STUDY ON COMBATING THE PESTS OF GRAPEVINE PHYTOSANITARY TREATMENTS AFFECT BIODIVERSITY AND FAUNA OF VINEYARD PLANTATIONS DEALU BUJORULUI

STUDIU PRIVIND COMBATEREA DĂUNĂTORILOR VIȚEI DE VIE ȘI INFLUENȚA TRATAMENTELOR FITOSANITARE ASUPRA BIODIVERSITĂȚII FAUNEI DIN PLANTAȚIILE VITICOLE ALE PODGORIEI DEALU BUJORULUI

TĂBĂRANU G.[1], TĂLMACIU M.[2]
e-mail: gabitabaranu@yahoo.com

Abstract. *Biodiversity is a specific feature of our planet, which ensures the smooth functioning of the ecosystems, the existence and development of the biosphere in general. Lately, the problem of protecting of biodiversity at the ecosystem, species and populations has become increasingly vital for reducing human impact on the biosphere. Viticultural ecosystem is defined as being the functional unit of biosphere created and controlled by man in order to obtain high yields of grapes quality and economic and social conditions more favorable. Pesticides used to combat of pathogens of grapevine, in addition to their positive effect, increase their level of aggression and contribute to environmental pollution and the grape harvest, when not used rationally. In the last two decades, public opinion in general and Romanian scientific research proved particularly sensitive to the environment and human health. This paper presents research carried out at the R.S.D.V.V Bujoru. Observations were made in the experimental groups compared with vines grown: ecologic technology (Merlot) and conventional technology (Witness). Epigenous fauna research focused study of vine plantations, that any pesticide treatment has a greater or lesser influence on its specific structure, but also the quantity of individuals within the same species that are found in different agroecosystems (D. Ball et al., 1986).*
Key words: *ecosystem, vines, biodiversity, pathogens, pesticides.*

Rezumat. *Biodiversitatea reprezintă o particularitate specifică a planetei noastre, care asigură funcționarea optimă a ecosistemelor, existența și dezvoltarea biosferei în general. În ultima perioadă, problema protejării biodiversității la nivel de ecosisteme, specii și populații a devenit tot mai vitală pentru reducerea impactului uman asupra biosferei. Ecosistemul viticol este definit ca fiind acea unitate funcțională a biosferei creată și controlată de către om, în vederea obținerii unor producții ridicate de struguri, de calitate superioară și în condiții economice și sociale tot mai avantajoase. Pesticidele folosite în combaterea agenților patogeni ai viței de vie, pe lângă efectul lor favorabil, sporesc gradul de agresivitate al acestora și contribuie la poluarea mediului și a recoltei de struguri, atunci când nu sunt utilizate rațional. În*

[1] Research and Development Station for Viticulture and Vinification Bujoru, Romania
[2] University of Agricultural Sciences and Veterinary Medicine of Iaşi, Romania

ultimele două decenii, opinia publică în general şi cercetarea ştiinţifică românească în special s-au dovedit sensibile la problemele mediului înconjurător şi al sănătăţii oamenilor. Lucrarea prezintă cercetările realizate la S.C.D.V.V Bujoru. Observaţiile s-au efectuat în mod comparativ pe două loturi experimentale cultivate cu viţă de vie: tehnologie ecologică (soiul Merlot) si tehnologie clasică (Martor). Cercetările au vizat studiul faunei epigee din plantaţiile de viţă de vie, cunoascând faptul că orice tratament cu pesticide are o influenţă mai mică sau mai mare asupra structurii specifice a acesteia, dar şi asupra cantităţii de indivizi din cadrul aceleiaşi specii care se întâlnesc în diferite agroecosisteme (Ball D. şi col., 1986).
Cuvinte cheie: *ecosistem, viţa de vie, biodiversitate, agenţi patogeni, pesticide.*

INTRODUCTION

The technology culture of the vine against pathogens and pests is one of the crucial technological links for obtaining high yields of grape and wine quality.

