RESEARCH REGARDING WEED CONTROL IN LAWN

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Abstract: *The areas cultivated with grass in the urban and peri-urban perimeters are constantly growing. An important technological link in lawn cultivation is weed control. In the present paper, the effectiveness of the following postemergent herbicides was analyzed in lawn cultivation: SDMA SUPER (1 l/ha), PREMIANT (1 l/ha), DICOPUR TOP464SL (1 l/ha), PRODATE REDOX (1 l/ha), FOXTROT 69EW (1 l/ha). The experiment took place in 2021 on a plot of land located on the outskirts of Timisoara, Timis County. Experimental results show that the herbicides taken in our study controlled the dicotyledonous weed species as well as some monocotyledonous species.*

Key words*: turf, dicotyledonous and monocotyledonous weeds, herbicides, degree of weed control*

INTRODUCTION

The lawn has both monocotyledonous and dicotyledonous weeds what makes their control difficult [1,6,11]. The composition of an ornamental turf is influenced by the maintenance works [14]. It is possible to reduce weed populations using management practices (cultural, mechanical), but it is impossible to completely eliminate weeds as can be achieved by applying herbicides [12]. The most critical time for efficient weed management is before sowing the lawn [3].

Herbicides are widely used in residential areas to control weeds in lawns. A large proportion of can enter in residential soils and follow pathways such as degradation, plant uptake, infiltration into groundwater or sewerage [13]. Chemicals remaining in the soil can have adverse effects on human health by ingestion of soil, inhalation of soil dust and dermal contact [8].

For chemical weed control is necessary a judicious use of herbicides [2,10,15] especially because their effectiveness differs in correlation with weed species [7]. Dicotyledons are fairly easily controlled by herbicides. In general, all herbicides applied to straw cereals are applied to lawns [2].

Excessive use of herbicides, together with the lack of tillage and other mechanical tools, increases the risk of herbicide-resistant weeds evolving into turf crops [5]. Is very important to improve our understanding of the fate of pesticides after household applications and to promote lawn management practices [8]. There are many concerns to find strategies to control weeds in turf without using herbicides [9].

Despite fertilizers, optimized mowing, insect and disease and control programs, and pre- and postemergence herbicides application, weeds remain a problem for turfgrass [4].

The researches aimed to determine the floristic composition of weeds in the lawn as well as the influence of some herbicides on the reduction of weeding. Based on these considerations, we chose the following herbicides for our study: Premiant, Dicopur Top 464 SL, Prodate Redox, SDMA Super, Foxtrot 69 EW.

MATERIALS AND METHODS

The experiment took place in 2021 on a plot of land located on the outskirts of Timisoara, Timis County. The experiment was set up in the spring of 2021, using a mixture of grass species consisting of Lolium perenne, Festuca rubra and Poa pratensis.

It was a single-factor experiment, placed according to the method of the latin square with the following experimental variants: V1– Premiant (1 l/ha); V2– Dicopur Top464SL (1l/ha); V3– Prodate Redox (1l/ha); V4– SDMA Super (1l/ha); V5– Foxtrot 69EW (1l/ha); V6– untreated.

Herbicide treatments were performed with a portable sprayer. The herbicide doses were determined according to the degree of weeding and the recommendations made by the manufacturing companies.

The establishment of the number of weeds/m2 was done by quantitative numerical method on each variant and experimental repetition.

RESEARCH RESULTS

In April 2021 the dominant weed species were the annual dicotyledons: Polygonum aviculare (14.18 %), Polygonum convolvulus (11.76 %), Capsella bursa pastoris (10.90 %) (figure 1). The share of perennial dicotyledonous weeds is quite low, being represented by Cirsium arvense (4.45 %). The annual monocotyledons are absent and the perennial monocotyledons are represented by the species Agropyron repens, with a participation percentage of 0.53 %.

