The study on methods of combating weeds from red clover culture in the conditions of Satu Mare county

Mondici Susana¹, Moisa Floare¹, Smit Gergely-Andrei¹, Brejea Radu², Șugar Ioan Radu³*

¹ Agricultural Research and Development Station Livada
² University of Oradea, Faculty of Environmental Protection,
³ Technical University of Cluj-Napoca, Faculty of Engineering
* Correspondence author. E-mail: ioan.sugar@imtech.utcluj.ro

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ABSTRACT

The research carried out in the 2020-2021 agricultural year on the red clover crop aimed to establish the effectiveness of herbicide supplied in pre-emergence and post-emergence on the floristic composition and the influence of herbicide treatments on production. The experiment was located at SCDA Livada, Satu Mare county, on a stagnogleyized preluvosol with a pH of 5.19, a clay content of 20.9% and a humus content of 2.82%.

INTRODUCTION

Red clover is an important perennial legume for humid hilly areas, which effectively capitalizes on the acid and moderately acid soils of Transylvania, Moldova and the north of the Romanian Plain, it is an alternative for creating a biodiversity among crop plants with a major role for improving the quality of fodder, ameliorating soils and reducing pollution through the low need for synthetic substances (Borza & Stanciu 2010, Mondici & Fritea 2016, Mondici et al. 2016). The remaining symbiotic nitrogen can provide 40-50% of the nitrogen required for the subsequent crops (Fritea et al., 2012, Mondici et al., 2017).

The small areas of land intended for the production of red clover seed in non-irrigated conditions require, in order to satisfy the demands, the improvement of the culture technology, in such a way as to ensure, year after year, the realization of large and constant seed productions per surface unit (Fritea et al. 1995, Giurgiulescu et al. 2015).

Our country, located in the center of the red clover cultivation area, meets extremely favorable conditions for very high productions of green mass or hay (Moisa & Smit, 2021, Mondici 2016).

Achieving high forage production is the key to solving the problem of animal nutrition (Domuța & Sabău 2001, Mondici & Fritea 2015). And in this sector of agriculture, herbicides have an important role in obtaining large harvests of good quality fodder - because the presence of weeds in fodder reduces production per hectare, greatly depreciates their quality, and some of them are very toxic for various animal species (Brejea 2010, Varga et al. 1998).

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MATERIAL AND METHODS

The experiments were located according to the randomized block method, 9 variants in 3 repetitions, the surface of the plot being 21 square meters.

Figure 1. Monthly and multiannual temperatures (°C) Livada 2021

Figure 2. Monthly and multiannual precipitation (mm) Livada 2021

In the Orchard, during this period, from sowing (September 9, 2020) until the onset of winter (November 1, 2020), 1027°C and 233 mm of precipitation accumulated, which ensured optimal conditions for the formation of 1-2 short shoots at the entrance in winter.

We are witnessing a warm autumn and winter, temperatures above normal values (Fig. 1) (+1.9°C in September, +2.3°C in October, +4.5°C in December
+2.9°C in January, +2.3°C in February, deviations from the multiannual average) associated with a period of rains (+35mm in September +62.9mm in October), favored the emergence and formation of clover plants for entering the Winter. The months of March, April and May of 2021 have values below the multi-year averages in terms of the thermal regime. The rains in May of 111 mm, 34.3 mm above the multi-year average, after the first green mass scythe, created favorable conditions for the formation of the second green mass scythe and the seed scythe (Fig. 2).

RESULTS AND DISCUSSIONS

The floristic composition of the weeds present in the experience placed in thered clover culture was: Viola arvensis, Capsella bursa pastoris, Matricaria inodora, Stellaria media, Cirsium arvense, Sonchus arvensis, Brassica napus (rapeseedmustard), Triticum (wheat mustard).

The herbicide used in the experiment are shown in table 1.

Table 1

Herbicide application scheme for the first year red clover crop

<table>
<thead>
<tr>
<th>No. Crt.</th>
<th>Erbicide</th>
<th>Doza l,kg/ha</th>
<th>Substanță activă</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dual Gold 96 EC + Kerb 50W</td>
<td>1,0 + 3,0</td>
<td>S – metolachlor 960/g + propyzamid 50%</td>
</tr>
<tr>
<td>2</td>
<td>Leopard 5 EC +Kerb 50W</td>
<td>1,5+3,0</td>
<td>quiazalofop- p-etil 50g/l + propyzamid 50%</td>
</tr>
<tr>
<td>3</td>
<td>Dual Gold 96 EC + Basagran Forte</td>
<td>1,0+2,0</td>
<td>S – metolachlor 960/g +bentazon 480g/l + wettol (adj.)</td>
</tr>
<tr>
<td>4</td>
<td>Leopard 5 EC + Basagran Forte</td>
<td>1,5+2,0</td>
<td>quiazalofop- p-etil 50g/l+ bentazon 480g/l + wettol (adj.)</td>
</tr>
<tr>
<td>5</td>
<td>Dual Gold 96 EC +Pulsar 40 EC</td>
<td>1,0+1,2</td>
<td>S – metolachlor 960/g + imazamox 40g/l</td>
</tr>
<tr>
<td>6</td>
<td>Leopard 5 EC + Pulsar 40 EC</td>
<td>1,5+1,2</td>
<td>quiazalofop- p-etil 50g/l + imazamox 40g/l</td>
</tr>
<tr>
<td>7</td>
<td>Dual Gold 96 EC +Corum</td>
<td>1,0+1,2 + 5</td>
<td>S – metolachlor 960/g + bentazon480g/l + imazamox22,4g/l</td>
</tr>
<tr>
<td>8</td>
<td>Leopard 5 EC + Corum</td>
<td>1,5+1,2 + 5</td>
<td>quiazalofop- p-etil 50g/l + bentazon480g/l + imazamox22,4g/l</td>
</tr>
<tr>
<td>9</td>
<td>Untreated</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The era of herbicide application was pre-emergence (immediately after sowing) and post-emergence (when the clover reaches 3-4 leaves).

