EFFECT OF SUNSHINE AND SHAPE OF FRUIT ON THE RATE OF RIPENING OF TOMATO FRUITS

The accompanying table (table I) shows high positive correlation between the number of sunshine hours and the number of days required for tomato fruits to reach full maturity after they had started to redden. This is surprising in view of the fact that light is not considered essential for the ripening processes of the tomato fruit. (1) The fruits are in fact ripened, by many commission merchants, in darkened rooms with or without the addition of ethylene. (2) DUGGAR found that heat and oxygen, but not light, were factors influencing the rate of color formation.

The results reported herewith were obtained in the Purdue greenhouses during the fall of 1927 and winter of 1928. Each plant was grown in a galvanized iron pot containing 40 pounds of rich loam soil. The plants were not allowed to become starved for any of the mineral elements nor to suffer from lack of moisture. The night temperature was regulated at approximately 60° F. and the day temperature at 70–75° F. The higher day temperature was maintained only on sunny days. Though the high correlations secured seem to indicate that a greater amount of sunshine may have been responsible, under the conditions of this experiment, for the more rapid ripening of the tomato fruits it is nevertheless possible that the higher temperatures may have been entirely responsible. It is, however,

* Published with the approval of the Dean of the School of Agriculture and the Director of the Agricultural Experiment Station of Purdue University.

1 DUGGAR, B. M. Lycopersicin, the red pigment of the tomato, and the effects of conditions upon its development. Washington Univ. Studies 1: 22–45. 1913.
<table>
<thead>
<tr>
<th>Variety</th>
<th>Number of fruits used</th>
<th>Coefficient of correlation</th>
<th>Mean shape of fruit</th>
<th>Number of days from pollination to ripeness</th>
<th>Mean weight (grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baltimore</td>
<td>75</td>
<td>-0.130 ± 0.077</td>
<td>1.41 ± 0.002</td>
<td>4.93 ± 0.12</td>
<td>66.3 ± 0.70</td>
</tr>
<tr>
<td>Marglobe</td>
<td>73</td>
<td>0.002 ± 0.079</td>
<td>1.32 ± 0.009</td>
<td>5.42 ± 0.13</td>
<td>64.6 ± 0.52</td>
</tr>
<tr>
<td>Red Pear</td>
<td>255</td>
<td>0.149 ± 0.041</td>
<td>0.76 ± 0.003</td>
<td>5.88 ± 0.09</td>
<td>56.0 ± 0.17</td>
</tr>
<tr>
<td>Ponderosa</td>
<td>42</td>
<td>-0.224 ± 0.098</td>
<td>1.50 ± 0.013</td>
<td>7.00 ± 0.21</td>
<td>63.7 ± 0.56</td>
</tr>
</tbody>
</table>
plausible that the greater amount of light favored the development of the red color of the tomatoes in this experiment as they were ripened on vines which were grown during the fall and winter under inadequate light conditions. DUGGAR did not test the effect of light on the rate of ripening of fruits that were still attached to the vines and although most of the fruits were grown in the greenhouse he does not state that light may have been a limiting factor for growth. Moreover the temperatures, 60–75° F., maintained during the Purdue tests were considered by DUGGAR as satisfactory for the formation of the red color of tomatoes.

There was no significant correlation between the shape

\[
\text{shape} = \frac{\text{equatorial diameter}}{\text{polar diameter}}
\]

of fruit and the rate of ripening as is shown in table II, although the tendency is for the rapid ripening of ovate fruits (Red Pear) and for the slower ripening of oblate fruits such as Baltimore and Ponderosa.

There seems to be some correlation between the weight of fruit and the number of days required for maturity although the Baltimore is a notable exception and the other data are not altogether significant.

The ovate fruit shape also seems to be correlated with the smaller fruits (\textit{i.e.}, those that weigh less) although the Marglobe fruits prove an exception to this rule. This agrees with the results secured by LINDSTROM\(^2\) in working with hybrids of ovate and oblate varieties of fruit.—C. L. BAKER and H. D. BROWN, Purdue University.

**TWO PLANT MATERIAL DRIERS**

*(WITH FOUR FIGURES)*

In the preparation of plant material for the study of enzyme content it sometimes becomes necessary to hasten the process of drying if one wishes to retain the enzymes as they are in the living plant. The drawings on another page show a drier adapted to the use of heat, and another to the use of sulphuric acid. In both, the ‘‘dead’’ air around the material is obviated, in one case by the use of a fan, and in the other by the movement of the material in a rotating basket.

In the first (fig. 1), warm air is forced directly over the material, and no ‘‘dead’’ air is allowed to retard the drying. Most plant leaves dry within four hours at a temperature of 42° C. Quiet unheated air requires about 24 to 36 hours for a less satisfactory drying. The walls are of beaver board one half inch apart. The cross partitions are of copper wire fly-screen. A longitudinal partition separates them at the middle, making six compartments in all.