

## FLIGHT DYNAMICS OF HARMFUL LEPIDOPTERS TO VINEYARDS USING THE TERASEYA FLY SYSTEM

### DINAMICA ZBORULUI UNOR LEPIDOPTERE DĂUNĂTOARE PLANTAȚIILOR DE VIȚĂ DE VIE CU AJUTORUL SISTEMULUI TERASEYA FLY

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**Abstract.** Among the practical applications of synthetic sexpheromones, the most important it is about constant supervision of insect populations for the purpose of forecasting and warning treatments or for their suitability. At present, in our country synthetic pheromones are produced for 33 species of insects of agricultural, horticultural and forestry importance. From their many, the Atrabot-type pheromone specific to the pest *Lobesia botrana* has been selected, which causes considerable damage to vineyards throughout the growing season. The present paper presents the results on flight dynamics and abundance of *Lobesia botrana*, a species harmful to red vineyards by means of the intelligent trap type Teraseya Fly.

**Key words:** Atrabot, Teraseya Fly, dynamics

**Rezumat.** Dintre aplicațiile practice ale feromonilor sexuali sintetici, cea mai importantă se referă la supravegherea permanentă a populațiilor de insecte dăunătoare, în vederea prognozei și a avertizării tratamentelor sau în vederea oportunității acestora. În prezent, în țara noastră sunt omologați și se produc feromoni sintetici pentru 33 de specii de insecte cu importanță agricolă, horticolă și silvică. Din multitudinea acestora a fost selectat feromonul de tip Atrabot specific daunătorului *Lobesia botrana*, molie ce produce pagube însemnate în plantațiile viticole pe parcursul întregii perioade de vegetație. În lucrarea de față se prezintă rezultatele privind dinamica zborului și abundența exemplarelor de *Lobesia botrana*, specie dăunătoare plantațiilor viticole pe rod cu ajutorul capcanei inteligente de tip Teraseya Fly.

**Cuvinte cheie:** Atrabot, Teraseya Fly, dinamică.

## INTRODUCTION

Insects establish intraspecific relationships, especially through chemical communication channels. Thus, in sexual behavior, females usually emit chemical messages for males in order to mate. The messenger substance is a strictly intraspecific attractive sex pheromone, which causes a specific precopulatory behavior in the recipient organism, regardless of whether the pheromone source is natural or synthetic (Baicu *et al.*, 1986; Săvescu, 1978).

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Among the practical applications of synthetic sex pheromones, the most important refers to the permanent surveillance of populations of harmful insects, in order to forecast and warn of treatments or in view of their opportunity.

Currently, in our country are approved and synthetic pheromones are produced for 32 species of insects of great horticultural, agricultural and forestry importance. For other species, the research is in different stages, and the family of approved pheromones will continue to grow.

This paper presents the results regarding the flight dynamics of harmful lepidoptera species to vineyards with the help of synthetic pheromones.

## MATERIAL AND METHOD

The number of generations changes often, depending on climatic conditions. Thus, in countries with higher temperatures, such as Italy, Spain or Greece, even four generations can appear. If for the first generation you have to look for the eggs laid on the flower buds, for the second generation a careful check of the grapes is required. It is preferable to look for larvae than for laid eggs, as the discovery of the egg takes a long time. Being a problem pest, monitoring is the key to success.

The ATRABOT pheromone trap for *Lobesia botrana* is a mixture of 15 main pheromone compounds, which nevertheless ensures a satisfactory efficiency. In general, classic traps ensure the capture of males during flight and mating (El-Sayed, 1999).

The observations in the field, during the entire observation period were made with the help of a Teraseya Fly (fig. 1) type trap which is an innovative and bold product designed for monitoring harmful insects in an agricultural crop.

The equipment is able to attract insects, capture and store them alive, photograph and recognize them using advanced image processing software algorithms and transmit the information to a data server.

Being bold in what it aims at, however, the product must be robust to withstand all conditions in the field, be self-sufficient in energy and provide information in a way that is easy for the user to understand.

The product is a single compact mechanical system, and the attraction of insects can be done by pheromones and / or electronically controlled light as intensity, duration and time of day. The product is able to provide a natural ventilation of the pheromone box (Reineke A. 2016).



