THE INFLUENCE OF SOME CULTURAL PRACTICES ON WEED EXTENT IN THE GRAPEVINE PLANTATION OF SD TIMISOARA

INFLUENȚA UNOR MĂSURI CULTURALE ASUPRA GRADULUI DE ÎMBURUIENARE ÎN PLANTAȚIA DE VIȚĂ DE VIE DE LA SD TIMIȘOARA

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Abstract: *The developed researches aimed the study of floristic composition of weeds from table grape plantation of Didactic Station Timisoara and their control degree by applying the most efficient control measures. Most of weeds that attack grape bearing vineyards are annual species with different vegetation periods and cover the whole vegetation period of grape vines. However, the perennial weeds seem to cause the most severe damages and especially those propagated through rhizomes (Agropiron repens, Cynodon dactylon, Sorghum halepense) or root shoots (Cirsium arvense, Sonchus arvense, Convolvulus arvensis etc.). The experience included 10 variants with herbicides and manual control practices.*

Rezumat: *Cercetările întreprinse vizează studiul compoziției floristice a buruienilor din plantația de viță de vie pentru struguri de masă, de la Stațiunea Didactică Timişoara şi a gradului de combatere a acestora în scopul aplicării celor mai eficiente măsuri de combatere. Cea mai mare parte a buruienilor care infestează plantațiile de vii roditoare sunt buruienile anuale cu durată de viață foarte diferită şi care acoperă întreaga perioadă de vegetație a viței de vie. Însă, buruienile perene sunt cele mai păgubitoare, în special cele înmulțite prin rizomi (Agropiron repens, Cynodon dactylon, Sorghum halepense) sau prin muguri de pe rădăcini (Cirsium arvense, Sonchus arvense, Convolvulus arvensis etc.). Experiența a avut 10 variante cu erbicide şi praşile manuale.*

Key words: *herbicides, manual control, weed extent, grape vine*
Cuvinte cheie**:** *erbicide, praşile, grad de îmburuienare, viță de vie*

INTRODUCTION

Despite of the progress registered in agriculture in the last century, weeds are still remaining present on cultivated areas and implicitly in grape vine plantations.

In countries with advanced agriculture, weeds are relatively sparse while the resources of weed seeds are continuously decreasing due to the financial and technical efforts made to reduce weed infestation on the ground of their growth particularities, interrelations with environment and organizing in nature in order to superiorly increase the yields and quality of crop species.

Relating to grape vines, yield losses registered are reaching 33.8% and are mainly caused by weeds, diseases and pests according to numerous authors (**CÂRCIU GH.,** 2004, **DEJEU L.,** 2004, **LĂZUREANU A., MANEA D., CÂRCIU GH., ALDA S.,** 2006).

The knowledge concerning weeds and their participation rate on weed extent creates the premises of elaborating efficient control strategies and assessment in time of anthropical flora (**CHIRILĂ C., OȘLOBEANU M., VARGA N.,** 1998, **CHIRILĂ C., CIOCÂRLAN V., BERCA M.,** 2002).

MATERIAL AND METHODS

The experiences were set up within Horticultural Farm of Didactic Station Timisoara, considering the table grape vine plantation (16 years old). The experimental plots represented by Chasselas doré and Muscat de Hamburg varieties were very closely located and have met similar environmental conditions. The researches were developed in the period: 2002 - 2003.

For each variety, two experiences have been set up and organized according to experimental technique models.

The experience aimed the selection of most efficient weed control measures (manual controls and herbicides) by studying floristic composition of weed species as well as the extent of weed control separately for both grape varieties.

The assessment of weed extent was performed using numeric quantitative method. Observations were made considering each experimental variant one day prior to applying of control measures and 30 days after their application.

