RESEARCH REGARDING THE CULTIVATION TECHNOLOGY OF
ROSMARINUS OFFICINALIS L.

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Abstract. Rosemary was used since ancient times as medicinal plant, ritual and seasoning. Rosemary volatile oil is obtained from branches with leaves and flowers, harvested all year round. The greatest production were obtained at the planted variant 70 cm x 70 cm. The duration of rooting is low with six days in the case of water usage and with 10 days in the case of perlite usage. The highest content in volatile oil was obtained at the planting variant 70x70 cm and 100x100 cm and with the smallest density.

INTRODUCTION

The ancient Elade doctors called rosemary the holly plant, Libanotis. It was mainained for a long time this name given by romans (ros – dew and marinus – big, „so the wet one by the sea dew”).

In Ancient Greece, before examination, the students were wearing garland from rosemary leaves, believing that this will improve their memory.

The rosemary was used in ancient time as medicinal plant, ritual and seasoning.

The rosemary is cultivated for its aerial part (Rosmarini herba) or leaves (Rosmarini folium). The rosemary volatile oil is obtained from branches with leaves and flowers, harvested all year round.

The extracts from Rosmarinus officinalis L. have a purifying action, antiseptic, antianemetical, against fever, diuretic (stimulates renal secretion and so it cleans the body of wastage).

MATERIAL AND METHOD

The research was carried out on the experimental field of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca in 2007, on a typical carbonate alluvial soil of alkaline reaction, moderate to poorly moldiferous, not too rich in nitrogen but so is phosphorus and potassium within the frames of a sub humid climate.

The variant experimentated and the methods are presented as follows.

1. The influence of density upon fresh herba production at Rosmarinus officinalis L.

In the experience we used four variants of planting:

- V1=50 cm (between rows) x 50 cm (between plants/row) variant considered control variant;
- V2=60 cm x 60 cm;
- V3=70 cm x 70 cm;
- V4=100 cm x 100 cm.
The experience was placed after unrandomised blocks method in three repetitions with the surface of the experience of 25 m².

The planting was made in spring (09. 05. 2006), and at harvest (09.10.2006) we determined the production of herba on repetitions and variants. The dates interpretation was made with the help of variant analyze.

2. The influence of the layer upon rooting at Rosmarinus officinalis L.

In the experience we used three variants of layers:
- V1 = mix (soil, peat, natural fertilizer, sand) – variant considered control variant;
- V2 = water
- V3 = perlit.

The experience took place in 28.01.2007. In order to be able to interpretate the dates with the variant analyze method we established for each layer four repetitions each with three pots.

3. The influence of density upon the plant weight, number of stems/plant, number of offshoot/plant at Rosmarinus officinalis L.

At harvest we weight from each repetition and variant six plants and from the same number of plants we numbered the stems/plant and the number of offshoots/plant. The dates interpretation was made with the help of variant analyze.

4. The study regarding the content in active principles (volatile oil) on density at Rosmarinus officinalis L.

To appreciate the qualities it was determined the content in volatile oil (ml/100 g dry) from dry leaves, depending on the nutrition space, by hydrodistillation of 50 g dry material for three hours in 750 ml tap water

RESULTS AND DISCUSSIONS

1. The influence of density upon the fresh herba production at Rosmarinus officinalis L.

From table 1 results the fact that the best productions were obtained at the planting variant of 70X70 cm (9331 kg/ha), when there were obtained differences which were distinct significant compared to the control variant (7306 kg/ha).

Good production were obtained also in the case of planting variant of 60X60 cm (8447 kg/ha), when there were obtained significant differences compared to the control variant.

The lowest productions were obtained at the planting variant 100X100 cm, when it was obtained the smallest quantity of herba (6863 kg/ha). The differences compared to the control variant are not significant.

2. The influence of the layer upon rooting at Rosmarinus officinalis L.

In the case of water and perlit usage the results were better than in the case of soil mix usage, natural fertilizer, peat and sand.

The period necessary for rooting lowered with six days in the case of water usage and with 10 days in the case of perlit usage.
The influence of density upon the fresh herba production *Rosmarinus officinalis* L. (Cluj-Napoca, 2006)

<table>
<thead>
<tr>
<th>Planting distance (cm)</th>
<th>The number of plants /ha</th>
<th>Fresh herba production Kg/ha</th>
<th>% ±Diference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>50x50</td>
<td>40000</td>
<td>7306</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>60x60</td>
<td>27777</td>
<td>8447</td>
<td>116</td>
<td>1141 X</td>
</tr>
<tr>
<td>70x70</td>
<td>20408</td>
<td>9331</td>
<td>128</td>
<td>2025 XX</td>
</tr>
<tr>
<td>100x100</td>
<td>10000</td>
<td>6863</td>
<td>94</td>
<td>-443 -</td>
</tr>
</tbody>
</table>

DL 5% = 1028,81; DL 1% = 1442,41; DL 0,1% = 2038,74

The influence of layer upon rooting at *Rosmarinus officinalis* L., (Cluj-Napoca, 2006)

<table>
<thead>
<tr>
<th>Variant</th>
<th>Period of rooting (days)</th>
<th>%</th>
<th>Differences</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mix layer</td>
<td>47</td>
<td>100</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Water layer</td>
<td>41</td>
<td>86,2</td>
<td>-6</td>
<td>X</td>
</tr>
<tr>
<td>Perlit layer</td>
<td>37</td>
<td>78,2</td>
<td>-10</td>
<td>XX</td>
</tr>
</tbody>
</table>

DL 5% = 5,22; DL 1% = 7,32; DL 0,1% = 10,34;

3. The influence of the density of planting upon the plant weight, number of the stems /plant, number of offshoots /plant at *Rosmarinus officinalis* L.

