

Protection Of Grape From Grape Moth (*Lobesia Botrana*. Den & Schiff) With Mating Disruption Pheromones)

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Abstract—Albania has planted 12 thousand ha with vineyard. Majority of vineyards parcels are planted in the hills and slope. Grape moth (*Lobesia botrana* Den & Schiff) is key insect pest in Albanian vineyard. In Albanian climatic conditions, grape moth develops three generation per year.

The first generation appears in flowering time (during May) the second generation at the end of June, (when the grape berry are so big as a pea grains, the third generation at the beginning of the August, (the beginning of coloring of grape berry). Most dangerous are the second and third generation. Wounded berry from grape moth larvae stimulate the gray mold (*Botrytis cinerea*). The mating disruption is based on avoiding contact between female and male of (*L.botrana*). In the vineyard where is used confusion pheromones are avoiding the using of conventional insecticides. In the variant treated with pheromones in harvesting time, only 2 % of bunches was infested from leaves, in the variant treated with conventional insecticides infestation was 6 % and in control, 13 % of bunches was infested.

The cost in variant treated with confusion pheromones was 2 % cheaper than variant with conventional insecticides treated with backpack pumps, 6 % cheaper than variant with conventional insecticides treated with backpack pumps with motor, and 13 % cheaper with conventional insecticides treated with motor pumps with a tractor. From the ecological point of view, the confusion pheromones have a significant priority in comparison with conventional insecticides.

Keywords—*Lobesia botrana*, grape, confusive method, pheromone

I. INTRODUCTION

The main goal of this study is to avoid using the conventional insecticides, to reduce plant protection cost and to avoid the chemical residues in product and environment. Pheromones are used in bio grape parcel and in conventional grape too.

Using of confusion pheromones is considered as a perfect method in bio-production. This method is very effective and efficient too. In Albania, confusion pheromones are used in 20 ha of vineyard.

Infection level from grape mother lives in the treated variant with confusion pheromones is three times lower than infection in variant treated with conventional insecticides and more than six times in comparison with control. The cost of a dispenser of pheromones is more expensive than insecticides, but the implementation is very cheap, because have no need for equipment for treatment. The cost of insecticides is lower than insecticides, but spray techniques is very expensive. The study will continue next year, 2016 too.

II. MATERIALS AND METHOD

A. Location of experimental field

The field test is carried out in "VILA DUKA", Ishmi commune, Durres Municipality. Ishmi village is located in north - east of Durres city. The hills are in front the Adriatic Sea surrounded by forest and nearby has not any other vineyard parcels. Grape is 8 years old and since seven years is managed in an organic way. Are planted three grape cultivars for wine; Merlot Cabernet, Tempranillo.

B. Plots setup

The field test is organized in three variants:

Variant 1. Treated with 500 dispensers of pheromones per ha.

Variant 2. Treated with conventional insecticides

Variant 3. Control, without treatments

The trade name of pheromone is called ISONET. L, with formula ((E) dodecenyl acetate and (E,E) and (Z,E) isomers of 7,9,11-dodecatrienyl acetate) Active ingredient is produced in Japan and formulation is prepared in a bio-factory in Switzerland. Formulation is made in the dispenser in a plastic wire in spaghetti form with 20-22 cm in length. Inside the dispenser has female sex pheromone. During the evaporation of the female pheromone in the vineyard is created a cloud with pheromones. In this situation, the female and male individuals have difficulty to find the biological

partners. Lack of contact between the pair, the female remains sterile and as a consequence have not egged on the grape clusters, and have not the larvae in grape berries.

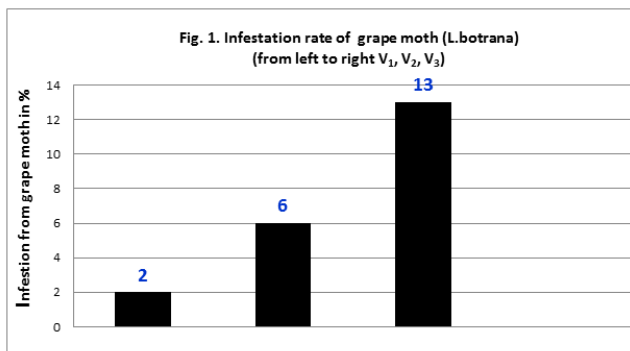
Dispensers are hanged in the vineyard before or during the flowering of the bunches. Dispensers are hanged one row with dispenser and another without a dispenser. A dispenser in the row is hanged every 5-6 meters. One dispenser protects 25-30 m² vineyard.

