WEED CHEMICAL CONTROL ON VINEYARS

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ABSTRACT

The vine is a perennial crop that can be infested with a large number of annual and perennial, monocotyledonous and dicotyledonous weed species. The damage caused by weeds to vines refers to competition from factors of vegetation, light, water, minerals, as well as the increased incidence of diseases such as blight, powdery mildew and gray rot. Weed control in the vine culture is a very important work can be done mechanically and chemically. Carrying out the autumn plowing is a mandatory work because it creates a superficial layer of loose soil, with large spaces, which determines the retention of water in the soil, at the disposal of the vine. The annual weeds are very well controlled by plowing, the seeds of which are buried in depth, thus contributing to the decrease of the degree of weeding. Perennial weeds, such as Bermuda grass, Johnson grass, field bindweed and field thistle cannot be combated by soil works because they multiply through vegetative organs. The use of herbicides on vines is beneficial because they increase production efficiently by reducing the cost of mechanical weed control. However, the application of easily leached soil herbicides can cause serious damage through root uptake and translocation to above-ground organs, including in combat. To avoid these problems, it is recommended to apply film-forming herbicides, which are very strongly absorbed on the soil surface, which does not leach into the soil and thus does not translocate into the vine plant. Such active substances act on the soil surface by stopping the emergence of weeds from the surface layer of the soil. Also, post-emergent antimonocotyledonous herbicides can be applied in the early phase of vine growth, which can control annual and perennial monocotyledonous weeds, having the advantage that they can be metabolized in the vine plant.

INTRODUCTION

Weeds cause great damage to vines by competing with vegetation factors and by creating an environment conducive to foliar and grape diseases. These damages occur due to the fact that weeds are voracious plants that grow rapidly and create a favorable

environment for the multiplication of diseases. Also due to the shading they produce, the weeds do not allow the normal ripening of the grapes (Petre SĂVESCU, 2021; Petre SAVESCU et al., 2019). Weeds with abundant growth that can affect the growth and production of vines are: Chenopodium album, Amaranthusretroflexus - fat hen, Abutilon theophrasti - velvet leaf, Solanumnigrum - black night shade, Balotanigra - black horehound, Cynodondactylon - Bermuda grass, Sorghum halepense - Johnson grass, Convolvulus arvensis - field bindweed, Cirsiumarvenese - field thistle, etc. (MirelaParaschivu et. al., 2021; Elena Partal, MirelaParaschivu – 2020; MirelaParaschivu, OtiliaCotuna – 2021; MirelaParaschivu et. al., 2015). The use of herbicides on vines is beneficial because it increases production efficiency by reducing the cost of mechanical weed control. However, the application of easily leached soil herbicides can cause serious damage by absorption by the roots and translocation to above-ground organs, including grapes. To avoid these problems, it is advisable to apply film herbicides, which are very strongly absorbed on the soil surface, which do not leach into the soil and thus do not translocate into the vine. Such active substances act on the soil surface by stopping the emergence of weeds from the surface layer of the soil. Also, post-emergent antimonocotyledonous herbicides can be applied in the early phase of vine growth, which can control annual and perennial monocotyledonous weeds, having the advantage that they can be metabolized in the vine plant. Glyphosate herbicides can be applied to vines with a protective funnel to control annual and perennial weeds. The application of this type of herbicide is done under the vine, so as not to damage the leaves (Morrison, J.C., 1992; Tiţa, Ovidiu, 2001).

MATERIAL AND METHOD

In order to control weeds in the vine culture, a two-factor experiment was organized in a private farm in DrăgăneştiOlt, Olt County. The experimental factors were:

- factor A - tillage, with 4 graduations:
- a1 - soil worked with mechanic tiller
- a2 - soil covered with fresh manure
- a3 - soil covered with semi-fermented manure
- a4 - soil covered with fermented manure.
- factor B - herbicide application, with 4 graduations:
- b1 - non-herbicide (control)

- b2 - post-emergence herbicide, 5 times with Roundup Classic pro, based on glyphosate, in a dose of 200 ml per 10 l of water

- b3 - pre-emergent herbicide with Galigan 240 EC, based on oxyfluorfen, 240 g / l, 1.5 l / ha

- b4 - pre-emergent herbicide with Galigan 240 EC, based on oxyfluorfen, 240 g / l, 1.5 l / ha plus Dual Gold 960 EC, based on metolachlor (960 g / l), 1 l / ha.

The sketch of the experiment was as follows:

a1		a2		a3		a4	
b1	b2	b3	b1	b2	b3	b3	b2
b4	b3	b4	b4	b1	b2	b1	b4
b2	b1	b3	b1	b3	b1	b4	b2
b3	b1	b4	b2	b2	b4	b1	b3
b4	b4	b1	b3	b4	b3	b3	b4
b3	b2	b2	b2	b4	b2	b2	b1

Figure 1.The sketch of the trial.