The experience was of single factor type arranged according to randomized block design with 10 variants each with 4 replications. The experimental variants for this experience were V_1 – without herbicides and control practices; V_2 - Touchdown (4 l/ha); V_3 – Roundup CS (3 l/ha); V_4 – Basta 14 SL (4 l/ha); V_5 – Gallant super (1.5 l/ha) + 2 manual controls; V_6 – Fusilade super EC (4 l/ha) + 2 manual controls; V_7 – Goal 2 E-RV (5 l/ha) + 2 manual controls; V_8 – 4 manual controls; V_9 – 3 manual controls; V_{10} - 2manual controls.

RESULTS AND DISCUSSIONS

The weed extent for the two experimental years was influenced both by climate conditions and methods used to control weeds.

The number of weeds in case of Muscat de Hamburg variety for the experimental year 2002 was of 129,25 weeds/m^2 (table 1). The predominant weed species were: *Agropyron repens* (18.28%), *Cynodon dactylon* (15, 59%), *Stellaria media* (12, 63%), *Convolvulus arvensis* (11, 79%), *Veronica hederifolia* (7, 80%) and Sorghum *halepense* (7, 09%). Monocotyledonous weeds represented 43, 08% while dicotyledonous weeds represented 56, 92%. Analysing the ratio of annual/ perennial weeds, it has been observed that annual weeds represented 37, 12%, while perennials 62, 88%.

In 2003, the number of weeds per sq. meter was of 135, 40 (table 1). The most frequent weed species were *Agropyron repens* (15.09%), *Cynodon dactylon* (13.42%), *Convolvulus arvensis* (11.16%) *and Stellaria media* (10.53%). The ratio between monocotyledonous and dicotyledonous species was of 38, 50% and 61, 50%, respectively. In the year 2003 comparatively with previous year, the perennial weed percentage was more reduced favouring weed annual species and represented 49, 98% and 50, 02%.

Also in case of experience, considering Chasselas doré variety, the present weed species are almost identical, differing on number of individuals, this being higher comparing with the one registered for Muscat de Hamburg. The weed difference is higher in favour of Chasselas doré variety due to the reduced foliage of vines that leads to a higher weed extension.

In the experimental year 2002, the number of weeds per m^2 was of 135.38 (table 2). The most predominant weeds for non -herbicide, non-manual weed control variant were: *Agropyron repens* (17.88%), *Cynodon dactylon* (15, 04%) *Stellaria media* (11.26%) *and Convolvulus arvensis* (10. 68%).

The perennial monocots *Agropyron repens, Cynodon dactylon and Sorghum halepense* represented 38,25% and were regarded as troublesome weeds due to their propagation way.

In the year 2003, the most predominant weeds were *Agropyron repens* (16.34%), *Cynodon dactylon* (14.30%), *Convolvulus arvensis* (11.09%) *and Stellaria media* (10.66%), while the number of weeds per m^2 was of 147.52 (table 2). The monocotyledons -dicotyledons ratio favoured the dycots 61.61% comparing with 38.39%. Perennial weeds represented 61.20%, while annuals only 38.80%.

Table 1.

Floristic composition of weed species for the variant without herbicides and manual practices in case of Muscat de Hamburg variety

