Researches on the Influence of Fertilization on the Yield and Its Quality with the Corn Cropped in Portaresti – Segarcea, Dolj

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Abstract. The experiment has researched the influence of the climatic condition and the fertilizers on the level and the quality of the yields. In this manner, the grain yields have ranged between 8,040 and 10,260 kg/ha, the grain output for 1 kg of fertilizer being between 10.7 and 16.8 kg and the protein content in function of the fertilization was of 12.4 – 12.7%.

Keywords: corn, fertilizer, hybrid, protein

INTRODUCTION

In order to ensure the food for populace that is in a constant increase the agricultural production must keep the rhythm both in our country and elsewhere.

Due to the fact that the increasing of the cropping land is no more available, the main mean of increasing the yield is the outturn.

The present paper is trying to bring a small contribution to the behavior of the corn crop in the climatic conditions of Portaresti – Segarcea zone from the Southern Oltenia in order to obtain high and constant yields, respectively, of good quality by using fertilizers.

MATERIAL AND METHOD

The experiment was located on a cambic chernozem from Portaresti-Segarcea zone (40 km South-East away of Craiova) within the 2006-2008 years being organized after the latin square method.

The experiment has unfolded on the same plot in rainfed conditions using the wheat – corn crop rotation.

The drilling was performed during the second half of the April at 70 cm distance between rows, at 45,000 plants per hectare and the corn hybrid was Olt of the FAO group 450 that is very well adapted in this zone.

The weed control was performed using the Dual preemergent herbicide 1 liter per hectare and Guardian 2.5 liters per hectare (the first one was incorpored by a harrow and the second one was left at the soil surface) and during the vegetation period there was applied Oltisan at 4-6 leaves of the corn plant, with Oltisan 1 liter per hectare plus Lontrel 0.33 liter per hectare. During the vegetation period there were done 2 mechanical hoeings between rows. The soil type of the experiment was cambic chernozem, with a pH of 6.9-7.1 the humus content was of 3.46-3.72% within the arable layer, 0.183 – 0.196% total nitrogen, a low phosphorus content – 15 ppm and a high available potash – 240 ppm. The rainfall, the temperature and the air moisture during the experiment have been close to the 60 years average values, (of 525 mm, 10.2°C and 72%).

The experiment has researched the influence of the fertilization on the yield, both quantitatively and qualitatively using, on the 60 kg/ha phosphorus background, 10 t manure
per hectare, different nitrogen fertilizer doses (N50, N100, N150, N200) in comparison with the control variant that was not fertilized by nitrogen yet fertilized by manure and phosphorus.

RESULTS AND DISCUSSIONS

Within the first table there are presented the yielding results, the synthesis of the experimental cycle that show that the yields of the researched variants were between 8,040 kg/ha and 10,260 kg/ha that emphasize the favorable reaction of the Olt hybrid to fertilization.

The synthesis of the yielding results in function of the fertilization recorded at Portarest-Segarcea in the experimental cycle 2006-2008

<table>
<thead>
<tr>
<th>Variant</th>
<th>Yield Kg/ha</th>
<th>%</th>
<th>Difference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 t/ha manure + N0P60</td>
<td>8,040</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10 t/ha manure + N50P60</td>
<td>8,852</td>
<td>110</td>
<td>812</td>
<td>x</td>
</tr>
<tr>
<td>10 t/ha manure + N100P60</td>
<td>9,531</td>
<td>119</td>
<td>1,491</td>
<td>xxx</td>
</tr>
<tr>
<td>10 t/ha manure + N150P60</td>
<td>9,858</td>
<td>123</td>
<td>1,818</td>
<td>xxx</td>
</tr>
<tr>
<td>10 t/ha manure + N200P60</td>
<td>10,260</td>
<td>128</td>
<td>2,220</td>
<td>xxx</td>
</tr>
</tbody>
</table>

DL 5% = 568 kg/ha  
DL 1% = 973 kg/ha  
DL 0.1% = 1,079 kg/ha

The applying of the nitrogen fertilizers, on 10t/ha manure and P60 background has determined the increasing of the grain yield by 812 kg/ha and this difference is significant.

