THE EFFECT OF DIFFERENT TYPES OF FERTILIZERS ON THE PRODUCTION CAPACITY OF MANGEL-WURZEL -BET UNDER THE CONDITIONS IN TIMISOARA

EFECTUL DIVERSELOR TIPURI DE ÎNGRĂȘĂMINTE ASUPRA CAPACITĂȚII DE PRODUCȚIE LA SFECLA FURAJERĂ ÎN CONDIȚIILE DE LA TIMIŞOARA

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Abstract: In order to increase the production of the mangel-wurzel-beet, the improvement of the quality of the crops is expected, which will be achieved using genetic engineering techniques and modern technologies, such as the usage of vegetal bio-stimulators with the purpose of influencing the growth and the development of the plants. Nowadays the bio-stimulators are very often used in biological agriculture not only for lawns, but also for fodder cultivation, successfully replacing some polluting products. The agro fund and the crop-rotation have had a direct influence on the level of production of the studied mangel-wurzel genotypes in Timisoara (2007-2008). To the two factors mentioned above, the positive influence of the products with a bio-stimulating role was added. The beet capitalizes on manure. At all doses of manure applied, increases of production are obtained in comparison with the untreated sample. The greatest increases of production are obtained at the mangel-wurzel breed Kyros, at a dose of 80 t manure/ha. (132.9 kg/ha). Analyzing these measurements from the point of view of the increase in production for 1 kg of used manure, one can notice that at the doses of 40 and 60 t/ha, the increases in production are higher than at the maximum dose for the mangel-wurzel.

Rezumat: Pentru sporierea productiei de sfecla furajera se asteapta, imbunatatirea calitatii recoltelelor utilizandu-se tehnici de inginerie genetica si tehnologii moderne, cum ar fi utilizarea biostimulatorilor vegetali, in scopul influentarii cresterii si dezvoltarii plantelor. Astazi biostimulatorii sunt foarte mult utilizati in agricultura biologica atat la pajisti cat si la culturi furajere; inlocuind cu succes unele produse poluante. Agrofondul si asolamentul, au avut o influenta directa asupra nivelului de productie, la care sa adaugat si influenta pozitiva exercitata de produsele cu rol biostimulator aplicate, la genotipurile de sfecla furajera studiate(2007-2008) la Timisoara. Sfecla furajeră valorifică foarte bine gunoiul de grajd. La toate dozele de gunoi de grajd aplicate, se obtin sporuri de producție comparativ cu martorul netratat. Cele mai mari sporuri de producție se obțin la soiul Kyros de sfeclă furajeră, la doza de 80 t/ha gunoi de grajd (132.9 kg/ha). Judecând oportunitatea acestei măsuri, prin prisma sporului la 1 kg gunoi de grajd aplicat, se poate ușor constata că la dozele de 40 și 60 t/ha, sporurile de producție sunt mai mari decât la doza maximă la sfecla furajeră.

Key words: sfecla furajeră, producție, bio-stimulatori, îngrășăminte organice

Cuvinte cheie: mangel-wurzel, production, bio-stimulators, organic fertilizers

INTRODUCTION

The requirements regarding the mangel-wurzel production are constantly growing. The new breeds have a high production potential (over 100t/ha of roots), but the cultivation under conditions of stress lowers the level very drastically.

One of the technological links for increasing the production of mangel-wurzel roots is the usage of fertilizers. The fertilizer type, the applied dose and the moment of application are
The mangel-wurzel extracts from the soil (for a production of 100 q of dry substance), 175 kg N, 40 kg P, 280 kg K, 35 kg Ca. (Moisuc şi Ducik, 2002). This fact makes the crop respond positively to fertilizer application.

The consumption of nutritional elements during the whole vegetation period of the mangel-wurzel is not even, the maximum consumption is in June, July, and August, which corresponds to the periods of maximum growth of the root.

