RESEARCHES ON OF GRAPE MOTH THE EVOLUTION (*LOBESIA BOTRANA* - DEN ET SCHIFF) OF DEALUL BUJORULUI THE VINEYARD, IN THE CONTEXT OF CURRENT CLIMATE CHANGE

CERCETĂRI PRIVIND EVOLUȚIA MOLIEI STRUGURILOR *(LOBESIA BOTRANA* – DEN ET SCHIFF) ÎN PLANTAȚIILE VITICOLE DIN PODGORIA DEALUL BUJORULUI, ÎN CONTEXTUL ACTUALELOR SCHIMBĂRI CLIMATICE

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Abstract. *The paper presents analysis of research conducted at The Research and Development for Winegrowing and Winemaking in the period 2005-2015 Bujoru climate factors (temperature, precipitation, humidity, etc.) that influence the biology and evolution of grape moth (Lobesia botrana - Den et Schiff) in plantations vineyards south of Moldova. Lately there was a deviation of climatic factors on the annual average (high temperature, frequency absolute minimum temperature below the freezing of the vine, increased the frequency of droughts, desertification) that can cause changes in the biological and behavioral the principal harmful vine vineyard Dealul Bujorului (grape moth), with consequences difficult to assess the integrity of the ecosystem vineyard.*
Key words: grapevine, grape moth, pheromone traps

Rezumat. *Lucrarea prezintă analiza cercetărilor efectuate la Staţiunea de Cercetare şi Dezvoltare pentru Viticultură şi Vinificaţie Bujoru în perioada 2005-2015 a factorilor climatici (temperatură, precipitaţii, umiditate etc.) care influenţează biologia şi evoluţia moliei strugurilor (Lobesia botrana – Den et Schiff) în plantaţiile viticole sudul Moldovei. În ultima perioadă s-a observat o abatere a factorilor climatici de la media multianuală (temperaturi ridicate, frecventa temperaturilor minime absolute sub pragul de îngheţ al viţei de vie, accentuarea şi frecvenţa secetelor, aridizarea) care pot provoca schimbări de ordin biologic şi comportamental asupra principalului dăunător al viţei de vie din podgoria Dealul Bujorului (molia strugurilor), cu consecinţe greu de evaluat pentru integritatea ecosistemului viticol***.***
Cuvinte cheie: viță de vie, molia strugurilor, capcane feromoni

INTRODUCTION

Grape moth (*Lobesia botrana* Den et Schiff) is the main pest of vine vineyards of SE Moldova. Product losses in some years are between 30-50% of grape production. Lately there has been a significant reduction in grape moth attack produced from plantations with vines vineyard Dealul Bujorului.

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Knowledge of pest biology and ecology of particular importance to the warning and applying the treatments to combat the economic damage threshold is exceeded (PED) 100 butterflies males / trap / week (Mirică *et al.,* 1976; Simion Cristina, 2003; Tabaranu *et al.*, 2005; Tabaranu *et al.*,2007; Teodorescu *et al.*, 2003).

MATERIAL AND METHOD

The research was conducted during 2005-2015 in vineyards from SCDVV Bujoru. Over ten years have made observations varieties (Merlot, Black Feteasca, Aligoté) on the evolution of the main pest of vine (grape moth - *Lobesia botrana*) in the current climate changes and changes in microclimate conditions due to the greenhouse effect.

To establish the population of when treatment applications in plots with vines were installed for warning and monitoring by 3 traps / ha with synthetic sex attractant type Atrabot (fig. 1).

Fig. 1 Sex pheromone trap type Atrabot

Registration butterfly capture was done weekly and based on the results was drawn curve flying pest. It materializes the flight, the maximum flight activity, the succession of generations, etc. data on which were established for the submission of clutch moments, the emergence of larvae, warning and appropriate treatments. Capsules with synthetic sex pheromone and valves adhesive were changed after 6 weeks of use.

RESULTS AND DISCUSSIONS

The average air temperature (average for the last 10 years) is 11.5°C identical to normal temperature, with a maximum during the growing season of 24.2°C (July) and a minimum of -1.3°C (January). Temperatures remain low until late spring in April and sometimes May. There is a slight increase in air temperature in the range 2005-2015 (table 1). In the analyzed period in June and July recorded maximum temperatures frequently exceeding 32 - 35°C in most years in the study with an absolute maximum temperature of 41.5°C / 07.VII.2012.

