On the efficacy of post-emergent herbicides on turf weed control

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Abstract Research carried out over two experimental years (2008-2009) on a turf area shows that the best results in weed control were when using herbicides containing two active substances. In the first research year, when annual dicot weeds predominated, we obtained maximum control (89.75%) using the herbicide Buctril universal 1 l/ha and, in the second year, when perennial dicot weeds appeared, maximum weed control (88.35%) was obtained using the systemic herbicide Icedin super (1 l/ha).

Key words turf, herbicides, weeds, weed control degree

No matter the methods of preparation of the land, turf areas are infested by weeds. The high diversity of ecological areas on which turf is set and the permanent changing of weed associations infesting turf have kept weed control under scrutiny [2, 7]. Weed infestation is particularly damaging in the first year of vegetation and particularly during the first period of vegetation when freshly sown species are less competitive compared to spontaneous species [6]. To control weeds, we use both mechanical and chemical methods.

Mechanical control is of two types – manual weeding and mowing. Manual weeding consists in manually removing every weed and is done by pulling when the number of the weeds is low or when weeds are scarce. Mowing helps a lot in weed control since weeds are not allowed to produce seeds or to store different substances, which results in plant death. But when seed reserve in the soil is considerable, fertilization and irrigation develop proper conditions for the weeds to sprout.

One of the main advantages of using herbicides is the efficacy of the diverse, direct, safe ways of applying herbicides on the weeds [3]. The main herbicides used on turf areas are mainly hormonal ones [1].

Research Method

The experiment was carried out on a cambic chernozem at Dumbrăvița; it was set after the randomised block method with 8 variants and 4 replications on a total number of 32 experimental plots [4, 8]. Herbicide rates were established depending on the weeding degree and on the recommendations of the producers. Determining weeding degree was done through the quantitative-numerical method for each experimental variant apart [5]. Processing experimental data was done with the help of the variance analysis.

The herbicides we studied were: Buctril universal (1 l/ha), DMA 6 (1 l/ha), Icedin super (1 l/ha), Cerlit (0.6 l/ha), Lintur 70 WG (150 g/ha), Mustang (0.5 l/ha), and Oltisan extra (1 l/ha). Application of herbicides was done using a portable spraying device.

Results obtained in 2008

Research carried out aimed at determining the floristic composition of turf weeds as well as the impact of some herbicides on weeding degree. Establishing the number of weeds per m² was done through the quantitative numerical method for each variant and experimental replication.

Annual dicot weed species predominated: Amaranthus retroflexus (15.34%), Chenopodium album (13.88%), Polygonum persicaria (9.50%) and Atriplex patula (9.32%), (figure 1). The share of perennial dicot weeds is rather low: they were represented by the following species: Cirsium arvense (3.47%) and Convolvulus arvensis (3.34%). Annual monocots are represented by the species Setaria glauca whose share was 6.02%, while perennial monocots were represented by the species Cynodon dactylon, whose share was 0.78%.
Analysing the effect of herbicides on turf weeding degree in 2008, we can see that it oscillated between 72.31% and 89.75% (figure 2). The highest weed control was 89.75% in the variants treated with the herbicide Buctril universal 1 l/ha. Satisfactory results in the diminution of the weeding degree were when treated with the herbicide Icedin super 1 l/ha and Oltisan extra 1 l/ha, with weed control shares of 87.38% and 87.02%, respectively. The poorest results were when treated with DMA 6 (1 l/ha), i.e. a weed control share of 72.31%.
Results obtained in 2009

In the spring of 2009, maintenance works and climate conditions changed the floristic composition of turf weeds. The total number of weeds per m² decreased to 27.06, with the following dominating weeds: Veronica hederifolia (26.65%), Stellaria media (17.18%), Convolvulus arvensis (11.75%), Lamium purpureum (10.23%), and Polygonum aviculare (8.14%), (figure 3).

Assessing herbicide efficacy on turf weeds pointed out that the particular efficacy of the systemic herbicides Icedin super 1 l/ha and Oltisan extra 1 l/ha, with a weed control of 88.35% and 87.65%, respectively (figure 4). To note the good results in weed control when treating with the herbicide Buctril universal 1 l/ha whose share was 86.73%. The herbicides Mustang 0.5 l/ha and Lintur 70 WG 150 g/ha ensure a weed control of 83.37% and 82.29%, respectively. The poorest results in weed control were when treated with the herbicide DMA 6 l/ha, with a share of 71.01%.

Figure 3. Floristic composition of weeds in the turf, in 2009
Conclusions

As a result of the research carried out in the field over the two experimental years (2008-2009) on turf weeding, we can draw the following conclusions:

1. In the spring of 2008, the following annual dicot weed species were dominant: *Amaranthus retroflexus* (15.34%), *Chenopodium album* (13.88%), *Polygonum persicaria* (9.50%) and *Atriplex patula* (9.32%). Annual monocots were represented by the weed species *Setaria glauca* with a share of 6.02%, while perennial monocot weed species are represented by the weed species *Cynodon dactylon*, with a share of 0.78%.

2. In the year 2009, the weeding spectrum changed substantially: together with the annual dicot species *Veronica hederifolia*, *Stellaria media*, *Lamium purpureum*, *Polygonum aviculare*, a considerable share was that of the perennial dicot weed species *Convulvulus arvensis*, *Taraxacum officinale* and *Cirsium arvense*.

3. Herbicide efficacy is different depending on the weed spectrum during the two experimental years. In 2008, when annual dicot weed species were predominant, maximum efficacy was when treated with the contact systemic herbicide *Buctril universal* 1 l/ha, followed by the systemic herbicides *Icedin super* 1 l/ha and *Oltisan extra 1 l/ha*. Analysis of herbicide efficacy in the year 2009 point out that in case of strong infestation by perennial dicot weed species there was maximum efficacy when treated with systemic herbicides *Icedin super 1/ha* and *Oltisan extra 1 l/ha*.

4. The share of weed control varied between 72.31% and 89.75% in 2008 and between 71.01% and 88.35% in 2009.

References