EVALUATION OF THE CONSERVATION OF BIODIVERSITY OF ECOSYSTEMS IN THE WINE CENTER OF COPOU IAŞI

EVALUAREA STĂRII DE CONSERVARE A BIODIVERSITĂŢII ECOSISTEMELOR DIN CENTRUL VITICOL COPOU IAŞI

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Abstract. *In order to assess the positive impact of the implementation of bio-resources, the greening system and multifunctional protection areas, on the functional biodiversity in the vineyard ecosystems of the vine plantations under the administration of the Research Station for Viticulture and Enology Iasi, six experimental plots were selected, which have native varieties, older and newer, recent creations, varieties of table grapes and wine grapes. The conservation status of biodiversity was assessed by means of two indicators, namely the quantity of semi-natural elements in the landscape of the vineyard holding and their quality. Following the assessment of the conservation status of the agroecological infrastructures (IAE) within the studied wine perimeter, it was found that these have on average a medium to good status, being able to apply corrective measures.*
Key words: biodiversity, agroecological infrastructures, vineyard

Rezumat. *Pentru evaluarea impactului pozitiv al implementării bio-resurselor, a sistemului de înverzire şi a zonelor multifuncţionale de protecţie, asupra biodiversităţii funcţionale în ecosistemele viticole din plantaţiile de viţă de vie aflate în administraţia Staţiunii de Cercetare Dezvoltare pentru Viticultură şi Vinificaţie Iaşi, au fost selectate şase loturi experimentale, cu soiuri autohtone, mai vechi şi mai noi, creaţii recente, soiuri de struguri pentru masă şi vin. Starea de conservare a biodiversităţii a fost apreciată cu ajutorul a doi indicatori, respectiv cantitatea elementelor seminaturale din peisajul exploataţiei viticole şi calitatea acestora. În urma evaluării stării de conservare a infrastructurilor agroecologice (IAE) din cadrul perimetrului viticol studiat, s-a constat că acestea prezintă o stare generală medie spre bună, existând posiblilitatea aplicării unor măsuri corective.*
Cuvinte cheie: biodiversitate, infrastructură agroecologică, plantaţii viticole

INTRODUCTION

Conservation of biodiversity as a scientific area has emerged as a necessity to reduce the dangers that threaten living organisms and their living environments (Billeter *et al.,* 2008). Protection of nature in general and of biodiversity in particular has as its main objective the unhindered preservation of the natural ecosystems (ecofond) and the genetic fund at global and regional level in order to

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ensure the balance between the natural components of the environment, on the one hand and between them and human society, on the other (Le Roux, 2008).

Conservation of biodiversity in wine ecosystems is an objective national strategy (Tomoiaga *et al.,* 2016) and involves the following actions: biodiversity assessment based on crop technologies used, especially for disease and pest control; controlling diseases and pests by less polluting methods by using low-toxicity substances; increasing the ratio of useful organisms / pathogens to meet the requirements of modern farming practices regarding the health status of human populations, soil and biodiversity conservation; creating a quick diagnosis on how, the time and the products needed to perform sanitary phytosanitary treatments, as well as the monitoring of the effects after treatment; increasing the level and quality of agricultural produce by improving plant protection systems in line with the concept of sustainable development; making agriculture sustainable and competitive in the context of preventing environmental damage through anthropogenic activities.

MATERIAL AND METHOD

In order to evaluate the positive impact of the implementation of the bio-resources, the greening system and the multifunctional protection zones on the functional biodiversity in the vineyard ecosystems of the vine plantations under the administration of the Viticulture and Oenology Research and Development Station in Iasi, six experimental lots with areas ranging from 1.60 to 1.74 ha and a number of 8 varieties representative of the Copou wine center (tab. 1).