The amount of monthly precipitation (average for the last 10 years) is 490.1mm, 455.9 mm normal girl (tab. 2). Rainfall distribution is heterogeneous, characterized by long periods legally deficient rainfall (droughts), falling short periods of precipitation. In the period analyzed the behavior and potential vine pest attack was highly influenced by climatic conditions (temperature, humidity etc.).

Temperature has a major influence on the development of grape moth, such as: high temperature > 34-36°C are lethal for the eggs and adults, eggs and larvae resistant to temperatures between 0°C and 10°C and to 23°C crisalidele.

Following research on the development of grape moth in the period 2005-2015 showed a slight downward trend in the pest population level from 2008 and 2009 (tab. 3).Adverse weather conditions have led to the development of pest braking biological activities (mating, laying and larval emergence). Flight dynamics of male butterflies had a high frequency, the average number of butterflies males / trap / week exceeding the PED 100 catches in 2005, 2006, 2007 and 2008. In subsequent years (2010, 2011, 2012, 2013, 2014 and 2015), due to high temperatures that exceeded repeatedly threshold Ot = 26.7°C (optimum heat during the egg-laying and hatching deposition) more eggs were dehydrated (Ur% under 50%), no more and finally hatched the number of population decreased and the attack was weak.

In 2005, 2006, 2007 and 2008 there was a sharp rise in the average number of butterflies caught exceeding the economic damage threshold (PED) 100 butterfly males / trap / week all three generations, except a- generation II of 2008 (table 3). For integrated control grape moth they were recommended specific treatments with plant protection products and mass capture of male butterflies using synthetic sex pheromone traps ATRABOT 7-9 type traps / ha for every generation.

In the years 2010-2015 the climatic conditions of high temperatures and drought prevailing atmospheric, caused dehydration hatching eggs and larval mortality, significantly reducing the insect population Economic damage threshold (PED) 100 butterfly males / trap / week all three generations.

Table 1

The average air temperature in the period 2005-2015

No.	Year	Average monthly (°C)												Average
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
1	2005	1.3	-0.6	4.6	11.7	18.2	20.8	24.3	23.3	19.1	11.7	5.4	2.5	11.9
2	2006	-4.3	-0.6	4.6	12.3	17.5	22.3	24.2	23.5	18.1	12.5	7.6	2.9	11.7
3	2007	4.3	3,1	8.3	12.1	21.2	25.5	28.1	25.4	17.4	12.1	4.1	0.4	13.5
4	2008	-0.7	3.4	9.1	13.0	17.9	23.1	24.0	25.8	15.6	11.3	5.5	2.2	12.5
5	2009	-0.6	1.6	4.4	11.1	16.5	21.0	23,8	21.9	17.1	11.6	6.2	2.1	11.4
6	2010	-4.6	-0.1	4.5	10.8	16.8	20.4	22.8	24.0	16.1	7.8	101	-1.7	10.6
7	2011	-2.9	-2.9	3.7	9.5	16.1	20.1	24.2	23.3	18.5	8.5	2.0	2.3	10.2
8	2012	-2.3	8.0	4.4	12.9	17.9	20.1	28.0	26.4	20.7	14.6	6.7	-1.9	11.6
9	2013	-2.2	1.8	3.6	12.7	18.5	20.9	21.5	22.2	15.0	10.7	8.3	0.1	11.1
10	2014	-1.3	-0.6	8.1	11.0	15.6	20.7	22.1	22.3	17.0	10.0	4.3	0.0	10.8
11	2015	-1.2	1.2	5.2	10.4	17.0	20.3	23.7	23.0	19.0	9.5	6.6	1.6	11.4
Average		**-1.3**	**-0.2**	**5.5**	**11.6**	**17.6**	**21.4**	**24.2**	**23.7**	**17.6**	**10.9**	**6.1**	**0.9**	**11.5**
Normal		**-1.2**	**0.1**	**5.2**	**11.7**	**18.1**	**21.8**	**24.1**	**23.1**	**17.5**	**11.4**	**5.2**	**0.4**	**11.5**