After penetration of pathogens and pests in the American continent growing in the countries in Europe, growers, both practitioners and researchers alike have sought ways and means to prevent and fight as effectively (Talmaciu and Georgescu, 1998).

In this regard were crystallized technologies to fight against the key pathogens and pests that have become classics and the lead role is held by plant protection substances in recent years have seen a diversification (Rosca et al., 2008).

Pesticides used to combat pathogens of grapevine, in addition to their positive effect, increase their level of aggression and contribute to environmental pollution and the grape harvest, when not used rationally. In the last two decades, public opinion in general and Romanian scientific research proved particularly sensitive to the environment and human health (Talmaciu et al., 1996 a-b).

Epigenous wildlife research focused study of vine plantations because any pesticide treatment has a greater or lesser influence on its specific structure, but also the quantity of individuals within the same species that are found in different agroecosystems (Ball et al., 1986).

MATERIAL AND METHOD

The research was conducted between April-June, in the Research and Development Station for Viticulture and Winemaking Bujoru, in a vineyard planted with Merlot aged 32 years.

The experiment was conducted on a land surface with a slope of 3-5%, chernozem soil type, with a humus content between 1,14 to 1,86% in the A horizon with a weak alkaline reaction (pH ,44 to 8,30) and a sandy loam texture; with the land surface facing east and about 170-200 m altitude. The rows'orientation was north to south, with a planting distance of 2,1 m x 1,2 m, and a provided density of 3968 vines / hectare. The rootstock used was Berlandieri x Riparia rootstock, Telecky Openheim SO4-4 selection. The experiment was conducted in two parcels with Merlot and Băbească gri grown in the Dealu Bujoru vineyard ecosystem.

The experimental variants of the research were as follows: V1 - clean technology (soiul Merlot), V2 -classic technology (soiul Merlot) and V3 MARTOR (soiul Băbească gri). In order to establish the quantitative and qualitative structure of the epigenous fauna on the ground surface, Barber soil type traps have been installed on the vine rows, being 2/3 filled with solution of formalin (formaldehyde) of 4%, and installed in 6 repetitions.

During the research, one of the parcels was treated according to conventional technology, with chemical pesticides, and the other was organically treated (with pesticides accepted in the organic viticulture) to combat mildew (copper sulphate), powdery mildew and mites (liquefying sulfur, powdery sulfur) and grape moth (synthetic sex pheromone traps type ATRABOT).

The entomological material was labeled, collected and transported to the laboratory where it was washed under running water, then was passed through 7% alcohol solution. To identify and count the epigenous fauna the magnifying trinocular glass (KRÜSS) with two 10x20 WF magnifiers was used.

RESULTS AND DISCUSSION

The entomologic material was collected as with the help of Barber soil traps. The relative numeric abundance (A.r.%) of a population is defined as the proportion represented by the number of individuals of a species or group to the total number of individuals belonging to all species of that sample.

In the material collected from the ground (during April-June) it has been found that:

At **V1 -** (organic) were identified 12 species or groups of arthropods belonging to the classes: Myriapoda, Insecta and Arachnida, but most of the class Insecta. The highest relative abundance of the species was recorded by the Formicide family (27.6%), followed by Lycosidae family (18.1%), Vespidae (14.0%), Curculionidae (8.8%), Carabidae (7,1%) and other species (7.1%) (table. 1).

At **V2 -** (classical) the fauna from the ground level was represented by a number of 11 species or groups of arthropod belonging to the classes: Insecta and Arachnida. Most populous family was the Formicide family (34.6%), Vespidae (15.6%), Fam.Staphylinidae (12.3%) and Carabidae (10.2%).

At **V3** - Witness - (Băbească gri) most populous was the Formicide family (38.3%), family Lycosidae (13.7%) and family Tettigoniidae (8.4%).