The doubling of the nitrogen dose to N100 has amplified the yield output to 19% and, respectively, that has conducted to a yield of 1,491 kg/ha and this difference is very significant.

Very significant statistically differences have been achieved with the N150 variant (23%, of 1,818 kg/ha).

The highest yield has obtained with the variant that received the highest nitrogen dose (N200), of 10,260 kg/ha, the yield output being of 28% which meant a very significant difference of 2,220 kg/ha.

In the first figure there are presented the grain output per 1 kg of nitrogen active ingredient that was recorded in the experimental cycle 2006-2008 at Portaresti – Segarcea. There can be noticed that yield output given by 1 kg nitrogen active ingredient was of 16.8 kg grains at N50 dose, 14.98 kg with the N100 dose, 12.8 kg at N150 dose and of 10.7 kg with the N200 dose.

The protein yield of the experimental cycle 2006-2008 is given in the second table.

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Within the fertilizer research at 10 t/ha manure + P60 and different nitrogen doses from N0 to N200, the protein yield has ranged between 981 kg/ha (N0) to 1,305 kg/ha (N200). In this way there was recorded an increase by 12 % with the N50 variant, 21% with N100 variant, 26% with N150 variant and 33% with N200 variant. The protein differences were significant at the N50 dose level and very significant with the N100 – N150 – N200 doses.
Fig. 1. The grains output per 1 kg of nitrogen fertilizer active ingredient recorded at 2006-2008 experimental cycle

Tab. 2

The protein yield in function of the fertilization doses within the 2006-2008 experimental cycle

<table>
<thead>
<tr>
<th>Variant</th>
<th>Yield Kg/ha</th>
<th>%</th>
<th>Difference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 t/ha manure + N0P60</td>
<td>981</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10 t/ha manure + N50P60</td>
<td>1,098</td>
<td>112</td>
<td>117</td>
<td>x</td>
</tr>
<tr>
<td>10 t/ha manure + N100P60</td>
<td>1,187</td>
<td>121</td>
<td>206</td>
<td>xxx</td>
</tr>
<tr>
<td>10 t/ha manure + N150P60</td>
<td>1,232</td>
<td>126</td>
<td>251</td>
<td>xxx</td>
</tr>
<tr>
<td>10 t/ha manure + N200P60</td>
<td>1,305</td>
<td>133</td>
<td>324</td>
<td>xxx</td>
</tr>
</tbody>
</table>

DL 5% = 88 kg/ha  
DL 1% = 124 kg/ha  
DL 0.1% = 146 kg/ha

The results on the influence of fertilization on the protein content during the 2006-2008 experimental cycle are presented in the figure 2. At the researched nitrogen doses there was recorded an increase of the protein content from 12.40% (N50) to 12.45% (N100), 12.50% (N150) and, respectively, 12.72% with the N200 variant.

Fig. 2. The results on the influence of fertilization on the protein content during the 2006-2008 experimental cycle
CONCLUSIONS

1. By applying nitrogen doses on P60 and 10 t/ha manure background within the experimental field Portaresti – Segarcea there were obtained a ten percent output with N50 (8,852 kg/ha with a yield difference over the control of 812 kg/ha), 19% with the N100 dose (9,531 kg/ha with yield difference of 1,491 kg/ha over the control), 23% with the N150 dose (9,858 kg/ha with a yield difference of 1,818 kg/ha over the control) and, respectively, of 28% with N200 dose (10,260 kg/ha with a 2,220 kg/ha over the control variant).

2. The grain output per 1 kg Nitrogen active ingredient that was applied on the above background has been of 16.80 kg grains with N50 dose, 14.98 kg with N100 dose, 12.80 kg with N150 and 10.70 kg with N200 dose.

3. The protein content has increased along with the nitrogen dose from 12.20% (N0) to 12.72% (N200) and the protein yield has increased from 963 kg/ha (N0) to 1,235 kg/ha (N200).

REFERENCES