

## RESEARCHES ON WINE MOTHS FLIGHT CAPTURED ON PHEROMONE TRAPS

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### Abstract

The forecasting and warning system in Romania started with a control programmes applied against *Plasmopara viticola*, the most important pathogen of grapevine. Since then, studies and new techniques have been developed and applied to other important pests of vineyards, including *Lobesia botrana* and *Eupoecilia ambiguella*, different models have been evaluated as an important part of the control strategy, field monitoring using pheromones traps is used to formulate warnings that are sent out to farmers about the need to spray or not. Our researches were done in village Fantanele, county Prahova situated on the "wine road" which capitalize famous "Dealul Mare" vineyard. The biology (flight curves of moths) of *Lobesia botrana* (grape vine moth), *Eupoecilia ambiguella* (European grape vine moth) was monitored in vineyard, in 2010-2011 using a sex pheromone traps, with a view to forecasting the damage rate and determining the best time to apply insecticides. Our data confirm that grape vine moth has 2-3 annual generations the moths appear from the end April until the end May flights spread over 2 to 3 weeks, the second flight takes place end of June-July and the third flight occurs in August-September, in the same time European grape vine moth has 2 annual generations, the moths arising from overwintered pupae appear at variable dates depending on year, the second flight takes place 2 to 2.5 months after the first. Data obtained confirm previous information's that before the 1st chemical application against adults, the peak of the flight curve should have been reached, for 1<sup>st</sup> flight the flower buds should be formed, and the pests' infestation rate in the vineyard should be at least 20%. For the 2nd application, at least one flight peak should have occurred, the grapes should be the size of peas and the infestation rate should be 1%. Sex-pheromone trapping have been used in determination of critical biological stages of these pests. Generally a total of 2-3 treatments used to be applied against these pests but, using a proper warning system based on counting of captures from pheromone traps the number of chemical treatments could be reduced to 1.

**Key words:** *Lobesia botrana*, *Eupoecilia ambiguella*, sex pheromone traps, flight curves

### INTRODUCTION

In Romania are reported in the culture of vines over 70 species of the animal kingdom, of which 20 are harmful. Side effects that occurred and occur continuously from excessive use of chemicals some positive influence on the quantity and quality of the harvest times, and on the other fermentation and thus adversely affect wine quality. European grapevine moth (*Lobesia botrana* Den. et Schiff.) and European grape berry moth (*Eupoecilia ambiguella* Hb.), species with 2-3 generations per year, moths appear in the first decade of June, but may occur earlier, in mid-May, with a twilight flight when the temperature exceeds 15<sup>0</sup> C. Larvae appeared in June to feed on flower buds and green beans,

larvae of the second generation, emerging in August feed on seeds from pulp soir early, while the third generation with ripe berries of late varieties. Attacked grape fruits, shrivel up and are often infected with the fungus *Botrytis cinerea* or *Penicillium glaucum* and rot, and the wine is bad and can not keep the wine cellar. Appreciation of the necessity of treatment can be done to combat the pests taking into consideration curve recorded flight of adults with pheromone traps Atrabot respectively Atrambig. Fighting against grape moths is generally preventive, because the larvae are sensitive to pesticides only immediately after hatching [6, 7].

In the village Fantanele, county Prahova situated on the "wine road" which capitalize famous "Dealul Mare" vineyard in the period 2010-2011 observations have been made

on the evolution of the most harmful pests (European grapevine moth (*Lobesia botrana* Den. et Schiff.) and European grape berry moth (*Eupoecilia ambiguella* Hb.) basically with the purpose to establish the population level, to improve warning and forecast activities for these pests, based on sexual attractive pheromone traps (type Atrabot and Atrambig) to establish proper time to apply the control treatments for small farmers from area.

## MATERIAL AND METHOD

In village Fantanele, county Prahova situated on the "wine road" which capitalize famous "Dealul Mare" vineyard, in the period 2010-2011 observations have been made on the evolution of the moths European grapevine moth (*Lobesia botrana* Den. et Schiff.) and European grape berry moth (*Eupoecilia ambiguella* Hb.). The installation of pheromone traps in vine plantation was making in spring at the end of April to beginning of May (Fig. 1).



Fig. 1. Type of ICCN pheromone traps in vine plantation

Two traps with each type Atrabot and Atrambig (from "Raluca Ripan" Institute for Research in Chemistry), were installed in the vineyards in order to establish the population level of pests. The captured moths were registered biweekly, moth flight curve was drawn, established the moment of flight start, peak flight activity, number of generations succession, for each pests. The synthetic sexual pheromones lures were replaced once/month and sticky parts of

traps were replaced when it considered necessary, at the beginning of flights or when the moths captured were no so many the captured moths were taken off with needle or when there are too many moths captured the sticky traps were replaced with new one.