Table 1

Identification data of experimental lots - VORDS Iaşi

Culture	Plot	Latitude N	Longitude E	Altitude, m	Variety	Locality
Vine	Plot 1	47°12'59.12"	27°32'05.29"	119	Fetească albă	Iaşi
	Plot 2	47°12'45.10"	27°32'05.29"	153	Fetească regală	Iaşi
	Plot 3	47°12'27.44"	27°32'04.57"	195	Aromat de Iaşi	Iaşi
	Plot 4	47°12'22.28"	27°32'04.92"	192	Aligote	Iaşi
	Plot 5	47°13'05.86"	27°32'08.35"	118	Fetească regală	Iaşi
	Plot 6	47°12'12.35"	27°31'41.22"	172	Golia, Gelu, Paula	Iaşi

The structure and morphology of microhabitats (vineyards, terraces, hedges, trees, wooded areas, etc.) and their conservation status were established in each batch.

REZULTATS AND DISCUSSIONS

In order to assess the conservation status of biodiversity in wine ecosystems, two indicators were taken into account, namely the quantity of semi-natural elements in the landscape of the vineyard holding and their quality.

The *quantitative indicator* represents the share of the total surface area of the component elements (artificial landscape and infrastructure) in relation to the surface of the vineyard.

In the case of the six experimental lots, the area actually occupied by vines (UAE) is 9.94 ha and the agroecological infrastructure (AEI) represented by terraces, hedges, tree trunks, isolated trees, wooded areas and flower strips, occupies 0.67 ha (tab. 2).

Table 2

Structure and morphology of micro habitats vineyard ecosystem Copou Iaşi

Nr. crt	Specification	Surface of experimental lots, ha						Total vineyards, ha
		Lot 1	Lot 2	Lot 3	Lot 4	Lot 5	Lot 6	
1	Vineyards	1.62	1.63	1.73	1.74	1.60	1.62	9.94
2	Terraces	0.048	0.13	-	-	0.16	0.08	0.418
3	Hedges	-	-	-	0.05	-	-	0.05
4	Tree trunks	-	-	-	0.005	0.01	-	0.015
5	Isolated trees	-	-	0.02	-	-	-	0.02
6	Wooded areas	0.05	0.03	-	-	-	0.06	0.14
7	Flower strips	-	-	0.01	0.015	-	-	0.025
	Total, ha	**1.72**	**1.79**	**1.76**	**1.81**	**1.77**	**1.76**	**10.61**

Under these circumstances, the ratio between AEI and UAE is 7% and artificiality rate are 93% (tab. 3).

Table 3

Participation of the seminatural elements in the experimental lots

Nr. crt	Experiment lots	UAE (area actually occupied by the vine, ha)	AEI (agro-ecological infrastructure, ha)	AEI/ UAE, %	Artificiality rates, %
1	Lot 1	1.62	0.10	6	94
2	Lot 2	1.63	0.16	10	90
3	Lot 3	1.73	0.03	2	98
4	Lot 4	1.74	0.07	4	96
5	Lot 5	1.60	0.17	11	89
6	Lot 6	1.62	0.14	9	91
	Total, ha	**9.94**	**0.67**	**7**	**93**

The qualitative indicator reflects the conservation status of the landscape elements. Quality is evaluated based on several criteria defined for each type of AEI: structure, composition and assimilated functions, respectively degradations. This allows to obtain a radial structure diagram showing the IAE in good conservation status, medium and unfavorable (tab. 4 to tab. 9).

At farm level, quality is assessed by aggregating all conservation status obtained for all agroecological infrastructures on the vineyards.

The assessment of the conservation status of agroecological infrastructures (AEI) within the studied viticultural area shows that 61% of them have a good overall status, 36% average and 3% unfavorable, with the possibility of applying corrective measures.

Table 4

The conservation status of the terraces within the experimental lots

Criteria	Indicators	Conservation status			Observ.
		Good	Medium	Unfavorable	
Structure	width, m	<5	5 - 2	>2	
	the presence of uncultivated soil, %	<10	10 - 20	>20	
	the recovery of trees or bushes (<30 cm), %	<25	25 - 50	>50	
Compozition	exotic species, %	<1	1 - 10	>10	not evaluated
	ruderal species, %	<1	1 - 10	>10	
	number of species of plants with visible flower, no	<10	5 - 10	>5	
	recovery of perennial species	<80	50 - 80	>50	
Degradation	surface degradation, %	<1	1 - 10	>10	burning plant remains