MATERIALS AND METHODS

The experiments were conducted in the experimental field of the discipline The Cultivation of Lawns and Fodder from the Didactical Station of the University of Agricultural Sciences and Veterinary Medicine of Banat, Timisoara. The location of the field is in the West Plain and the soil for the experiments is cambic chernozem.

The evolution of the climatic resources, in the period 2007 – 2008, highlights the changing nature of it, with notable changes from the average (table 1 and 2).

<table>
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<tr>
<th>Specification</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
<th>X</th>
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<td>8,6</td>
<td>12,7</td>
<td>18,3</td>
<td>22,4</td>
<td>24,22</td>
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<td>10,7</td>
<td>4,2</td>
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<tr>
<td>2008</td>
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<tr>
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<td>16,4</td>
<td>19,6</td>
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<td>20,8</td>
<td>16,9</td>
<td>11,3</td>
<td>5,7</td>
<td>1,4</td>
</tr>
</tbody>
</table>

We used as a biological material the breed Kyros of mangel-wurzel. The seeding was done in parcels, in rows of 50 cm and a distance of 20 cm between plants in a row. The observations and biometrical measurements were done on 150 plants. A series of quantitative characteristics of the roots under the influence of certain bio-stimulators and manure were determined.

The manure was applied in autumn in doses of 20, 40, 60, 80 t/ha, and the bio-stimulator treatments were done several times, differentially during the vegetation period in the following doses: Megafol 3.5 l/ha, Folibor 5 l/ha and Cropmax 1 l/ha.

The products with a bio-stimulator role used in the research were:

**Megafol** – producer: VALAGRO SpA – Atessa/Italy
It is a foliar bio-stimulator, based on vegetal amino acids. The vegetal origin of the product ensures a high and at the same time well balanced concentration of vital amino acids for the growth and development necessities of the plants.

The Megafol fertilizer has the following chemical composition: total Nitrogen 4.5 %, out of which organic N 4.5 %, organic carbon 13.4%, free amino acids 28%.

The bio-stimulator Megafol has a balanced and rapid action.

**Folibor** – is a liquid fertilizer with borax and calcium, produced by NATURAL RESEARCH Ltd, Craiova.

The ferti-stimulator Folibor has the following chemical composition: borax (g/l): min. 6.5; Calcium (g/l): min. 17. This is an organic borax product under the form of natural metabolite, recommended for the ecological, organic and biological agriculture.

**Crompax** – is a complex, super-concentrated nutrient for foliar fertilization, which is 100% natural, produced by Holland Farming B.V. The Cropmax fertilizer has the following chemical composition: vegetal growth stimulators (auxins, cytokinins, gibberellins), organic amino acids, vegetal vitamins, vegetal enzymes.

- Macro-microelements N...0,2%, P...0,4%, K...0,02%, Fe...220mg, Mg...180mg, Zn...40mg, Mn...45mg, Cu...35mg;
- Other elements B, Ca, Mo, Co, Ni ...10mg.

**RESULTS AND DISCUSSIONS**

The agro fond and crop rotation had a direct influence on the level of production, to which we can add the positive influence of the bio-stimulating products applied, of the mangel-wurzel genotypes, which we have researched on (2007-2008) in Timisoara.

From the analysis of the achieved results (table 3), in the two experimental years for the Kyros breed increases in production between 13.38 t/ha and 15.15 t/ha were achieved. In this respect the following experimental variants with the highest increases were registered:

- In the variant, when the bio-stimulator Megafol was applied, a production of 104.36 t/ha was achieved, which is significantly superior to the untreated sample.
- In the variant, when the bio-stimulator Cropmax was applied, a production of 106.085 t/ha was achieved, which is significantly superior to the untreated sample.