No.	Species	Number of weeds/m^2		% of participation		Botanical group
		2002	2003	2002	2003	
1.	*Agropyron repens*	23,63	20,43	18,20	15,09	Perennial monocotyledonous sp.
2.	*Cynodon dactylon*	20,15	18,17	15,59	13,42	Perennial monocotyledonous sp.
3.	*Stellaria media*	16,32	14,26	12,63	10,53	Annual dicotyledonous sp.
4.	*Convulvulus arvensis*	15,24	15,11	11,79	11,15	Perennial dicotyledonous sp.
5.	*Veronica hederifolia*	10,08	12,10	7,80	8,94	Annual dicotyledonous sp.
6.	*Sorghum halepense*	9,17	5,24	7,09	3,87	Perennial monocotyledonous sp.
7.	*Cirsium arvense*	7,36	2,36	5,69	1,74	Annual dicotyledonous sp.
8.	*Amaranthus retroflexus*	6,37	10,35	4,93	7,64	Annual dicotyledonous sp.
9.	*Chenopodium album*	4,53	10,14	3,50	7,49	Annual dicotyledonous sp.
10.	*Cardaria draba*	3,37	2,78	2,61	2,05	Perennial dicotyledonous sp.
11.	*Capsella bursa-pastoris*	3,16	8,05	2,45	5,95	Annual dicotyledonous sp.
12.	*Echinochloa crus-galli*	2,74	8,28	2,12	6,12	Annual monocotyledonous sp.
13.	*Sinapis arvensis*	2,61	3,16	2,02	2,33	Annual dicotyledonous sp.
14.	*Sonchus arvensis*	2,37	3,07	1,83	2,27	Perennial dicotyledonous sp.
15.	*Portulaca oleraceae*	1,57	0,24	1,22	0,18	Annual dicotyledonous sp.
16.	*Poligonum aviculare*	0,58	-	0,45	-	Annual dicotyledonous sp.
17.	*Taraxacum officinale*	-	1,14	-	0,84	Annual dicotyledonous sp.
18.	*Plantago media*	-	0,52	-	0,38	Perennial dicotyledonous sp.
	Total	129,25	135,40	100,00	100,00	-

Table 2.

Floristic composition of weed species for the variant without herbicides and manual practices in case of Chasselas doré variety

No.	Species	Number of weeds/m^2		% of participation		Botanical group
		2002	2003	2002	2003	
1.	*Agropyron repens*	24,21	24,10	17,88	16,34	Perennial monocotyledonous sp.
2.	*Cynodon dactylon*	20,36	21,09	15,04	14,30	Perennial monocotyledonous sp.
3.	*Stellaria media*	15,24	15,72	11,26	10,66	Annual dicotyledonous sp.
4.	*Convulvulus arvensis*	14,46	16,36	10,68	11,09	Perennial dicotyledonous sp.
5.	*Amaranthus retroflexus*	11,06	11,05	8,17	7,49	Annual dicotyledonous sp.
6.	*Chenopodium album*	10,48	10,77	7,74	7,30	Annual dicotyledonous sp.
7.	*Veronica hederifolia*	9,15	7,25	6,76	4,91	Annual dicotyledonous sp.
8.	*Sorghum halepense*	7,21	8,16	5,33	5,53	Perennial monocotyledonous sp.
9.	*Cardaria draba*	6,39	6,30	4,72	4,27	Perennial dicotyledonous sp.
10.	*Cirsium arvense*	4,52	14,26	3,34	9,67	Perennial dicotyledonous sp.
11.	*Echinochloa crus-galli*	3,16	3,27	2,33	2,22	Annual monocotyledonous sp.
12.	*Sinapis arvensis*	2,98	2,16	2,20	1,46	Annual dicotyledonous sp.
13.	*Capsella bursa-pastoris*	2,78	5,21	2,05	3,53	Annual dicotyledonous sp.
14.	*Sonchus arvensis*	1,84	-	1,36	-	Perennial dicotyledonous sp.
15.	*Portulaca oleraceae*	0,96	1,04	0,71	0,70	Annual dicotyledonous sp.
16.	*Taraxacum officinale*	0,58	-	0,43	-	Annual dicotyledonous sp.
17.	*Papaver rhoeas*	-	0,78	-	0,53	Annual dicotyledonous sp.
	Total	135,38	147,52	100,00	100,00	-

In the year 2002, the extent of weed control for Muscat de Hamburg variety was comprised between 61,52% (2 manual practices) and 98,25% (Gallant super - 1,5 l/ha + 2 manual practices). An efficient weed control is also performed using herbicides like Fusilade super EC (4 l/ha) and Goal 2 E-RV (5 l/ha), respectively associated with 2 manual practices, the weed extent being of 94, 36% and 93.16%, respectively. Variants with 4 and 3 manual control practices insure a level of weed control of 87.05% and 84.27%, respectively (table 3).

