Seed Production System in Romania: Levels and Correlations for Main Cereal Crops

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ABSTRACT

This paper aims at presenting the structure of varieties and the evolution of consumption of seeds for main cereal crops. Analyzing the number of varieties and hybrids, it may be noticed that there is a growing trend. In Romania, the quantities of seeds used were variable, depending, on the one hand of the importance and expansion of the crop, and, on the other hand, on the records existing in the seed chain. For Romania, looking at the overall practices applied in relation to seed utilization a growing trend was noticed with respect to using seeds for wheat crops, but also a drop of barley and maize crops, besides the annual fluctuating consumption levels. By correlating the factors (areas and amounts of seeds) with production that may be obtained a growing trend for wheat and barley was noticed and a decreasing trend for maize.

Keywords: Correlation/Determination Coefficient, Crop System, Exponential Function, Local Population, Seed, Variation Curves, Variety/Hybrid

INTRODUCTION

It is a well known fact that in Romania crops for seed growing purposes are deemed strategic crops, both due to the use of the seed production and for the income that is generated. Constantly, a choice for seed growing crops must be seen two-dimensionally: on the one hand the selection of crop varieties in an improved and adequate manner given the crop environment in Romania; on the other hand, the need to permanently monitor the production of high quality seeds of the varieties deemed efficient. The achievement of this intention implies a thorough knowledge of all conditions of crop systems (ranging from the natural-geographic ones to the technological components), and also of the restrictions for applying them. If production factors amplify, this leads to a growth of production for most cereal crops, matters also supported by the multiple correlation coefficient.

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RESEARCH METHODOLOGY

The purpose is to determine how to use seeds by comparing indicators adequate for the main cereal crops. The analyses were based on knowing the growth rates of production given a reference year, which were calculated for wheat, barley and maize. The indicators expressed in absolute and relative values particularly referred to annual trends and variations.

In order to know the influence of each factor on crop production, presumptive estimates were made with the help of production functions. The influence factors were represented by the quantity of seeds \((x_1)\) and the area \((x_2)\), which were analyzed individually and simultaneously, watching the influence on total production \((y)\), and the formula was presented synthetically by exponential functions. In order to find the intensity of correlation the multiple correlation coefficient was also determined \((r_{x_1,x_2})\). The basis for calculation for 2000-2010 enabled a calculation of these correlation indicators for wheat, barley and maize. In doing so, the intention was to emphasize the features of each cereal crop in order to identify future trends.

RESULTS

Structure of Varieties and Evolution of Seed Consumption for Main Cereal Crops

By knowing the number of varieties and hybrids, presented in Table 1, a growing trend may be noticed. By comparisons between 2012/2008, the highest number of such varieties/hybrids is for the six-row barley (500.0%), common wheat (282.6%) and maize (187.7%).

Synthetically, it may be shown that in more than 50 years, the efforts of the seed improvement teams were aimed at three major stages, namely\(^1\): (1) Local population stage – with reference to improvement works, particularly of maize (mainly for collection, study and subsequently improvement operations regarding local populations). (2) Stage of varieties – hybrids among varieties, which was brief and the results were not better than in the previous stage. (3) Stage of varieties between inbred lines - is deemed the most important stage since the heterozyg effect was capitalized on. It is worth mentioning that these hybrids achieve for maize an average production of over 7000 – 8000 kg/ha of standard grains, within a short

<table>
<thead>
<tr>
<th>Crop</th>
<th>2008</th>
<th>2012</th>
<th>Differences</th>
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<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
</tr>
<tr>
<td>Common wheat</td>
<td>23</td>
<td>65</td>
<td>42</td>
</tr>
<tr>
<td>Durum wheat</td>
<td>9</td>
<td>7</td>
<td>-2</td>
</tr>
<tr>
<td><em>Hordeum distichon</em> (Two-Rowed Barley)</td>
<td>17</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td>Six-row barley</td>
<td>2</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Maize (hybrids)</td>
<td>154</td>
<td>289</td>
<td>135</td>
</tr>
</tbody>
</table>

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