The Results of Cultivating the Species Agastache foeniculum (Pursh) Kuntze at Jucu, CJ

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Abstract. Agastache foeniculum is a recent species cultivated in Romania. The species has the advantage that it can withstand low winter temperatures in the Transylvanian Plain, up to -25º C in soil covered with snow. Another major advantage of the species is that from its total mass, the plant foliage prevails which provides feedstock production materials for medicinal purposes. In the research conducted in 2011-2012 in the experimental field of Jucu were pursued issues regarding morphology, biology and plant phenology as well as productivity elements and finally the production of herba which can be done by the species in two periods of planting and three densities. It was cultivated a local population through seedling in two periods (26.04.2011 and 21.05.2011) at densities of 47,619 plants/ha (30 cm x 70 cm), 35,714 plants/ha (40 cm x 70 cm) and 28,517 plants/ha (50 cm x 70 cm). The experiences location was done by the method of subdivided parcels with 2 factors (time and planting density) in three repetitions. The surface of the experimental plot was 3 m2. Statistical interpretation was made by variance analysis method with one, two, and three factors and interpretation of the results, highlighting the significance of differences after the multiple comparisons test (Duncan test) and Student test. From measurements made at green plants it resulted that leaves represent a significant share of 37.98% of the total mass of the plant, 30.8% branches, main stem 10.44% and 20.78% inflorescences. If dried plant leaves have the highest share from the total plant of 35.89%, followed by branches (25.75%), flowers (19.04%) and 19.32% stems. The results justify the extension of the cultivation of this plant in the Transylvanian Plain, harvested herba with an important phytotherapy value.

Keywords: Agastache foeniculum, morphology, the percentage of plant parts, herba production.

INTRODUCTION

Agastache foeniculum species was recent cultivated in Romania. It was brought to the USAMV Cluj-Napoca in 2007, from SCDL Bacău, as part of a research project funded by UEFISCDI. It is a herbaceous species, perennial, used in ornamental, medicinal and aromatic purposes. The species has the advantage to withstand the low winter temperatures in the Transylvanian Plain, up to -25 ºC in the ground, covered with snow. Annual average (over 100 years) of air temperature in this area is 8.3º C and rainfall of approximately 615 mm. (Duda et al., 2011). Research conducted in 2011-2012, in the experimental field at Jucu pursued issues regarding morphology, biology, plant phenology, productivity elements and finally the production of herba which can be achieved by the species in two periods of planting and three densities.

MATERIAL AND METHOD

An origin of Agastache foeniculum (Pursh) Kuntze from SCDL Bacău was cultivated by seedling, in two periods of time (26.04.2011 and 21.05.2011) at densities of 47,619 plants/ha (30 cm x 70 cm), 35,714 plants/ha (40 cm x 70 cm) and 28,517 plants/ha (50 cm x 70 cm). The placement of the experiences was done through the subdivided parcels with 2
factors method (time and planting density) with three repetitions. The surface of the experimental plot was 3 m². Statistical interpretation was made through variance analysis method with one, two, and three factors and the interpretation of results, highlighting the significance of differences, was made through the Student test and multiple comparisons test (Duncan test).

RESULTS AND DISCUSSIONS

Under the experimental conditions at Jucu CJ, on average in the 2011-2012 time period, the species *A. foeniculum* (Pursh) Kuntze had at 30-35 days after planting, a number of 6-12 leaves. The preblossoming phenophase lasted between 15 and 20 days, from the 3rd decade of May until the 2nd decade of July. The blossoming lasted between 20-25 days, beginning in the 2nd decade of July until the end of the month.

The flowering stage was ranging between 50-60 days from planting, in the 3rd decade of July to the 2nd decade of September. The seed maturation, staggered, had a duration of 40-50 days, on average, from the 2nd decade of September to the 3rd decade of October (Figure 1, bluegrass Matei Cristina Firița, 2012).

Fig. 1. Plant aspects and phenophases duration to *A. foeniculum* (Pursh) Kuntze

From the measurements made in 2011 on the plants grown in the experimental field of UASMV Cluj-Napoca from Jucu village, it was concluded that the leaves have had a significant percentage of 37.98% of the total mass of the green plant, the ramifications 30.80%, the main stem has showed the lowest rate of 10.44% and the inflorescences have had a significant percentage of 20.78%.

After drying the plants, the leaves have also had the highest rate of the total plant, 35.89%, followed by branches (25.75%), inflorescences (19.04%) and the main stem, 19.32% (Fig. 2 and 3, according to Matei, 2012).

The production of herba (dry weight) obtained, between 3.05 and 3.83 t/ha was inversely proportional to the density, on the three densities applied (47,619 plants / ha 35,714
pl/ha and 28,517 plants/ha), with a distinctly significant difference at the density of 35,714 plants/ha towards the greatest density and a very significant positive difference at a density of 28,517 plants/ha compared to the control, with an extra production of 0.78 t.

Fig. 2. Share of different parts of *A. foeniculum* green plants (Pursh) Kuntze (Jucu, 2011)

Fig. 3. Share of different parts of *A. foeniculum* dry plant (Pursh) Kuntze (Jucu, 2011)
The differences are provided statistically through both of the assessment methods (analysis of variance and Duncan test) (Tab. 1).

Tab. 1
The influence of plant density upon the dry cut yield at *A. foeniculum* (Pursh) Kuntze (Jucu, 2011-2012, yearly average)

<table>
<thead>
<tr>
<th>Density (pl/ha)</th>
<th>Dryed cut yield (t/ha)</th>
<th>Difference</th>
<th>Significance</th>
<th>Duncan Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>%</td>
<td>t</td>
</tr>
<tr>
<td>47.619</td>
<td>3.05</td>
<td>100</td>
<td>0</td>
<td>Mt</td>
</tr>
<tr>
<td>35.714</td>
<td>3.42</td>
<td>112.3</td>
<td>0.38</td>
<td>**</td>
</tr>
<tr>
<td>28.517</td>
<td>3.83</td>
<td>125.6</td>
<td>0.78</td>
<td>***</td>
</tr>
<tr>
<td>DL (p 5%)</td>
<td>0.21</td>
<td>DS</td>
<td>0.21-0.22</td>
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<tr>
<td>DL (p 1%)</td>
<td>0.31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DL (p 0.1%)</td>
<td>0.46</td>
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</table>

CONCLUSION

Determining the plant parts share of *Agastache foeniculum* (Pursh) Kuntze from the whole, both green and especially the dry one is very important for estimating the plant value and efficiency in the use of herbal purposes, given that the highest concentration of active principles (volatile oil, polyphenols, flavonoids, flavones etc.) is found, in decreasing order, in inflorescences, leaves, lateral branches and main stem. The large share of leaves and inflorescences from the total mass of the plant is a major advantage of the species because they constitute the raw material plant for medicinal purposes. Setting the *Agastache* culture at a density of 28,517 plants/ha (70 cm between rows x 50 cm between plants in the row) provides the highest production of herba. The results justify the extension of the cultivation of this plant in the Transylvanian Plain, harvested herba with an important phytotherapy value.

REFERENCES