The precipitation deficit registered during the experimental year 2003 favoured the effectiveness of manual control practices. The extent of weed control ranged between 60.84%

and the variant with 4 manual control practices insured extents of weed control of 97.12%. In case of weed controls over 90%, there are also included the variants with herbicide treatments, Fusilade super EC (4 l/Ha) and Gallant super (1, 5 l/ha) associated with two manual control practices. The variant with 3 manual control practices proved to be efficient, insuring extents of weed control of 84.56% (table 4).

Table 3.

Influence of control measures on the extent of weed spreading, in case of Muscat de Hamburg variety, in the year 2002

Variant	Number of weeds /m^2	Controlled number of weeds/ /m^2 comparing the control variant	Extent of weed control (%)	Significance of differences
V_5- Gallant super (1,5 l/ha) + 2 praşile manuale	2,26	126,99	98,25	***
V_6- Fusilade super EC (4 l/ha) + 2 praşile manuale	7,29	121,96	94,36	***
V_7- Goal 2 E-RV (5 l/ha) + 2 praşile manuale	8,84	120,41	93,16	***
V_8- 4 praşile manuale	16,74	112,51	87,05	***
V_9 - 3 praşile manuale	20,33	108,92	84,27	***
V_3- Roundup CS (3 l/ha)	24,36	104,89	81,15	***
V_2- Touchdown (4 l/ha)	25,36	103,89	80,38	***
V_4- Basta 14 SL (4 l/ha)	30,43	98,82	76,46	***
V_{10} – 2 praşile manuale	49,74	79,51	61,52	***
V_1 – neerbicidat, neprăşit	129,25	Mt.	0,00	-

$DL_{5\%}$ = 4,03 buruieni/m^2
$DL_{1\%}$ = 5,45 buruieni/m^2
$DL_{0,1\%}$ = 7,26 buruieni/m^2

Table 4 .

Influence of control measures on the extent of weed spreading, in case of Muscat de Hamburg variety, in the year 2003

Variant	Number of weeds /m^2	Controlled number of weeds/ /m^2 comparing the control variant	Extent of weed control (%)	Significance of difference
V_8- 4 praşile manuale	3,90	131,50	97,12	***
V_6- Fusilade super EC (4 l/ha) + 2 praşile manuale	9,13	126,27	93,26	***
V_5- Gallant super (1,5 l/ha) + 2 praşile manuale	13,31	122,09	90,17	***
V_7- Goal 2 E-RV (5 l/ha) + 2 praşile manuale	15,98	119,42	88,20	***
V_9 - 3 praşile manuale	20,91	114,49	84,56	***
V_3- Roundup CS (3 l/ha)	26,02	109,38	80,78	***
V_2- Touchdown (4 l/ha)	30,67	104,73	77,35	***
V_4- Basta 14 SL (4 l/ha)	35,89	99,51	73,49	***
V_{10} – 2 praşile manuale	53,02	82,38	60,84	***
V_1 – neerbicidat, neprăşit	135,40	Mt.	0,00	-

$DL_{5\%}$ = 4,40 buruieni/m^2
$DL_{1\%}$ = 5,95 buruieni/m^2
$DL_{0,1\%}$ = 7,93 buruieni/m^2

The higher weed extent in case of Chasselas doré emphasized a lower rate of weed control.

In the year 2002, as a result of applying weed control measures, it has been registered control proportions of 60, 63% and 97, 12%. Gallant super (1.5 l/ha) + 2 manual control practices proved to be most efficient with control rates of 97.12%. Manual control practices, three or four attained weed control rates of 87.36% and 83.65%, respectively. Among all three herbicides with total action, Roundup CS (3 l/ha) proved to be most effective with control rates of 80.27% (table 5).

In the year 2003, the variant with 4 manual control practices proved to achieve the best weed control with proportions of 95.78%. The variant with three manual weed controls insured a control rate of 83.52%, while the variant with 2 manual weed controls insured proportions of only 60. 03%. Systemic herbicides (Goal 2E-RV, Fusilade super and Gallant

super) with two manual weed control practices generated weed control rates of 87.47% and 92.36% (table 6.).