3.1. The influence of density upon the plant weight at *Rosmarinus officinalis* L.

From table 3, it can be seen that the best results, regarding the plant weight depending on the density, were obtained in the case of the planting variant of 70X70 cm (465 g), when there were obtained distinct significant differences compared to the control variant (275 g).

Good results were also obtained in the case of 60X60 cm (393 g) variant, when there were registered significant differences compared to the control variant (275 g).

Also, at the planting variant of 100X100 cm (375 g) we can observe that the plant weight is bigger that the weight of the control variant (275 g), but the differences are not significant.

The influence of density upon the plant weight at *Rosmarinus officinalis* L., (Cluj-Napoca, 2006)

<table>
<thead>
<tr>
<th>Variant</th>
<th>Planting distance (cm)</th>
<th>Plant weight (g)</th>
<th>%</th>
<th>±Diference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>V 1 (control variant)</td>
<td>50X50</td>
<td>275</td>
<td>100</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>V2</td>
<td>60X60</td>
<td>393</td>
<td>143</td>
<td>118</td>
<td>X</td>
</tr>
<tr>
<td>V3</td>
<td>70X70</td>
<td>465</td>
<td>169</td>
<td>190</td>
<td>XX</td>
</tr>
<tr>
<td>V4</td>
<td>100X100</td>
<td>372</td>
<td>135</td>
<td>97</td>
<td>-</td>
</tr>
</tbody>
</table>

DL 5% = 99,81; DL 1% = 139,93; DL 0,1% = 197,78

3.2. The influence of the density upon the number of stems /plant at *Rosmarinus officinalis* L.

The best results, as it can be seen in table 4, were obtained in the case of the planting variant of 70X70 cm, when there were obtained distinct significant differences compared to the control variant. In this case there were obtained 8 stems /plant compared to 3 stems /plant as there were obtained in the case of control variant.
Good results were obtained in the case of planting variant 60X60 cm and 100X100 cm, when there were obtained 6 stems/plant and 5 stems/plant, but the differences weren’t significant.

3.3. The influence of the density upon the number of offshoots/plant at *Rosmarinus officinalis* L.

The best results were obtained in the case of the planting variant 70X70 cm, when there were registered distinct significant differences compared to the control variant. In this case there were obtained 52 offshoots/plant, compared to 41 offshoots/plant obtained in the case of the control variant (table 5).

Good results were obtained in the case of planting variant 60X60 cm (46 offshoots/plant), but the differences were not significant.

At planting variant 100X100 cm there can be observed that it was obtained the same number of offshoots/plant as in the case of the control variant, 41 offshoots/plant.

### Table 5

<table>
<thead>
<tr>
<th>Variant</th>
<th>Planting distance (cm)</th>
<th>Number of offshoots/plant</th>
<th>±Difference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>V 1 (control variant)</td>
<td>50X50</td>
<td>41</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>V2</td>
<td>60X60</td>
<td>46</td>
<td>112.3</td>
</tr>
<tr>
<td></td>
<td>V3</td>
<td>70X70</td>
<td>52</td>
<td>127.9</td>
</tr>
<tr>
<td></td>
<td>V4</td>
<td>100X100</td>
<td>41</td>
<td>101.6</td>
</tr>
</tbody>
</table>

DL 5% = 6,89; DL 1% = 9,66; DL 0,1% = 13,66

4. The study of active principles content (volatile oil) on density at *Rosmarinus officinalis* L.

After determining the content in volatile oil from rosemary dry leaves we obtained the following results, depending the planting distance:

- V1 – 0,99 ml/100 g dry leaves
- V2 – 2,43 ml/100 g dry leaves
- V3 – 3,09 ml/100 g dry leaves
- V4 – 3,09 ml/100 g dry leaves.

It can be observed the fact that the highest content in volatile oil was obtained at the planting variant of 70X70 cm and 100X100 cm and with the smallest densities.
Figure 1 The mode of the experience locating with *Rosmarinus* variety

Figure 2 The three sublayers of rooting (mix, water and perlit)
CONCLUSIONS AND RECOMMENDATIONS

1. The best results were obtained at the planting variant of 70 cm x 70 cm, so we recommend for production the planting variant of 70 cm x 70 cm.

2. The duration of rooting was six days lower in the case of water usage and 10 days in the case of perlit usage, so we recommend that offshoots rooting to be made in perlit.

3. In experiences regarding the influence of density upon some plant organs, the best results were obtained at planting variant of 70 cm x 70 cm.

4. The highest content in volatile oil was obtained at the planting variants of 70x70 cm and 100x100 cm and with the smallest density.

BIBLIOGRAPHY