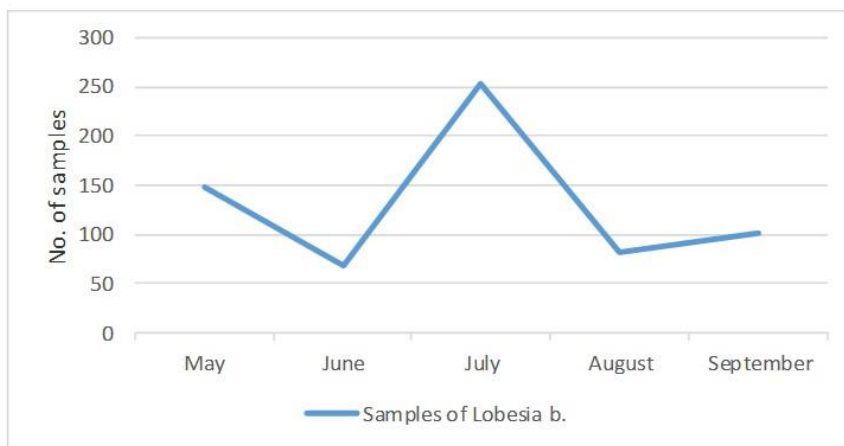
Fig. 1 Teraseya Fly trap in the experimental field

## RESULTS AND DISCUSSIONS

In the conditions of the Vasile Adamachi Didactic Farm from Iasi (tab. 1), the butterflies of the hibernating generation (G1) were registered for the first time at the traps with sexual pheromone on 18.05 and at a maximum temperature of 25°C and at an average of 19°C. The temperature during the insect's activity period varied between 18°C-27°C and the precipitations were 1.7 mm. Spawning conditions were unfavorable. The percentage of attacked plants was 3.5% of the total of the 100 plants observed. The entire development cycle lasted 50 days with 453°C sum of temperatures, and the biological threshold was calculated at  $t = 12^{\circ}\text{C}$ . The development of the larvae lasted approximately 30 days, and that of the stern was 7 days.

The first butterflies of the second generation (G2) appeared on traps on 3.07 in the conditions of 27°C maximum temperature, humidity 71%, and precipitation was absent. The flight lasted 28 days until 31.07. During the flight the temperatures varied between 15°C-32°C, the humidity was between 57-97%, and the precipitations were 20mm throughout. The frequency of the attacked plants has reached the percentage of 2.5%, from here it can be concluded that the temperatures and excess humidity are unfavorable to the development of the insect.

In the conditions of 2021, the flight of the third generation (G3) butterflies also appeared between August and September. These butterflies lay eggs on the grains, and the caterpillars cause even more serious damage to the previous generation, as they coincide with the period when the grain content is very favorable for the development of gray rot.



**Fig. 2** Flight dynamics of *Lobesia botrana*

The species *Lobesia botrana* is present in the stationary Vasile Adamachi and recorded three generations per year (Fig 2). The value of the amount of effective temperature required for the appearance of butterflies in spring is correlated with the climatic conditions of the previous year, especially in July, August and September.

Table 1

The flight dynamics of the adult <i>Lobesia botrana</i> in 2021																		
Generation	G1						G2				G3							
Month	May			June			July			August			September			October		
DECADS	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
No. of samples		58	90	13	0	56	181	72	1	0	75	7	0	0	101	0	0	0
Total samples	148			69			254			82			101			0		

Table 2

Relationships between flight duration and abiotic factors							
Stationary	Generation	The appearance of adults decads / month	Flight duration (days)	°C maxim/average		H% mm min. /max.	
Vasile Adamachi Farm	I	I/IV	23	22-29	15-25	50-60	0-17
	II	III/VI	31	25-28	20-24	65-85	0-15
	III	II/VIII	18	22-25	17-19	70-80	5-45

## CONCLUSIONS

1. Among the vine pests, the grape moth remains the main pest in the vineyards of the eastern part of Moldova.

2. Between April and September, the population of *Lobesia botrana* remained below the PED of 100 catches / trap / week for all 3 generations.

3. The pest has fluctuated over the last 5 months, with three peaks of flight where between 100 and 250 catches per month have been recorded, and the population has remained constant below the economic damage threshold (PED) of 100 catches / trap / week.

4. In present, the evolution of the pest from Vasile Adamachi Iași farm is within reasonable limits, but with a tendency to decrease the frequency, especially in the third generation, which could produce the most significant losses through the development of gray grape rot.

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