## RESULTS AND DISCUSSIONS

In the literature there is mention of the species *Eupoecilia ambiguella* in Wallachia respectively at Ștefănești vineyard, [1] but there are no specific data on the presence of pest in vineyards surrounding Fantanele village, which prompted this study. Of course the European grapevine moth (*Lobesia botrana*) is a common pest of grape and it was no a surprise for us that we captured a lot of moths on pheromone traps. It was determined the presence of two pest species of Lepidoptera namely *Lobesia botrana* and *Eupoecilia ambiguella* in village Fantanele vineyard and was established the flight curve of the two species with pheromone traps. Bărbuceanu and Andriescu [1] shows that according to Bovey [2], in most grape growing regions where damage, species evolve in two annual generations, because preferences for regions with cool, wet climate, *Eupoecilia ambiguella* is called "Northern insect" compared to other grape moth (in Romania generally it has two generation/year), in the same time, *Lobesia botrana*, called "Southern insect" (in Romania generally it has three generations/year). Luke [4, 5] quoted by Barbuceanu and Andriescu made some observations on the biology of *Eupoecilia ambiguella* in Moldova and states that have two generations, and in warmer years and indicates the presence of the third generation. Our observations confirm the assumption that in village Fantanele vineyard the European grapevine moth (*Lobesia botrana*) has three generations annually, with three flight peaks recorded in May, July and August. Analysing the data of year 2010 (Table 1) it was registered the maximum moth captured/traps for GI on 22 May (41.0 moth/trap) and for the G II a max value on 10 July (66.5 moth/trap), the flight continuing until the mid July, and GIII reached the max value on 21 August (84.0 moth/trap). European grape berry moth (*Eupoecilia*

*ambiguella* Hb., according to pheromone traps moths captures has only two generations/year first with a sharp pick on 22 May (33.5 moth/trap), the second around the time of 24 July with few moths captured (4.55 moth/trap). In 2010 the high temperatures and the atmospheric drought and we presume that this situation it was followed by a pest population reducing and reflected in decreasing of mating number of eggs laid their dehydration and increasing of larval mortality and in this respect the pest populations of both pest species were reduced. Analysing the data of year 2011 (Table 2) European grapevine moth (*Lobesia botrana*) has also similar three generations/year, with three flight peaks recorded in May, July and August, when it was registered the maximum moth captured/traps

for GI on 21 May (32.0 moth/trap) and for the G II a max value on 09 July (47.5 moth/trap), and GIII reached the max value on 20 August (101.0 moth/trap). European grape berry moth (*Eupoecilia ambiguella* Hb. has also two generations/year first with a sharp pick on 11 June (87.0 moth/trap), the second around the time of 23 July with a lot of moths captured (100.5 moth/trap). Year 2011 was favourable for developing of moth pest populations.

By means of the pheromone traps (Atrabot and Atrambig) installed in vine plantation could be determined the level of population, and based on the moths flight curve it could be establishing, by farmers, the moment of applying the control treatments, the plotting of the moth flight curves [3,8,9].

Table 1. Flight curve registered in 2010 on the evolution of the moths European grapevine moth (*Lobesia botrana* Den. et Schiff.) and European grape berry moth (*Eupoecilia ambiguella* Hb.).

Pest	Number of captured moth/trap								
	08-V	22-V	12-VI	26-VI	10-VII	24-VII	07-VIII	21-VIII	11-IX
European grapevine moth ( <i>Lobesia botrana</i> Den. et Schiff.)	33.0	41.0	11.0	1.5	66.5	11.0	38.5	84.0	5.5
European grape berry moth ( <i>Eupoecilia ambiguella</i> Hb.)	14.5	33.5	10.0	2.5	0.5	4.5	1.5	0.5	0

Table 2. Flight curve registered in 2011 on the evolution of the moths European grapevine moth (*Lobesia botrana* Den. et Schiff.) and European grape berry moth (*Eupoecilia ambiguella* Hb.).

Pest	Number of captured moth/trap								
	07-V	21-V	11-VI	25-VI	09-VII	23-VII	06-VIII	20-VIII	10-IX
European grapevine moth ( <i>Lobesia botrana</i> Den. et Schiff.)	11.5	32.0	5.5	22.0	47.5	11.5	22.0	101.0	16.5
European grape berry moth ( <i>Eupoecilia ambiguella</i> Hb.)	44.0	63.5	87.0	5.5	0.5	100.5	10.5	1.0	0

## CONCLUSIONS

It was determined the presence of two pest species of European grapevine moth (*Lobesia botrana* Den. et Schiff.) and European grape berry moth (*Eupoecilia ambiguella* Hb.) in village Fantanele vineyard and was established the flight curve of the two species with pheromone traps.

Our observations confirm the assumption that in village Fantanele vineyard the European grapevine moth (*Lobesia botrana*) has three

generations annually, with three flight peaks recorded in May, July and August.

Our observations shows that in analysed area, European grape berry moth (*Eupoecilia ambiguella* Hb.), according to pheromone traps moths captures, has only two generations/year first in May, the second around the end of July. By means of the pheromone traps (Atrabot and Atrambig) installed in vine plantation, moth flight curves could be determined, and based on it the moment of applying chemical treatments for pest control.

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