SOME FACTORS AFFECTING STOLON AND TUBER FORMATION IN THE POTATO PLANT

BIRGER SVENSSON
Royal Agricultural College, Uppsala 7, Sweden

Summary, Zusammenfassung, Résumé, p. 37

1. INTRODUCTION
The main object of this investigation was to study the influence of the following factors on stolon and tuber formation:
   a. The size of the seed-pieces.
   b. The number of stems in the hill.
   c. The plant spacing.
   d. The planting depth.
   e. The time and method of earthing up.
   f. The variety.
   g. The nitrogen supply.

2. DEFINITIONS
Stems with roots, stolons, branches and leaves develop from the eyes of the seed tuber. The stolons can be divided into the following groups:
   a. stolons of the first order (from the stem).
   b. stolons of the second order (from stolons of the first order).
The tubers can also be divided into groups, depending on the stolons from which they are formed. Tubers are not formed from all stolons, and for this reason a standard of tuber formation was required. To indicate the frequency of tuber formation use was made of the following formula:

\[
\text{Frequency of tuber formation} = \frac{\text{Number of stolons with tubers}}{\text{Total number of stolons}} \times 100
\]

The number of stems was taken as an index of the hill-size.

3. LITERATURE
A very extensive survey of the literature on stolon and tuber formation has recently been published by MADEC and PERENNEC (1959), so that in the present text reference will only be made to articles closely connected with the investigation.

1 The investigation was carried out at the Institute of Plant Husbandry and supported by the Swedish Agricultural Research Council.

Received for publication 20th August, 1961.
SOME FACTORS AFFECTING STOLON AND TUBER FORMATION IN THE POTATO PLANT

4. INVESTIGATION CARRIED OUT BY THE AUTHOR

Material and methods

The main part of the investigation was carried out on a light, sandy soil in a field belonging to the Ultuna farm (situated in eastern Sweden, lat. 59°49'N, long. 17°39'E). The results of the soil analysis are shown in Table 1.

<table>
<thead>
<tr>
<th>pH value</th>
<th>P₂O₅ (kg/ha)</th>
<th>K₂O (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH-Zahl</td>
<td>7.1</td>
<td>501</td>
</tr>
</tbody>
</table>

Climatic conditions during the two years of the main part of the experiments can be summarized as follows:

1958. This year the stand developed very well and despite rain in July there was no late blight damage.

1959. The year was very dry and hot. No attacks of late blight were observed.

Seed tubers of the highest grade (Swedish class test) were used. According to Rieman et al. (1953) the number of stems in the hill affects the number of tubers per stem. It was therefore necessary to control the number of stems per hill. It was also found that differences between seed potato lots were too great to permit seed tubers being used without treatment. In order to control the hill-size two methods were used. In the first seed tubers were chitted and treated before planting so as to leave only the required number of sprouts. In the other part of the investigation use was only made of single-sprouted seed-pieces. All seed tubers and seed-pieces were disinfected with a TMTD solution. The Bintje variety was used in all experiments.

The experiments were arranged with 4 replications and with 10 hills at every period in each plot. The plant spacing was 70 - 30 cm and the planting depth 7-7 cm.

The plants were lifted by hand and the following characters determined:

- Number of stems per hill,
- The stem-length,
- The stolon-length,
- Number of first order stolons per stem,
- Number of first order tubers per stem,
- Number of second order stolons per stem,
- Number of second order tubers per stem,
- Tuber yield (g per stem and hill),
- Tuber size.