Effect of Seed Size on Uniformity of Pimiento Transplants (Capsicum annuum L.) at Harvest Time

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Abstract. Replicated field plots of small, medium, and large pimiento seeds, cv. Truhard Perfection, were planted in mid-February of 1972 and 1973. Compared to seedlings produced by small seeds, those from medium and large seeds emerged 2 days earlier to a significantly better stand, and attained in 71 days the growth, the hardened condition, and the root system required of usable transplants by canners. Transplants from small seeds failed to reach these requirements within the 75-day duration of this study.

The nation's pimiento (Capsicum annuum L.) transplant-growing industry is centered around Bartow in Polk County, FL. Seed plantings are made in open fields from late January to mid-February. Most transplants are usually ready for once-over hand harvest within 70 to 75 days, or as soon as they have attained a height of 22-23 cm, a well-developed root system, and become adequately hardened. Frequently 10 to 15% of them fail to meet canner requirements, due to lack of size, and have to be discarded. This often causes economic problems for the commercial transplant grower. In an effort to regulate size uniformity at harvest, some growers have reduced their seeding rates as much as 15%, while others have tried clipping the taller plants by mechanical means to let the smaller ones increase in size. Both practices have aided the cause but not to the extent desired. Seed size was thought to be involved, especially since the results of research with other vegetable crops (1, 3, 5, 6, 7, 8, 9, 10, 11) suggest such a relationship. We studied the influence of this factor on the uniformity of field-grown pimiento transplants at harvest.

Materials and Methods

Company seed stocks of cv. Truhart Perfection (2) were used. Their disc-like shape and absence of pubescence permitted good separation of the seeds into small, medium and large sizes (Table 1) by using metal screens with round perforations of 3, 4, and 5 mm, respectively, diameter.

Experiments were conducted in 1972 and 1973 in level fields equipped with sprinkler irrigation. The fine sandy loam soil was well supplied with organic matter from the incorporation of green manure crops of begger weed (Desmodium tortuosum). The soil had a pH of 6.5. Land preparation, seeding, and management of the transplants were in accordance with commercial practices for the central FL plant-growing area. The 3 treatments were replicated 4 times in randomized complete blocks. Singlerow plots 12.2 m long and 1.22 m wide were planted on February 15 in 1972, and February 16 in 1973. The date of first seedling emergence was recorded for each treatment and stand counts were made 14 days later. Height measurements of 20 typical plants in each replicate were taken 30, 45, 60, and 75 days after seeding. The data were subjected to analysis of variance, and mean differences were tested by Duncan's multiple range test (4).

Table 1. Distinguishing characteristics of small, medium, and large pimiento seed.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>diam</th>
<th>wt</th>
<th>No./kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>2.99</td>
<td>5.87</td>
<td>170,358</td>
</tr>
<tr>
<td>Medium</td>
<td>3.54</td>
<td>7.20</td>
<td>138,889</td>
</tr>
<tr>
<td>Large</td>
<td>4.19</td>
<td>8.08</td>
<td>123,763</td>
</tr>
</tbody>
</table>

2Average of 10 determinations of 20 seeds each.

Results and Discussion

Seedling emergence and plant stands. Compared to seedlings from medium and large seeds, those from small seeds emerged 2 days later and had a 10% lower stand (Table 2). Similar relationships occurred in the greenhouse but the time elapse was

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Table 2. Effect of seed size on time required for first seedling emergence and on plant stands.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Days from seeding to first seedling emergence</th>
<th>Percent stand of plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>18a&lt;sup&gt;2&lt;/sup&gt;</td>
<td>84a&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Medium</td>
<td>16b</td>
<td>93b</td>
</tr>
<tr>
<td>Large</td>
<td>16b</td>
<td>94b</td>
</tr>
</tbody>
</table>

<sup>2</sup>Within a column, means followed by different letters are significantly different by Duncan's multiple range test at the 5% level.

Plant growth. Young transplants from large seeds were a little taller than those from medium and small seeds at the end of 30 days after seeding (Fig. 1). This extra growth was thought to be caused by additional reserve food that was available in the large seeds prior to root development.

As the young seedlings in each treatment began to develop their root systems, differences in plant growth became more evident. Transplants from large seeds made a mean gain in growth of 6 cm between the 30 and 45-day periods after seeding; those from medium seeds gained 3 cm; and those from small seeds 2.5 cm. At the 60-day period plant growth from all seed sizes had taken place at a faster rate than during the previous 2 weeks, yet none had reached the harvest size. Transplants from both medium and large seeds attained their 22-23 cm height in 71 days. Transplants from small seeds had reached a mean height of 13 cm at this time and only 15 cm by the end of 75 days after seeding when the experiment was terminated. They would, therefore, be discarded at harvest due to their small size. Numerous observations made of plants of all sizes during their growth periods indicated a definite correlation between top growth and root development. This correlation is thought to account for the ultimate difference in transplant size at harvest.

Random samples taken from seed stocks used contained 15% small, 63% medium, and 22% large seeds. Our data suggest that small seeds result in poor stands of undersize transplants. It would be economical to grade out and discard seeds less than 3 mm in diameter to insure good stands of uniform transplants that reach marketable size at the same time.

**Literature Cited**