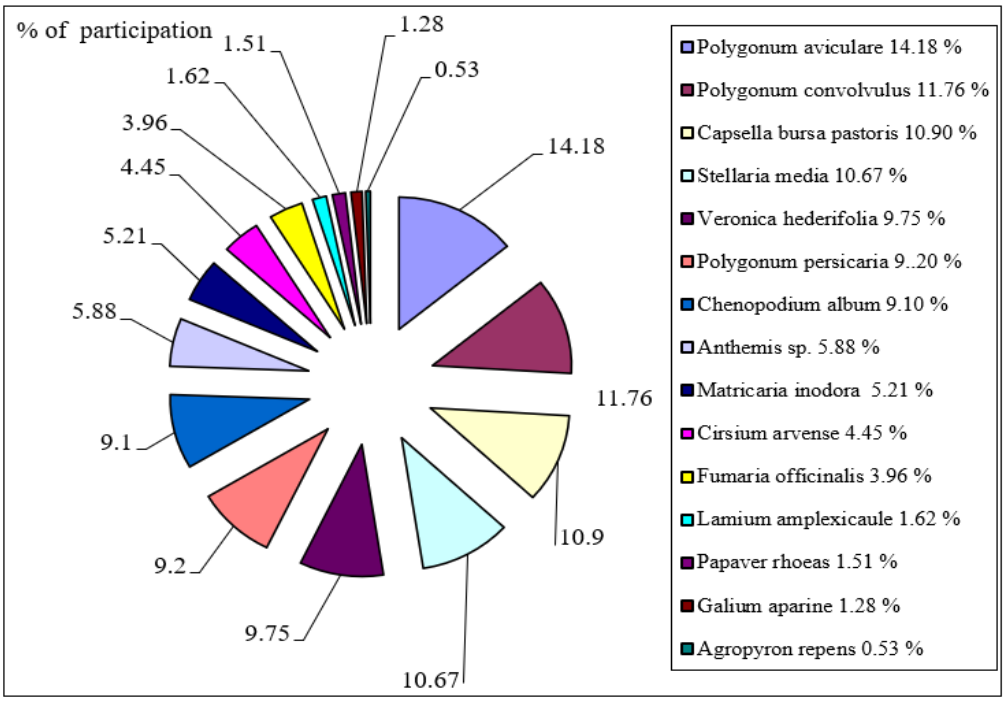

Figure 1. The floristic composition of lawn weeds, in April 2021 (%)

If we analyze the weed control degree after herbicide applications in lawn in April 2021, we notice that it ranged between 0.00 % and 89.43 % (figure 2.). The highest weed reduction rate was 89.43 % and was achieved in the variant where the herbicide Premiant 1l/ha was applied. Satisfactory results in the reduction of weeding were obtained in the herbicide variants with Dicopur Top 464 SL 1 l/ha. In the absence of annual monocotyledonous weeds, the effectiveness of Foxtrot 69 EW 1 l/ha in weed control was zero.

Compared to the beginning of the spring of 2021, in the second part of May 2021, the maintenance works, the fertilization and the climatic conditions changed the floristic composition of the weeds in the lawn. The total number of weeds/m2 was 51.66. As in April 2021, the dominant weed species were the annual dicotyledons: Stellaria media (18.82 %) and Polygonum aviculare (16.52 %), but there is an increase in the share of annual dicotyledonous species with late germination Portulaca oleracea (8.65 %) and Abutilon theophrasti (5.60 %).

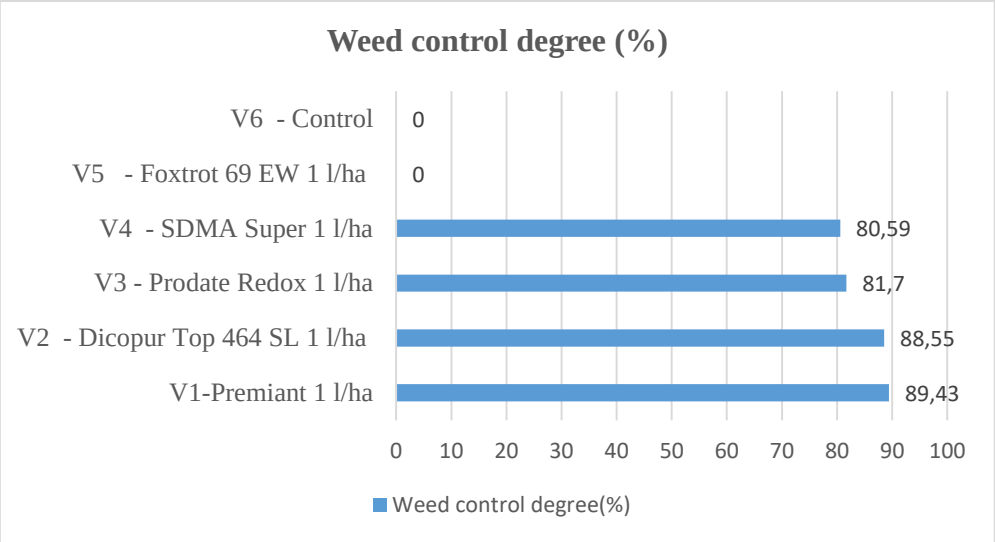

Figure 2. The weed control degree in turf, in April 2021 (%)