The treatments against pathogens and pests were done as follows:

In the **V1 -** plot (organic), treatments with biological fungicide against: mildew (Triumf 40 WG, copper sulphate), powdery mildew (Sulfavit 80 PU, PP Sulfavit 95) and grape moth (synthetic sex pheromone traps ATRABOT type) (table 2);

In the **V2-**plot (classical), control treatments were done with conventional chemical pesticides that are specific to the traditional production technology. To combat the mites one acaricide called Nissorun has been used, while to combat the grape moth, the insecticide Vip 50 SC (table 3) has been used.

In the **V3 –** Witness **(**Băbească gri) the treatments of diseases and pesticides have made conventional technology of manufacturing chemical processes. To combat pests no insecticide was used (table 4)

Table 1

Invertebrate species collected by soil type traps Barber in the period 15.05.2009 - 30.06.2009

No	Systematic framing (Species, Family, Order)	Variant/ Relative numerical abundance					
		V1	A.r.%	V2	A.r.%	V3	Ar%
1	*Gryllus campestris*/ fam. *Gryllidae*/ Order Orthoptera	16	3,8	0	0	1	0,2
2	*Apis* sp./ fam. Apidae/ Order Hymenoptera	5	1,2	0	0	4	0,8
3	Fam. *Vespidae*/ Ord. Hymenoptera.	39	14,0	67	15,6	24	5,1
4	*Alopecosa pulverulenta*/ familia. Lycosidae/ Order Araneae	76	18,1	18	4,2	64	13,7
5	*Formica rufa*/ fam.Formicide/ Order Hymenoptera	116	27,6	149	34,6	179	38,3
6	*Carabus* sp./ fam. Carabidae/ Order Coleoptera	30	7,1	44	10,2	16	3,4
7	Ord. Diptera	21	5,0	57	13,2	36	7,7
8	Cicada viridis/ fam. Cicadidae/ Order Homoptera	21	5,0	18	4,2	6	1,3
9	*Saga pedo* / fam. Tettigoniidae / Order Orthoptera	5	1,2	0	0	39	8,4
10	Fam. *Staphylinidae* / Order Coleoptera	1	0,2	53	12,3	12	2,6
11	*Gryllotalpa gryllotalpa* / fam. Gryllotalpidae / Order Orthoptera	1	0,2	0	0	0	0
12	*Eurigaster Maura,* Subordinul Geocoridae, Order Heteroptera	0	0	0	0	2	0,4
13	Fam. *Curculionidae*/ Order Coleoptera	37	8,8	8	1,8	13	2,8
14	*Coccinella septempunctata/* fam. Coccinellidae / Order Coleoptera	0	0	4	0,5	2	0,4
15	*Forficula auricularia* / fam. Forficulidae / Order Dermaptera	0	0	2	0,4	0	0
16	*Myriapoda*	0	0	1	0,2	0	0
17	*Melolontha m.,*fam.Scarabaeidae,Order Coleptera	0	0	0	0	1	0,2
18	Order Lepidoptera	0	0	0	0	1	0,2
19	Species other	30	7,1	9	2,1	67	14,3
Total		**420**	100	**430**	100	**467**	100

Table 2

Phytosanitary intervention program V 1 (organic) in 2009

No.	Pheno-phase	Pathogen combated	The used product	UM (kg,l)	The dose (ha)
1.	Debudding - Vine shoot 10-15 cm	Mildew	Sulfavit 80 PU	kg	4,00
2.	Vine shoot 30 cm	Mildew Grape moth G I	Sulfavit 95 PP Type traps ATRABOT	kg buc	10,00 9,00
3.	Before the blooming	Manna Midlew	Triumf 40 WG Sulfavit 95 PP	kg kg	2,00 15,00
4.	End of blooming	Manna Midlew	Triumf 40 WG Sulfavit 95 PP	kg kg	2,500 25,00
5.	Growth of grapes	Manna Midlew Grape moth G II	Triumf 40 WG Sulfavit 95 PP Type traps ATRABOT	kg kg buc	2,500 15,00 9,00
6.	Compacting of grapes	Manna Midlew Grape moth GIII	Copper sulphate Sulfavit 95 PP Type traps ATRABOT	kg kg buc	10,00 25,00 9,00

