trap. In this connection it was agreed the treatment to be repeated at 1 June.

The results obtained under the extension records showed an essential decrease of adults and reached a low of 0.3 ex/trap at June 7 to 10.

Records made after treatment (4-10.06) showed that after June 10 in the experimental lot were not detected practically adults of fly cherries.

Based on the records made on of fly cherries biological reserve, pest biology and influence of ecological factors were found combating fly cherries were necessary and were achieved two treatments.

For the assess the efficacy of different doses of the preparation during baking were harvested from each three trees that make up a repetition ripe fruits a 100 ripe fruits (total 300 fruits).

Table 3

The results of capturing adult fly cherries with glue traps (2013)

The number of traps	Record periods													
	Mai									June				
	5	8	11	14	17	20	23	26	29	1	4	7	10	13
1.	0	0	1	1	3	5	3	4	1	1	0	1	1	0
2.	0	0	1	2	3	5	1	4	1	1	0	0	0	0
3.	0	0	1	1	4	6	3	5	1	0	1	0	0	0
Average	0,0	0,0	1,0	1,3	3,3	5,3	2,3	4,3	3,0	0,7	0,3	0,3	0,3	0

These were brought into the laboratory where after a few days were analyzed. To determine the presence of larvae at first fruits were split. In order to achieve more accurate results fruits subjected to analysis were introduced in water over 24 hours. After this period, the fruits were passed through sieves of different sizes. Larvae were collected and counted on the last sieve.

The data reveals that in version control the attack level of the fruits constituted 96.44% which further testifies to the high density of the pest in the experimental lot. In the experimental variants this index was much lower and at preparation Engeo K 247 SC with norm consumption 0.2 l/ha 2.67%. In the third variant this index made up 20.22%.

The calculations of biological efficacy of preparations and doses studied demonstrates that the most effective in combating fly cherries is the insecticide Engeo K 247 SC with the norm consumption 0.2 l/ha, which provides an efficiency of 97.23%, which is the standard .

The biological effectiveness of insecticide Engeo K 247 SC to the norm consumption 0.15 l/ha constituted 79.03% and gives essential as the 4th version so and standard.

It should be noted that besides cherry fly in the experimental lot were found single copies of black cherry aphid, with much lower density than PED. Records made after the completion of chemical treatments showed that this pest was not detected.

CONCLUSIONS

In the year of research biological reserve fly cherries was very high and exceeded three times the economic damage threshold, ensuring in this way a high background for the application of insecticides.

Biological reserve of fly cherries constituted 7.5 pupae/m^2, of which 6.5 pupae, or 86.67% were viable.

The first pupae with pink eye were detected on 29 April and reached the maximum value (eg 42) on 10 May.

First pupae who have green eyes (1 eg.) were detected in 7 May, and the maximum number of pupae with green eyes was detected in 13 to 20 May.

The first fly cherries adults were captured at May 11 to 14 and during 10 days of numerical value of the flies has gradually increased and accounted maximum (5.3 adults/trap) on 20 May.

Terms performing chemical treatments were established as a result of studying the biological factors, ecological and phenological.

The most effective in combating the fly cherries is insecticide Engeo K 247 SC, with consumption norm 0.2 l/ha which ensures a reduction in the fruits attacked by 97.23%.

REFERENCES

Busuioc M., 2006 - *Entomologie agricolă*, Centrul editorial al UASM, – 639 p. ISBN 978-9975-64-020-6, Chişinău

Памужак Н., Кроитору Н., Пануца С., Тимуш А., **2010 -** *О результатах государственного испытания инсектицидов против вишневой мухи на вишни и черешни.*, *Lucrări ştiinţifice*, UASM, Chişinău, vol. 24, Pt. 2: Horticultură, Viticultură şi vinificaţie, silvicultură şi grădini publice, protecţia plantelor, p. 315-320, 0,5 c.a. ISBN 978-9975-64-127-2.

Lazări I., 2002 - *Îndrumări metodice pentru testarea produselor chimice şi biologice de protecţie a plantelor de dăunători, boli şi buruieni în Republica Moldova.*,Tipografia Centrală, Chişinău, 286 p. ISBN 9975-9597-3-3