We note the significant proportion of annual monocotyledonous weeds with late germination: Setaria sp. (12.98 %) and Echinochloa crus galli (10.32 %). Perennial dicotyledonous weeds Convolvulus arvensis (6.20 %), Cirsium arvense (5.88 %) and Taraxacum officinale (2.14 %) are also observed (figure 3).

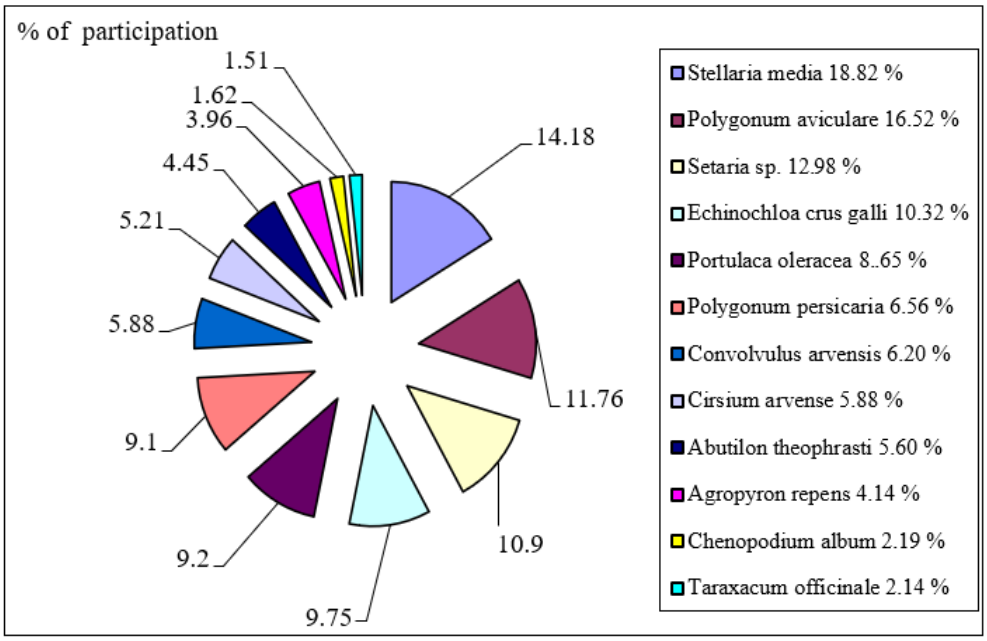

Figure 3. The floristic composition of lawn weeds, in May 2021 (%)

