APPLICATION OF PHEROMON TRAPS FOR THE DYNAMIC TRACKING OF *LOBESIA BOTRANA* FLYING IN VINEYARDS

Boyan STALEV

Agricultural University of Plovdiv, 12 Mendeleev Str., Plovdiv, Bulgaria

Corresponding author email: stalev26@abv/bg

Abstract

The colorful grape moth Lobesia botrana is found in all wine-growing regions of Europe, as well as in countries such as Asia and Africa. It is one of the most dangerous enemies in the vine and in Bulgaria especially in the south central part. (Stalev, B., 2013). The purpose of our study was to determine when it is most appropriate to combat flying forms. To accomplish this task, namely to track the flight dynamics of the colorful grape moth (Lobesia botrana). In the territory of the training and experimental base of the Department of Viticulture near the village of Brestnik, flying was carried out and monitored by pheromone traps type C1. This was done during the two growing seasons of 2017-2018 from experience.

Key words: viticulture, pheromone traps, Mavrud variety, Lobesia botrana.

INTRODUCTION

With the development of viticulture as one of the important sub-sectors of agriculture in many countries around the world and the introduction of technical progress in the cultivation of vine varieties, the need to study their biology has increased.

Climatically, the region belongs to the transitional continental climate region and is included in the sub-region of the Plovdiv field, which occupies part of the Upper-Thracian lowland. The temperature regime is characterized by relatively hot summers and mild winters. The freezing time is an average of 211 days. The last spring frost occurs between 5 and 20 April, and the first autumn frost occurs between 27 October and 8 November. With regard to the duration of the freezing weather during the year, the region does not differ from the plains of southern Bulgaria. The temperature sum for the period with average daily temperatures higher than 10°C is in the range 3800-4000°C (3900°C). The average annual rainfall for a multi-year period is 515 mm (Angelov, L., 2006). It is about the annual rainfall in the plains regions of southern Bulgaria and at the same time is about 250 mm smaller than the area of transitional Mediterranean climate in the South-Eastern part of the country. Nowadays, a great deal of attention is paid to wine-making, with the majority of that production being red wines. The Mavrud variety, which is an old local variety and typical of the Plovdiv and Asenovgrad districts, also deserves attention in this line of thought (Babrikov D., 2000; Babrikov D., 1977; Babrikov D., 1997).

The integration of Bulgaria into the EU opens up opportunities, but at the same time also presents serious challenges to the development of the agricultural sector in the conditions of increased competitive pressure. Especially when quality raw material for wine production has to be produced. Following the restriction of the range of chemicals such as chlorpyrifos and dimethoate from EU Member States to combat Lobesia botrana, pheromone traps will increasingly need to be used to control the density and control of the moth grape moths. (Gordon, D., L., 2003; Louis, F., 2001). Mating One of the most dangerous enemies of the vine in Europe, including the colorful grape moth Lobesia botrana Den in Bulgaria et Schiff. (Galet. 1982). Extensive research on morphology, biology, its harmful activity and its fight in Bulgaria is conducted by Harizanov (1981). In various countries of Europe, at present, the method of sexual pheromone disorientation is applied over an area of 90,000 ha (Charmillot & Pasquier, 2001). Natural populations of parasitic and predatory insects limiting the density of mossy grape moth have been reported (Galet., 1981; Kreiter, S., 2000; Wahl, T., 1988) and other. In Bulgaria this method is not yet widely used, but in recent years it has been worked in this direction (Papanikulau et al., 2009; Atanasova et al., 2010; Stalev et al., 2012; Braikov, 2006; Harizanov, A., 1981).

The purpose of the present development is to apply pheromone traps type C1 and to track the flight dynamics of the moth grape moth (*Lobesia botrana*) in the Mavrud variety grafted and grown on the Kober 5BB pad.