Table 5

The state of conservation of live hedges within experimental lots

Criteria	Indicators	Conservation status			Observ.
		Good	Medium	Unfavorable	
Structure	the width of the fence, m	>2	1 - 2	<1	
	the fence distance to the treated surface	>1	0,5 - 1	<0,5	
	flooring at the edge of the fence	current shifting	without overlapping		
	types of associated structures: bunch of branches, stones, walls, fallen trees	<3	1 - 2	0	
Compozition	number of species of shrubs with thorns	<1	1 - 10	>10	
	recovery of exotic species	<1	1 - 10	>10	
Degradation	surface degradation, %	<1	1 - 10	>10	

Table 6

The state of conservation of tree strata in experimental lots

Criteria	Indicators	Conservation status			Observ.
		Good	Medium	Unfavorable	
Structure	height, m	>4	2 - 4	<2	
	the distance from the trunk to the edge of the treated / cultivated area, m	>1	0,5 - 1,0	<0,5	
	small associated structures: a bunch of branches, stones, walls, fallen trees	<3	1-2	absence	
Compozition	exotic species except platanus and trees, %	absence	<5	>5	
Degradation	surface degradation, %	<1	1 - 10	>10	

Table 7

The state of conservation of wooded areas within the experimental lots

Criteria	Indicators	Conservation status			Observ.
		Good	Medium	Unfavorable	
Structure	the width of the fence, m	>2	1 - 2	<1	
	the fence distance to the treated surface	>1	0,5 - 1	<0,5	
	number of wood layers (arboricola:> 3m, bushy high from 1.5 to 1.5 m, bushy down <1.5 m)	3	2	2	
	flooring at the edge of the fence	current shifting	without overlapping		
	trees with trunks or trees> 30 cm in diameter	1	absence		
	types of associated structures: bunch of branches, stones, walls, fallen trees	<3	1 - 2	0	
Compozition	number of species of shrubs with thorns	<1	1 - 10	>10	
	recovery of exotic species	<1	1 - 10	>10	not evaluated
Degradation	surface degradation, %	<1	1 - 10	>10	

Table 8

The state of conservation of isolated trees within the experimental lots

Criteria	Indicators	Conservation status			Observ.
		Good	Medium	Unfavorable	
Structure	height, m	>4	2 - 4	<2	
	distance from the trunk to the edge of the treated / cultivated area, m	>1	0,5 - 1,0	<0,5	
	small associated structures: a bunch of branches, stones, walls, fallen trees	<3	1-2	absence	
Compozition	exotic species except platanus and trees, %	absence	<5	>5	
Degradation	surface degradation, %	<1	1 - 10	>10	

Table 9

The state of conservation of the flower bands in the experimental lots

Criteria	Indicators	Conservation status			Observ.
		Good	Medium	Unfavorable	
Structure	width, m	<5	5 - 2	>2	
	the presence of uncultivated soil, %	<10	10 - 20	>20	
	number of layers	<3	2	1	
Compozition	exotic species, %	<1	1 - 10	>10	not evaluated
	ruderal species, %	<1	1 - 10	>10	
	number of species of plants with visible flower	<10	5 - 10	>5	
	recovery of perennial species	<80	50 - 80	>50	
Degradation	surface degradation, %	<1	1 - 10	>10	burning plant remains

Among the measures for improving the conservation status we mention: creating green corridors connecting green areas inside and on the periphery of the farm; expanding flower bands with melliferous plants as pollen and nectar source for pollinating insects or seeds (*Vicia sp., Lotus corniculatus*); the extension of *Prunus spinosa* and *Rosa canina* fruit bands for the useful entomofauna shelter; protection of meadows and natural meadows, which are only mown if necessary and in any case will not till; protection of large solitary trees and existing shrubs because they can provide food and shelter to wildlife; providing structural elements such as stones or woods that offer a good habitat for insects; rebuilding soil retention structures such as terraces on sloping land.

CONCLUSIONS

1. Following the assessment of the conservation status of agroecological infrastructures (AEI) within the studied wine-growing perimeter, it was found that they have a medium to good overall state, with the possibility of applying corrective measures: creation of green corridors, extension of honey and bushes, restoration of terraces on slope lands.

2. The researches revealed a significant positive correlation between the state of biodiversity of the viticultural ecosystem and the semi-natural elements of the agroecological infrastructure.

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