Table 2

The average yearly precipitates (mm) in 2005-2015

No.	Year	Precipitations (mm)												Amount
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
1	2005	14.7	31.4	25.7	18.4	59.2	74.8	98.6	50.8	14.5	15.7	66.9	26.4	497.1
2	2006	27.1	10.8	40.6	54.2	40.0	77.7	31.8	92.1	34.4	7.7	4.7	9.4	430.5
3	2007	51.5	23.1	43.1	14.9	31.3	96.4	1.0	57.3	36.5	59.4	60.1	67.3	541.9
4	2008	14.1	1.3	38.9	37.7	60.6	38.5	55.5	9.8	49.8	21.6	15.4	57.4	401.1
5	2009	46.8	21.2	40.6	12.8	28.4	86.8	30.9	13.8	56.0	35.2	14.4	32.6	419.5
6	2010	12.8	41.0	11.0	26.6	103.2	127.6	101.8	40.2	20.2	76.4	21.8	51.6	634.2
7	2011	15.2	13.4	5.4	53.6	32.2	45.2	93.4	28.0	5.2	28.0	0.2	9.8	329.6
8	2012	39.3	25.4	9.2	18.6	115.8	13.8	27.1	23.1	24.6	42.0	6.8	102.3	448.0
9	2013	34.4	35.2	39.4	32.0	89.6	90.6	18.6	81.6	203.6	45.2	38.8	4.1	713.1
10	2014	16.8	4.8	29.2	72.4	4.1	38.5	84.6	55.0	3.4	44.4	53.4	43.6	450.2
11	2015	27.0	35.6	59.0	32.0	13.8	53.0	23.0	74.4	22.0	74.0	111.4	1.2	526.4
Average		**27.2**	**22.1**	**31.1**	**33.9**	**52.6**	**67.5**	**51.5**	**47.8**	**42.7**	**40.9**	**35.8**	**36.9**	**490.1**
Normal		**21.5**	**19.2**	**26.7**	**36.5**	**48.0**	**72.1**	**50.5**	**48.6**	**40.3**	**32.4**	**29.5**	**30.5**	**455.9**

Table 3

Evolution grape moth (*Lobesia botrana* - Den et Schiff) Peony Hill vineyard in the period 2005-2015

Number	Year	The maximum curve flight G a I-a		The maximum curve flight G a-II-a		The maximum curve flight G a-III-a		The degree of infection %	Observations
		Date	*Number of exemplary*	Date	*Number of exemplary*	Date	*Number of exemplary*		
1	2005	6.V	219	7.VII	243	28.VIII	302	10-20 %	medium attack
2	2006	19.V	206	14.VII	351	11.VIII	395	20-53 %	strong attack
3	2007	9.V	640	20.VI	585	10.VIII	300	20-50 %	strong attack
4	2008	7.V	215	25.VI	73	13.VIII	179	10-20 %	medium attack
5	2009	29.V	67	17.VI	208	20.VIII	177	10-20 %	medium attack
6	2010	4.V	87	22.VI	120	10.VIII	77	5-10 %	weak attack
7	2011	18.V	64	22.VI	47	10.VIII	7	5-10 %	weak attack
8	2012	11.V	16	15.VI	63	06.VIII	16	5 %	weak attack
9	2013	8.V	3	12.VI	4	17.VII	29	5 %	weak attack
10	2014	4.VI	8	9.VII	5	20.VIII	12	5 %	weak attack
11	2015	7.V	16	18.VI	10	14.VIII	42	5 %	weak attack

CONCLUSIONS

1. Under water stress, high temperatures etc., changes in grape moth vine plantations is much affected as greatly diminished frequency (F) and the degree of attack (GA%);

2. The climatic conditions in the period 2010-215 were generally unfavorable grape moth and visibly influenced generations attacks (G I , G-II and G-III);

3. Changes biologically determined conditions due to climate change are visible G II and G III when larvae overlap in most cases with pupated and adult and larval mortality causes temperatures above 32^0C young dehydration eggs.

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