MATERIALS AND METHODS

The Mavrud variety planted in 2013 in the educational and experimental base of the Vineyard Department near the Brestnik village was used as the object of the study. The study itself was conducted during the period 2016-2017. Planting distances are 3.0/1.0 m. the vines are formed on a stepped double sided border. The loading of the vines was accomplished by short fruiting units. The variety is grafted on a Berlandieri x Riparia Teleki sel Kober 5BB pad. The experimental design included variants with load flowering in the flowering phase, grain growth and 5-cluster layering. To track the flight dynamics of the colorful grape moth (Lobesia botrana). On the territory of the training and experimental base of the Department of Viticulture near the village of Brestnik, flying was performed and monitored by pheromone traps type C1.

Ampelographic characteristics of the Mavrud variety under study.

Name - Causeni (Moldova), Kachivela (Pomorie, Burgas - Bulgaria).

Origin and distribution - The Mavrud variety is an old local variety grown in our lands from ancient times.

The areas occupied by this variety as of 1981 are 1.18%.

And by 2015, the area is 1663 ha with Mavrud, which is just under 2% of the total vineyards in Bulgaria.

Areas with Mavrud in the area of Asenovgrad and Plovdiv are about 781.4 ha.

Botanical description

Normally developed leaves - large, five-lobed, the upper incisions are deep, mostly closed at the bottom, once there is a tooth at the base.

The lower incisions are medium-deep, openshaped, with a narrow mouth and rounded bottom. The caudal incision is open, arched wide.

The upper teeth are triangular with a curved tip on one side and the posterior and intermediate teeth are triangular and triangular.

The upper surface of the leaf blade is mesh-like with webs of moss, with flesh and skin strongly frayed below.

The nerves are pink-wine-red at the base, evenmossy.

Autumn color is violet red.

Mature shoots - medium long and thick internodes with slightly convex nodes.

Color - bisexual.

Cluster - large, winged, branched, broadly expanded at its base half-compacted to loose.

Grain - medium spherical, slightly trapped on the handle, juicy, with a sweet taste.

The skin is thick, wiry, blue - black, with an abundant waxy coating.

Climatic characteristics of the area and relief The length of the growing season in the days for the climatic indicators is taken from the

Climate Directory of the Republic of Bulgaria.

Mechanical properties of the grains - skins %, meat %, seeds %, theoretical yield, killed grains %, dry grains.

Of each variant, 45 vines (three replicates of 15 vines) were included in the experiment.



Figure 1. Formulation of the experiment



Figure 2. V1 - Felizeno at 30 cm long shoots and ruffled, normalized during flowering with 5 fissures



Figure 3. V2 - Felizeno at 30 cm long shoots, brittle and scabrous, normalized during the IV phase of 5-grape grain growth

RESULTS AND DISCUSSIONS

The quality of the grapes depends on the content of sugars, titratable acids, dyestuffs, mineral salts, amino acids, but these indicators will be in the necessary condition only if the grape is protected by enemies and, above all, by Lobesia botrana. The average annual air temperature for station Plovdiv is 12.4°C, and for the region of the city Brestnik - 12.6°C and varies from 10.9 to 13.5 °C. In the spring, small for loos are possible, which sometimes slow

down the development of the vine in the beginning.



Figure 4. Pheromone traps type C1



Figure 4. Carrying out a visual control by counting

This characteristic of the region phenomenon is almost always observed during the month of April. Monthly air temperatures for the winter and summer months are relatively constant. The annual temperature amplitude is in the range of 20.5°C to 22.5°C and does not differ from the amplitude for the entire southwestern, transitional-continental climatic area. The frequency of late spring cooling in studies area is not different from that in the rest of the lowland territories of southern Bulgaria. As a result of the study conducted in the period 2016-20117 in the conventional cultivation of vines with the use of pheromone traps type C1. Figures 4 and 5 to track flight dynamics. Butterflies in pheromone traps have been identified, indicating their efficacy. In the conventional cultivation of the vines, the seasonal dynamics of the flight of the mulled grape moth were monitored in the experiment. with the density of the enemy significant. The flight dynamics and the number of butterflies attracted are presented in Figure 5. They show that in the vinevard that was monitored in 2016, the largest number of butterflies of the colorful moth was identified and caught at the beginning of the first generation of vegetation, with the number of butterflies caught over 110. The chart also notes that this trend continues for future generations. 2017 data in Figure 6 again showed the beginning of the flight in April by about 45, and in July and August again the flight found a large number of butterflies per colorful grape moth, similar to the results of 2016. Their number reaches 100 in the third generation.