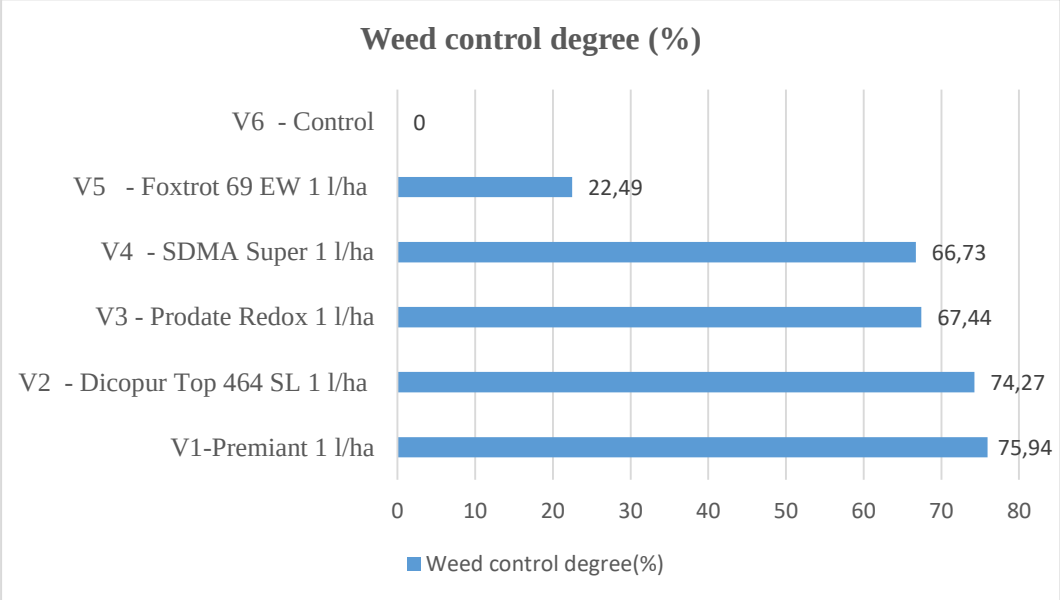

Figure 4. The weed control degree in turf, in May 2021 (%)

The evaluation of the effectiveness of the herbicides on the weeds present in the lawn in May 2021 shows a lower efficacy compared to April 2021. This is explained by the appearance in the lawn of annual monocotyledonous weeds and the fact that except for Foxtrot 69 EW 1l/ha the other herbicides used combat monocotyledonous species. However, we note a satisfactory control of annual and perennial dicotyledonous weeds by the systemic herbs Premiant 1 l/ha and Dicopur Top 464 SL 1 l/ha, which control weeds in a proportion of 75.94% and 74.27% respectively. The weakest weed control results are obtained in the herbicide variants with SDMA Super 1 l/ha, where the weed control percentage is 66.73 %. Foxtrot 69 EW 1 l/ha herbicide ensures the exclusive control of the annual monocotyledonous weeds Setaria sp. and Echinochloa crus galli, the control percentage being 22.49% (figure 4).

CONCLUSIONS

Following the application of two herbicide treatments during 2021, we can conclude:

When applying the first treatment (April), the predominant weed species were ephemeral and early germinating dicotyledons: Stellaria media, Capsella bursa pastoris, Veronica hederifolia, Polygonum aviculare and Polygonum convolvulus. Monocotyledonous weed species are almost non-existent, being represented by Agropyron repens with a participation percentage of only 0.53%.

In these conditions, in April, the anticotyledonous herbicides have the effect of destroying the weeds, the highest control percentages corresponding to the herbicides Premiant 1 l/ha and Dicopur Top 464 SL 1 l/ha, of 89.43% and 88.55% respectively. The herbicides Prodate Redox 1 l/ha and SDMA Super 1 l/ha control the dicotyledonous weeds in a proportion of 81.70% and 80.59%, respectively. In the absence of annual monocotyledonous weeds, the effect of Foxtrot 69 EW 1 l/ha herbicide is zero, as the herbicide does not control dicotyledonous weeds.

Analyzing the floristic composition of weeds at the end of May 2021, we find that the weeding spectrum has changed substantially. Along with the annual dicotyledonous weed species Stellaria media and Polygonum aviculare, we find a significant contribution of the annual monocotyledonous weed species Setaria sp. and Echinochloa crus galli.

We note the appearance of summer dicotyledonous species: Portulaca oleracea, Abutilon theophrasti and Chenopodium album, but also the installation of perennial dicotyledonous species such as Convolvulus arvensis, Cirsium arvense and Taraxacum officinale. As in April 2021, the presence of perennial monocotyledons is extremely low, being represented only by Agropyron repens (4.14%).

In May 2021 is observed a much lower efficacy of antidicotyledonic herbicides due to the change in the weeds spectrum. We observe the appearance in a high percentage of the annual monocotyledonous weeds: Setaria sp. and Echinochloa crus galli, weeds that the mentioned herbicides do not control. Thus, the herbicides Premiant 1 l /ha and Dicopur Top 464 SL 1 l/ha reach a control level of around 75%. It should be noted that the Foxtrot 69EW 1 l/ha herbicide controls annual monocotyledonous weeds, thus being a simple solution for the destruction of these weeds that appear in the lawn at the beginning of summer.

Selective control of weeds in lawn requires differentiated use of herbicides, depending on the presence of dicotyledonous or monocotyledonous weed species.

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