During the growing season, after the treatments, observations were made regarding the degree of selectivity and effectiveness on weeds.

The selectivity of the tested herbicides against the red clover crop was scored following visual observations according to the EWRS scale (grades from 1 to 9; 1=selectivity, 9=phytotoxicity).

Through the statistical analysis of production differences, it is found that the variant treated with Leopard 5 Ec 1.5l/ha + Basagran Forte 2l/ha applied in post-emergence and Dual Gold 96 EC 1l/ha + Pulsar 1.2l/ha applied in pre-emergence and post-emergence bring distinctly significant increases in production compared to the level of 5.92q/ha achieved in the control variant. Significantly positive production
differences are ensured for the variants treated with Dual Gold 96 EC 1l/ha + Kerb 3kg/ha and for the variant treated with Dual Gold 96 EC 1l/ha + Corum 1.25l/ha.

Positive production differences are also ensured by the other varieties treated with herbicides, but not statistically guaranteed (Table 2).

Table 2

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Var</th>
<th>Erbicide</th>
<th>Doza l,kg/ha</th>
<th>Epoca de aplicare</th>
<th>Producția q/ha</th>
<th>Diferența +/- față de Mt</th>
<th>Semnificația</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Dual Gold 96 EC + Kerb 50W</td>
<td>1,0 + 3,0</td>
<td>preem</td>
<td>7,46</td>
<td>1,54</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Leopard 5 EC + Kerb 50W</td>
<td>1,5+3,0</td>
<td>preem+post</td>
<td>7,33</td>
<td>1,41</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Dual Gold 96 EC + Basagran Forte</td>
<td>1,0+2,0</td>
<td>preem+post</td>
<td>6,92</td>
<td>1,0</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Leopard 5 EC + Basagran Forte</td>
<td>1,5+2,0</td>
<td>post</td>
<td>8,13</td>
<td>2,21</td>
<td>xx</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Dual Gold 96 EC + Pulsar40 EC</td>
<td>1,0+1,2</td>
<td>preem+post</td>
<td>8,13</td>
<td>2,21</td>
<td>xx</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Leopard 5 EC + Pulsar40 EC</td>
<td>1,5+1,2</td>
<td>post</td>
<td>6,35</td>
<td>0,43</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Dual Gold 96 EC + Corum</td>
<td>1,0+1,25</td>
<td>preem+post</td>
<td>7,73</td>
<td>1,81</td>
<td>x</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Leopard 5 EC + Corum</td>
<td>1,5+1,25</td>
<td>post</td>
<td>6,96</td>
<td>1,04</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Untreated</td>
<td></td>
<td>-</td>
<td>-</td>
<td>5,92</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

DL 5% = 1,51q/ha  1% = 2,07q/ha  0,1% = 2,85q/ha

The evaluation of the effectiveness was done by counting the weeds by species per 1 square meter in each variant before the first mowing.
Analyzing the effectiveness of herbicides in year I red clover, it is observed that there is a close correlation between effectiveness and production (Fig. 3).

CONCLUSIONS

The experience was located in Satu Mare county at the Livada Agricultural Development Research Station, on an acid soil, in the 2020-2021 agricultural year.

The dominant weed species in red clover culture were: Viola arvensis, Capsella bursa pastoris, Matricaria inodora, Stellaria media, Cirsium arvense, Sonchus arvensis, Brassicanapus (rapeseed mustard), Triticum (wheat mustard).

The selectivity of the herbicide saga instred clover r was very good, the score according to the EWRS scale being 1.

Efficacy ranged from 65 to 98%.

Increases in production were obtained with each treated variant, but statistically ensured were the variants treated with: Leopard 5 Ec 1.5l/ha + Basagran Forte 2l/ha, Dual Gold 96 EC 1l/ha + Pulsar 1.2l/ha, Dual Gold 96 EC 1l/ha + Kerb 3kg/ha and in the variant treated with Dual Gold 96 EC 1l/ha + Corum 1.25l/ha.

Based on the results obtained, the best strategies for fighting weeds in the red clover culture can be established.

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