From the experience gained during the two years we can conclude that in the land of the village.



Figure 5. The dynamics of flying butterflies of the colorful grape moth in the vineyards of the village Brestnik in 2016



Figure 6. The dynamics of flying butterflies of the colorful grape moth in the vineyards of the village Brestnik in 2017

Brestnik is in a high density area and it is necessary to systematically combat the colorful grape moth throughout the growing season, for this purpose it is necessary to carry out annual monitoring using pheromone traps. The purpose is to determine the beginning of a flight in order to adequately combat the caterpillars of this enemy. Otherwise, it would lead to damage and deterioration of both the appearance of the grape and its technological in terms of fermentation parameters on the one hand and on the other hand the production of poor quality wines as All this is confirmed by the results presented in Table 1.

The data from the mechanical analysis of the grapes show that the percentage of normal grains is very high in the two variants involved in the experiment - from 94.71% in V1 to 95.83%. V2. 29.96% were reported at V1 to 18.46% at V2 grains, proving that a high percentage of grape samples and grains could be obtained by failure to follow the forecast given by the *Lobesia botrana* flight haul before the grape harvest. Regarding the construction of the grain, the meat occupies from 74.43% at V1 to 80.78% at V2, respectively, the skins are 19.29-14.01%, respectively for V1 and V2.

	GRAPES						RAIN		
Variant	Year	Clings, %	Nipples, %	Rot, %	Milere, %	Staff, %	Of skins, %	Seedof, %	Meat, %
V_1	2017	5.29	94.71	29.96	4.60	1.10	19.29	6.27	74.43
V ₂	2017	4.17	95.83	18.46	3.56	0.32	14.01	5.21	80.78

Table 1. Mechanical analysis of the grapes of the Mavrud variety

CONCLUSIONS

The results of the studies on the dynamics of flight and the possibilities of using pheromone traps for monitoring *Lobesia botrana* in the production of grapes of the variety Mavrud in the village Brestnik, allow us to draw the following conclusion:

• The terrain of which is planted the Mavrud variety is characterized by favorable climatic conditions for growing varieties for red table wines. The total temperature amount is 4000°C. The average 24-hour temperature of the warmest month of July is 22.8°C the duration of the frost-free period is 211 days. The amount of precipitation is 515 mm. The area is characterized as moderately dry. The average multi-annual deficit in the balance of atmospheric hydration for the period June-August is within the range 200-300 mm. This

creates a prerequisite for the normal wintering and development of *Lobesia botrana*.

• In the area of Brestnik village, the colorful grape moth *Lobesia botrana* was found to be very high density (over 110 pieces per catch), using C1 type pheromone trays, and during the two years of the experiment a high density of the enemy was recorded.

• Used on pheromone traps type C1. for the determination of the density of the colorful grape moth have shown high efficiency and must be placed in the land of Brestnik to signal to wine producers when insecticidal treatments should be carried out against the host.

• Mechanical analysis shows that the normalization of the yield leads to a change in the ratio of the clump of grain and, in

particular, the ratio of meat to skin on the one hand, and from the other to the reading of a high % of rotten grains, which is evidence that failure to follow the forecast submitted by the *Lobesia botrana* flight catch could lead to a high percentage of rotten grains leading to a poor harvester quality of grape harvest and wine.

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