<table>
<thead>
<tr>
<th>Nr.crt.</th>
<th>Fertilizer and dose</th>
<th>Production 2007-2008 (t/ha)</th>
<th>%</th>
<th>Difference</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Sample</td>
<td>90,92</td>
<td>100</td>
<td></td>
<td></td>
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<tr>
<td>1</td>
<td>Megafol</td>
<td>104,36</td>
<td>115</td>
<td>13,38</td>
<td>x</td>
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<tr>
<td>2</td>
<td>Folibor</td>
<td>99,8</td>
<td>110</td>
<td>8,86</td>
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<tr>
<td>3</td>
<td>Cropmax</td>
<td>106,085</td>
<td>117</td>
<td>15,155</td>
<td>x</td>
</tr>
</tbody>
</table>

DL5%=10,65t/ha DL1%=16,13t/ha DL0.1%=25,9t/ha

From diagram 1, the fact that the root productions increases along with the application of bio-stimulators can be ascertained. The minimum root production is achieved through the application of the Folibor bio-stimulator (99.8 t/ha), and the maximum production is recorded through the application of the bio-stimulator Cropmax (106,085 t/ha).
Diagram 1. The root production for the breed Kyros of mangel-wurzel

After the application of the bio-stimulators

The mangel-wurzel capitalizes very well on manure and from the research one can ascertain that for the mangel-wurzel, in an area with less precipitations and lighter and fertile soils, 20 – 40 t of manure/ha are enough. The doses can be increased to 60 – 80 t/ha, if the manure is administered alone.

Regarding the valorization of organic fertilizers by the mangel-wurzel, one can notice that manure (table 4) administered alone in doses of 20 – 60 t/ha, increases the production of roots by 12-29%, and at the dose of 80 t/ha the root production has increased by 46%.

Table 4

<table>
<thead>
<tr>
<th>No.crt.</th>
<th>Fertilizer and dose</th>
<th>Production 2007-2008(t/ha)</th>
<th>%</th>
<th>The difference</th>
<th>The Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Sample</td>
<td>90,92</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Manure 20t/ha</td>
<td>102,015</td>
<td>112</td>
<td>11,095</td>
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<tr>
<td>2</td>
<td>Manure 40t/ha</td>
<td>108,49</td>
<td>119</td>
<td>17,57</td>
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<td>3</td>
<td>Manure 60t/ha</td>
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<td>129</td>
<td>26,505</td>
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<tr>
<td>4</td>
<td>Manure 80t/ha</td>
<td>132,9</td>
<td>146</td>
<td>41,98</td>
<td>xxx</td>
</tr>
</tbody>
</table>

DL5% = 10.36t/ha  DL1% = 15.07t/ha  DL0.1% = 22.61t/ha

In diagram 2 we present the root productions for the Kyros breed of mangel-wurzel, which resulted after the application of cumulative doses of manure.

After the application of manure

On the basis of the production results of a two-year research on the Kyros breed of mangel-wurzel, fertilized with four increasing doses of manure, one can ascertain that the minimum production of 102,01 t/ha of roots is achieved at a dose of 20 t manure, significantly higher than the untreated sample.

Very significant increases of production are obtained for the doses of 60 t/ha and 80 t/ha, which makes us recommend the dose of 60t/ha from an economic point of view.
CONCLUSIONS
From researching the influence of the bio-stimulators and of the manure on the root production of mangel-wurzel, cultivated during a period of two years the following conclusions can be drawn:

- Through the application of the three bio-stimulators during the vegetation period of the mangel-wurzel, increases in production between 10% (through the administration of the biostimulator Folibor) and 17% (through the administration of the bio-stimulator Cropmax) are achieved.

- The results in the production of mangel-wurzel highlight the direct effect that the manure exerts. This way, according to the applied dose, the root production registers values between 11,095 t/ha for the variant 20t manure/ha and 41,98 t/ha for the variant 80 t manure/ha.

Compared to other compounds, used in modern agriculture (herbicides, chemical fertilizers), the manure and the bio-stimulators do not pollute, therefore they could be used successfully in biological agriculture.

BIBLIOGRAPHY