Study of Floristic Composition of Arnica Montana L. Grasslands Exploited Low-Input

Ioan ROTAR, Florin PĂCURAR, Roxana VIDICAN, Anca BOGDAN, Denes DEAK, Erika BANTO

University of Agricultural Science and Veterinary Medicine, Cluj, Plants Science Department, No 3-5, Manastur Street, 400372 Cluj-Napoca, Romania

Abstract. In sustainable view and given the new climate and demographic phenomena, the mountains must be a clean living environment, supplier of energy, biodiversity and food for humans and animals, adequate safety measures and good management, with continued compliance with the balance agro-forestry and preventing human depopulation and agricultural traditions and cultural degradation. Oligotrophic grasslands from Gârda de Sus village was a subject of Arnica Project (2004-2007, www.arnica-montana.ro). This project aimed at sustainable exploitation of Arnica montana L. species benefit and welfare of local people. So, oligotrophic grasslands have managed so as to maintain the species Arnica montana L. in abundance-dominance as possible. Following this project was set into remote exploit local species Arnica montana L. and that capitalize on the international market as certified product. Interests of entrepreneurs are to maintain the existing flora in the oligotrophic meadows. The obiective of our study is to evaluate the effect of low-inputs on a grassland of Arnica montana L. from boreal floor, Gârda de Sus, Apuseni Mountains, Romania. In Apuseni Mountains, extensive grazing and extensive meadow management practices have been typically for subsistence-based or small-scale farming systems in areas of low agriculture productivity. However, longer term effects of these grasslands need to be investigated.

Keywords: low-input, mountains, biodiversity, grasslands

Introduction. Lawns are second order in recent times the attention of increasingly important segment of our society that regulated use and conservation to preserve for future generations (Zimkova et al., 2007). Oligotrophic grasslands of the Apuseni Mountains are a source of diversity more often cited in various meetings. Biodiversity, subject to current problems is of great importance and provides answers to increasing consumer pressure regarding food safety. By use of grasslands affects floristic composition and especially the species Arnica montana L., a species in the study area is a reliable source of income. For an awareness of the importance of this species is tested at a local sustainable use of pastures because the practice a communal grazing meadows irrational, with a load of poor animals, causing a degradation by installing carpet herbaceous species in terms unworthy feed (Rotar et al., 2011).

Materials and methods. The experimental field is located in the Poienile Ursului, Garda de Sus village, Alba County, Apuseni Mountains at 1380 m elevation and started in 2009, using a randomized block design with five treatments with five replicates. The plot size is 6 m² in the following experimental treatments: T1 - abandoned meadow, T2 - traditional mowing (once per year, at 5-7 cm cutting height, no later than the 1st of August), T3 - early mowing (once per year, at 5-7 cm cutting height, in the first part of June), T4 – (mowing twice per year; at 5-7 cm cutting height, first time in June and the second in August), T5 – imitating grazing through four times mowing per year, in: June, July, August and September, at 5 cm cutting height. The floristic studies have been performed according to Braun-Blanquet method. We have been monitoring the Arnica montana L. flowers in all variants.
Results and discussions. The management of grasslands influence the floristic composition. The grassland type is *Agrostis capillaris* L.-*Festuca rubra* L. and is present in all variants.

Poaceaes family plants have a different coverage depending on the harvesting system. The lowest proportions (32.1%) have had in the variant used by grazing (V5). A similar percentage of participation is meeting in variant mown twice per zear (V4), 35.8%. Relatively low coverage with Poaceae believe favors the presence of species *Arnica montana* L. in grassland composition, the percentage of participation in these types of species *Arnica montana* L. is of 9.0% from the one that mimics the grazing (V5) and 9.8% in variant mown twice a year (V4).

Interestingly, as outlined in our data that the variant that we have the highest rate of Poaceaes participation (V3, early mowing) of 47.12% have the lowest attendance of the species *Arnica montana* L. Also reduced participation of the species *Arnica montana* L. and we have abandoned variant (V1) of 4.8% although the participation of plants from other botanical families is high, 56.24%, which demonstrates that the structure envolves toward the floristic composition damage.

In the abandoned variant (V1) we see that the lowest number of inflorescences of *Arnica montana* L. and lowest number of stems, which shows the danger of high diversity grassland abandonment (table 1).

In traditional mown variant (V2), in five rehearsal, we have 95 stem and 157 flowers, which are all present only in the second rehearsal.

In early mown variant (V3) have the same number of stems as with the traditional mown but a smaller number of flowers, 141. In this model both floriferous stems and numbers of flowers are distributed in the first three rehearsals most, but the only variant where there is a flowering stem with one flower per stem and the fifth repetition.

In variant mown twice a year (V4) we have the largest number of stems (223) and therefore the greatest number of inflorescences (350). Put it this impressive account management on grasslands, due to mowing. Stems are distributed only in the first three repetitions.

The variant that mimics repeated grazing by mowing (V5) have a total of 98 stems and 139 flowers, spread in the first and second repetition.

<table>
<thead>
<tr>
<th>Rehearsal</th>
<th>V1-Stem</th>
<th>V1-Flowers</th>
<th>V2-Stem</th>
<th>V2-Flowers</th>
<th>V3-Stem</th>
<th>V3-Flowers</th>
<th>V4-Stem</th>
<th>V4-Flowers</th>
<th>V5-Stem</th>
<th>V5-Flowers</th>
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<td>R1</td>
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<td>0</td>
<td>72</td>
<td>90</td>
<td>45</td>
<td>64</td>
<td>95</td>
<td>136</td>
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<td>R2</td>
<td>6</td>
<td>11</td>
<td>95</td>
<td>157</td>
<td>6</td>
<td>14</td>
<td>153</td>
<td>256</td>
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<td>0</td>
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<td>36</td>
<td>25</td>
<td>30</td>
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<td>Total</td>
<td>11</td>
<td>18</td>
<td>95</td>
<td>157</td>
<td>95</td>
<td>141</td>
<td>223</td>
<td>350</td>
<td>98</td>
<td>139</td>
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</table>

Conclusion. A low-input grassland primarily requires extensive management with all their implications (moderate inputs, organic fertilizers etc.) because it is obvious that less intensive farms contribute little to overproduction, environmental pollution and loss of biodiversity.

In natural oligotrophic grassland ecosystems *Arnica montana* L. species is significantly present, which can be used through putting in good use in drug industry or cosmetics.

To preserve the botanical diversity of meadows in the Apuseni Mountains, and especially the presence of *Arnica montana* L., traditional management or mowing twice per year are recommended.
REFERENCES