The cost of each variant is calculated from the cost of products and the cost of treatment with different types of equipment. Cost is calculated for backpacks, backpack with motor and motor pumps with tractor, Is calculated the cost for hanging of dispensers by hand in the case of variant treated with confusion pheromones

In the three variants are made analyses on the bunches for infection of grape moth larva.

III. RESULTS AND DISCUSSION

Protection of grape from grape moth (*L.botrana*) with mating disruption pheromones is with economic and ecologic value. Infestation from (*L.botrana*) larvae in the variant treated with confusion pheromones was three times less in compare with variant treated with conventional insecticides.



The cost in variant treated with confusion pheromones was 2 % cheaper than variant with conventional insecticides treated with backpacks pumps, 6 % cheaper than variant with conventional insecticides treated with backpacks pumps with motor, and 13 % cheaper with conventional insecticides treated with motor pumps with a tractor. Take into account that mating disruption method with confusion pheromones is a very ecologic method, without negative impact on the human health and in the

environment, the total cost of (*L.botrana*) control with confusion method is much cheaper than conventional insecticides. By increasing of the surface of vineyard treated with confusion method, the cost of dispensers will be cheaper too. Confusion pheromones that caused mating disruption were the best solution for protection of grape from (*Lobesia botrana*). The mating disruption grape moth (*L.botrana*) is very easy to apply in Albania because vineyard is located in hills and slopes, and where the use of agricultural machinery is very difficult.

By using this method conventional insecticide was no need to be applied. The isolated distance between treated and untreated block has been 5 km. This is an argument for the role of so called "isolated distance". This distance has avoided the coming of the fertile (*L.botrana*) female from untreated vineyard to treated one.

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Table 1. Infection of grape clusters from grape moth (*L.botrana*), the year 2015. Analysed 200 grape clusters. (before harvesting)

Variants	Control points					Shuma	infection in % clusters
	Point 1	Point 2	Point 3	Point 4	Point 5		
	Larvae in 40 clusters	Larvae in 40 clusters	Larvae in 40 clusters	Larvae in 40 clusters	Larvae in 40 clusters	Larvae in 200 clusters	Larvae in 100 clusters
Variant 1 treated with confusion pheromones (Isonet L)	1	0	2	0	1	4	2
Variant 2 treated with conventional insecticides	2	1	2	4	3	12	6
Control, without treatments	5	6	4	6	5	26	13

Table 2. Variant 1. Cost of treatment with Isonet L in quantity 500 dispenser /ha of the grape (in Lek)

Trade name of product	Norme dispenser /ha	Value of dispenser	Value of dispenser per ha	Value of work for hanging of dispensers in the field	Total value of treatment (Isonet L plus work for hanging the dispensers in the field)
Isonet L	500	45	22500	500 Leke	23000

Table 3. Variant 2. Cost with conventional insecticides (in Lek)

Grape moth generations	Name of insecticides and number of treatment for each generation	Quantity of product use in Liter or Kg / 1 ha	Value in Albanian Lek for one Liter or Kg of product	Value of product per 1 ha
First generation	-	-	-	-
Second Generation	2 treatments with insecticide (Mospilan)	210 ml x 2 treatments =420ml	6000	2460 (2 treatment)
Third generation	1 treatment with insecticide (Lanate 20)	For 1 treatment =240 gr	4500	1080 (1 treatment)
For three generates are made 3 treatments			10500	3500

Table 4. Cost of grape moth control (*L.botrana*) according to spraying techniques

Number of treatments with Conventional insecticides per season	Treatment techniques	Working days needed for each spraying technique for three treatment in season	Volume of working day	Cost of work for three treatments
3	Backpacks pump	8	2500	20000
3	Backpack pump with motor	4,5	5000	22500
3	Motor pump with tractor	3	6000	18000

Table 5. Total cost according to plant protection products and spray techniques (in Lek)

Products	Cost of product per one treatment per 1 ha		Cost of spraying technique	Total cost Total	Cost of spray technique in comparison with Pheromones (100 %)
Pheromones	22500		5000	23000	100 %
Insecticides	3540				
a		Backpacks pump	20.000	23540	Plus 2 %
b		Backpack pump with motor	22.500	26040	Plus 13 %
d		Motor pump with tractor	18.000	21540	Plus 7 %