Table 5.

Influence of control measures on extent of weed spreading in case of Chasselas doré variety in the year 2002

Variant	Number of weeds/m^2	Number of controlled weeds/m^2 comparing the control	Extent of weed control (%)	Significance of differences
V_5- Gallant super (1,5 l/ha) + 2 praşile manuale	3.90	131.48	97.12	***
V_6- Fusilade super EC (4 l/ha) +2 praşile manuale	8.08	127.30	94.03	***
V_7- Goal 2 E-RV (5 l/ha) + 2 praşile manuale	9.69	125.69	92.84	***
V_8- 4 praşile manuale	17.11	118.27	87.36	***
V_9 - 3 praşile manuale	22.13	113.25	83.65	***
V_3- Roundup CS (3 l/ha)	26.71	108.67	80.27	***
V_2- Touchdown (4 l/ha)	29.26	106.12	78.39	***
V_4- Basta 14 SL (4 l/ha)	33.71	101.67	75.10	***
V_{10} – 2 praşile manuale	53.30	82.08	60.63	***
V_1 – neerbicidat, neprăşit	135.38	Mt.	0.00	-

$DL_{5\%}$ = 4.40 buruieni/m^2
$DL_{1\%}$ = 5.95 buruieni/m^2
$DL_{0,1\%}$ = 7.93 buruieni/m^2

Table 6

Influence of control measures on extent of weed spreading in case of Chasselas doré variety in the year 2003

Variant	Number of weeds/m^2	Number of controlled weeds/m^2 comparing the control	Extent of weed control (%)	Significance of differences
V_8- 4 praşile manuale	6.23	141.29	95.78	***
V_5- Gallant super (1,5 l/ha) + 2 praşile manuale	11.27	136.25	92.36	***
V_6- Fusilade super EC (4 l/ha) + 2 praşile manuale	16.01	131.51	89.15	***
V_7- Goal 2 E-RV (5 l/ha) + 2 praşile manuale	18.48	129.04	87.47	***
V_9 - 3 praşile manuale	24.31	123.21	83.52	***
V_3- Roundup CS (3 l/ha)	39.95	117.57	79.70	***
V_2- Touchdown (4 l/ha)	35.29	112.23	76.05	***
V_4- Basta 14 SL (4 l/ha)	40.60	106.92	72.48	***
V_{10} – 2 praşile manuale	58.96	88.56	60.03	***
V_1 – neerbicidat, neprăşit	147.52	Mt.	0.00	-

$DL_{5\%}$ = 5.02 buruieni/m^2
$DL_{1\%}$ = 6.78 buruieni/m^2
$DL_{0,1\%}$ = 9.04 buruieni/m^2

CONCLUSIONS

1. In case of Chasselas doré variety, it has been observed the mostly spread weed species were perennial monocotyledonous *Agropyron repens* and *Cynodon dactylon*, followed by dicotyledonous species: *Stellaria media, Convolvulus arvensis and Cirsium arvense*

2. During the research years, in case of Muscat de Hamburg variety, the monocotyledonous weeds registered the highest participation rates for *Agropyron repens*, *Cynodon dactylon and Sorghum halepense*, while for dicotyledonous *Stellaria media*, *Convolvulus arvensis and Veronica hederifoli*

3. The weed extent was correlated with reduced precipitation amounts registered during the experimental period. The largest number of weeds was registered in 2002, when precipitation level was increased.

4. For both considered grape varieties, Chasselas doré and Muscat de Hamburg, the best results during the experimental years (2002-2003) were obtained when weed control was combined with chemical or agro-technical methods, these being applied for the variants V5 -

Gallant super (1,5 l/ha) + 2 manual controls and V6 - Fusilade super EC (4 l/ha) + 2manual controls.

5. The highest weed rate that remained uncontrolled for both grape varieties was registered for the variant with only 2 manual weed controls.

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