The experiment was placed in a vine plantation with a length of 60 m. The rows of vines are planted at a distance of 1.5 m. Two rows each constituted each graduation of the factor A. Thus, a1, representing the cultivated soil with chainsaw was herbicided, on the two rows depending on the factor B as follows: a1 - non-herbicide, b2 - post-emergent herbicide, 5 times with Roundup Classic pro, based on glyphosate, in a dose of 200 ml per 10 l of water, b3 - pre-emergent herbicide with Galigan 240 EC, based on oxyfluorfen, 240 g / l, 1.5 l / ha and b4 - pre-emergent herbicide with Galigan 240 EC, based on oxyfluorfen, 240 g / l, 1.5 l / ha plus Dual Gold 960 EC, based on metolachlor (960 g / l), 1 l / ha. Factor B graduations were applied in 3 repetitions, resulting in 12 experimental plots for each factor A graduation and a total of 48 experimental plots. The surface of an experimental plot was 1.5 m wide by 6 m long, ie 9 m2. The application of herbicides was done with manual equipment from the Pandora company, made of plastic, using fan nozzles, for herbicides. Post-emergent herbicides were applied 5 times during the vine growing period, when most weeds were about 15 cm tall. Pre-emergent herbicides were applied immediately after tillage with the chainsaw. The degree of weeding was determined for the non-herbicide variant as well as for the experienced variants, according to the numerical method (Dobre M., 2019).

Figure 2. Aspect from the beginning of the experiment, in the spring.

Figure 3.View of the variants worked with a mechanic tiller, one month after the application of herbicides.

RESULTS AND DISCUSSIONS

Following the determination of the degree of weeding in the non-herbicide variant, the following results were obtained:

From these results it is observed that the highest average number of weeds per square meter was determined for the species Xanthium

strumarium, Triticumvulgare and Convolvulus arvensis. The wheat comes from the straw in the manure. Cocklebur also come from fermented manure because it is one of the few species that can grow on manure. The same situation happens with the fat hen. The other species are dispersed in the experiment, obtaining values of 20-40 of constancy, K%.

Figure 3.Non-herbicide variant for the application of unfermented manure. The massive presence of Xanthium strumarium is observed.

The variants treated with herbicides on the ground or on vegetation had different degrees of weeding. Thus, the application of the Roundup classic herbicide determined the control of all weeds, annual or perennial, monocotyledonous or dicotyledonous. The degree of weeding obtained for this variant registered only grass weeds, due to the non-uniformity of application. The disadvantage of this option is the high cost of the herbicide. Thus, an area of 4 l plus 80 ml of herbicide is applied to the surface of 180 m^2. At 5 applications, 400 ml of herbicide will be applied. At a price of 48 lei / l, it results that 19.2 lei will be spent on the surface of 180 m^2.

Table 1

Degree of weeding determined in the non-herbicide variant

Nr. crt.	Sci. name	Biol. category	R I	R II	R III	R IV	R V	Average	P %	K %
1	*Sorghum halepense*	m.p.	0	10	0	0	5	3	8.24	40
2	*Cynodon dactylon*	m.p.	12	0	0	0	0	2.4	6.59	20
3	*Sonchus arvensis*	d.a.	2	1	0	0	0	0.6	1.64	40
4	*Cirsium arvense*	d.p.	0	5	0	0	0	1	2.74	20
5	*Convolvulus arvensis*	d.p.	0	0	8	6	4	3.6	9.89	60
6	*Setaria glauca*	m.a.	0	0	0	0	2	0.4	1.09	20
7	*Digitaria sanguinalis*	m.a.	0	0	0	0	4	0.8	2.19	20
8	*Triticum vulgare*	m.a.	12	6	15	4	0	7.4	20.32	80
9	*Abutilon teophrasti*	d.a.	0	0	3	0	2	1	2.74	40
10	*Solanum nigrum*	d.a.	0	3	0	2	0	1	2.74	40
11	*Galinsoga parviflora*	D.a.	0	0	0	7	12	3.8	10.43	40
12	*Amaranthus retroflexux*	d.a.	0	0	14	0	0	2.8	7.69	20
13	*Xanthium strumarium*	d.a.	15	8	6	10	0	7.8	21.42	80
14	*Xanthium spinosum*	d.a.	0	4	0	0	0	0.8	2.19	20
			41	37	46	29	29	36.4		

CONCLUSIONS

Following the research carried out, the following conclusions were drawn:

1. The highest average number of weeds per square meter was determined for the species Xanthium strumarium, Triticumvulgare and Convolvulus arvensis. The wheat comes from the straw in the manure. Cocklebur also come from fermented manure because it is one of the few species that can grow on mangroves. The same situation happens with the fat hen. The other species are dispersed in the experiment, obtaining values of 20-40 of constancy, K%.
2. The variants treated with herbicides on the ground or on the vegetation registered different degrees of weeding. Thus, the application of the Roundup classic herbicide determined the control of all weeds, annual or perennial, monocotyledonous or dicotyledonous. The degree of weeding obtained for this variant registered only stray weeds, due to the non-uniformity of application. The disadvantage of this option is the high cost of the herbicide. Thus, an area of 4 l plus 80 ml of herbicide is applied to the surface of 180 m^2. At 5 applications, 400 ml of herbicide will be applied. At a price of 48 lei / l, it results that 19.2 lei will be spent on the surface of 180 m^2.
3. Regarding the cost of these two herbicides, Galigan herbicide is applied in an amount of 30 ml on an area of 180 m^2. The price of a liter of Galigan is 170 lei and, therefore, 30 ml costs 5 lei. Dual Gold herbicide costs 100 lei per liter and 180 ml is applied to 180 m^2, which costs 2 lei. In total, applying the Galigan + Dual Gold combination costs 7 lei per 180 m^2. To control resistant weeds (perennials and those that cross the herbicide layer) we recommend the correction with a post-emergence application with Roundup, which costs 12 lei. In total, the two applications cost 19 lei, compared to 48 lei for 5 applications with Roundup.

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