Table 3

Phytosanitary intervention program V 2 (classic) in 2009

No.	Pheno-phase	Pathogen combated	The used product	UM (kg,l)	The dose (ha)
1.	Debudding - Vine shoot 10-15 cm	Mildew	Sulfavit 80 PU	kg	4,00
2.	Vine shoot 30 cm	Mildew The mites	Sulfavit 95 PP **Nissorun**	kg l	10,00 0,50
3.	Before the blooming	Manna Midlew Grape moth G I	Salomea75WG Sulfavit 95 PP **Vip 50 SC**	kg kg l	3,00 15,00 0,25
4.	End of blooming	Manna Midlew	Armetil M Pen100 EC	kg l	2,50 0,25
5.	Growth of grapes	Manna Midlew	Selene + Vitra Falcon 460EC	l kg l	0,25 1,50 0,30
6.	Compacting of grapes	Manna Midlew	Copper sulphate Sulfavit 95 PP	kg l	10,00 30,00

Table 4

Phytosanitary intervention program V 3 (Băbească gri) in 2009

No.	Phenophase	Pathogen combated	The used product	UM (kg,l)	The dose (ha)
1.	Debudding - Vine shoot 10-15 cm	Mildew	Sulfavit 80 PU	kg	4,00
2.	Vine shoot 30 cm	Mildew	Sulfavit 95 PP	kg	10,00
3.	Before the blooming	Manna Midlew	Salomea75 W Sulfavit 95 PP	kg kg	3,00 15,00
4.	End of blooming	Manna Midlew	Armetil M Pen100 EC	kg l	2,50 0,25
5.	Growth of grapes	Manna Midlew	Selene + Vitra Falcon 460EC	l kg l	0,25 1,50 0,30
6.	Compacting of grapes	Manna Midlew	Copper sulphate Sulfavit 95 PP	kg l	10,00 30,00

CONCLUSIONS

1. Epigenous fauna captured in the vineyard with the Barber soil type traps was represented by 420 copies in the V1 parcel, 430 copies in the V2 parcel and 430 copies in the V3 parcel.

2. The highest relative numerical abundance of all species was recorded by *Formica rufa* / *Formicide* family (38,4%) in the V3 ,(27.6%) in the V1 parcel, and 34.6% in the V2 parcel, respectively.

3. Of predatory species collected, insects of the order Coleoptera, (7.1%) in V1 and (10.2%) in V2, have been found.

REFERENCES

1. **Baal D., Tapp L., Gordon F., Potter D.A., 1986** – "*Effects of pesticides on earhworm populations"* in Kentucky bluegrass Insescticide and Acaricide Tests, p. 395.
2. **Tălmaciu M., Georgescu T., Filipescu C., Badeanu Marinela, 1996a –** "*Studii asupra structurii și abundenței speciilor de carabide din cultura viței de vie*", Revista Agronomice în Moldova, vol. I., II., Iași.
3. **Tălmaciu M., Georgescu T., Mitrea I., Filipescu C., Bădeanu Marilena, Radu C., 1996b - "***Contributions to the knowing of the carabid fauna of the vine plantation in Huși vineyard", Vaslui District,* Lucrări științifice, vol. 39, Seria Horticultură, U.Ș.A.M.V. Iași, p. 267 - 271
4. **Tălmaciu M., Georgescu T., 1998 –** *Fauna de carabide (Coleoptere - Carabidae) din plantațiile de viță de vie din Moldova,* Editura "Ion Ionescu de la Brad" Iași
6. **Roșca I., Rada Istrate, Margarit G., Maria Neamțu, 2008** - "*Studii privind biodiversitatea faunei epigee din plantația de măr de la S.C.D.P. Băneasa*", Analele Institutului de Cercetare- Dezvoltare pentru Protecția Plantelor, vol. XXXV, p. 29-37, Eikon, Cluj Napoca coeditoare cu Editura Rawex Coms București.