The Influence of “Sweating” on Postharvest Decay of Blueberries

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ABSTRACT

No apparent increase in the rate of decay of uninoculated or artificially inoculated freshly harvested blueberries (Vaccinium corymbosum) resulted from condensed moisture (“sweating”) following cold storage. Dip-inoculations with Alternaria sp. resulted in a threefold increase in decay, whereas placing a Botrytis-rotted berry in the center of test pints did not result in significant increases in nesting and subsequent decay.

Previous studies have indicated that rapidly cooling freshly harvested blueberries to 2 C and storing them at cold temperatures in atmospheres enriched with carbon dioxide significantly reduced postharvest disease development (4,5). Because the major factor limiting shelf life of fresh blueberries is disease (1-3,6), the other half was kept dry by warm forced air, which raised the berry temperature to 21 C in 2.5 min. The berries were held at 21 C for 3-4 days and then all fruits were examined for decay. The number of pints per treatment ranged from four to 10 in a test. The data from each test were subjected to the Student’s t analysis.

In 1980, berries in one test were dip-inoculated with Alternaria sp. to see if significant decay differences between dry and sweated berries would occur with a high level of decay. Berries in four open-mesh plastic pint containers were each dipped in a 5 x 10^4 spores per milliliter suspension of Alternaria sp. for 1 min, drained, air-dried at room temperature for 4 hr, and refrigerated overnight at 2 C. In one 1981 test, a berry decayed by Botrytis cinera was placed in the center of each of five pints to determine if sweating increased nesting and subsequent decay.

RESULTS AND DISCUSSION
Under the conditions of our tests, no significant increase in the rate of decay resulted from sweating (Table 1). Similar results were obtained whether berries were stored overnight or for 4 days at 2 C. In all cases, visible condensate dissipated in 4-6 hr. In addition, sweating had little or no adverse effect on berry bloom.

In our early tests, berries were cold-stored for 4 days, but overnight cooling in later tests made them sufficiently cold for our purposes. Dip-inoculating the berries with Alternaria sp. resulted in a threefold increase in decay, but significantly, no increase in decay occurred in sweated as compared with dried berries. Placing a Botrytis-rotted berry in each pint did not materially increase nesting or result in any significant increase in decay.

Growers commonly store berries overnight at temperatures approximating 10 C. We simulated this practice in to our other treatments and obtained results consistent with those reported here.

These tests indicate that as far as decay is concerned, sweating played a relatively minor role. A more significant factor governing shelf life is the temperature at which blueberries are rapidly cooled and stored. Our work (4) and that of others (7).

Table 1. Decay incidence of fresh blueberries after cold storage at 2 C and subsequent holding for 3-4 days at 21 C

<table>
<thead>
<tr>
<th>Year</th>
<th>Tests (no.)</th>
<th>Cultivar</th>
<th>Exam. (no.)</th>
<th>Decay (%)</th>
<th>Dry berries</th>
<th>Exam. (no.)</th>
<th>Decay (%)</th>
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<tr>
<td>1979</td>
<td>2</td>
<td>Bluecrop</td>
<td>2,063</td>
<td>11.8</td>
<td>1,966</td>
<td>14.6</td>
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<td></td>
<td>2</td>
<td>Jersey</td>
<td>3,168</td>
<td>22.1</td>
<td>3,544</td>
<td>18.8</td>
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<tr>
<td>1980</td>
<td>1</td>
<td>Weymouth</td>
<td>1,662</td>
<td>9.0</td>
<td>1,784</td>
<td>7.9</td>
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<tr>
<td></td>
<td>1</td>
<td>Bluette</td>
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<td>12.3</td>
<td>2,051</td>
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<td>2</td>
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<td>10.4</td>
<td>2,482</td>
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<td>28.2</td>
<td>880</td>
<td>31.2</td>
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<td>1981</td>
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<td>21.0</td>
<td>1,195</td>
<td>23.5</td>
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<td>26.7</td>
<td>1,267</td>
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<td>15.0</td>
<td>2,399</td>
<td>17.7</td>
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</tr>
</tbody>
</table>

*No significant differences were found between decay means in any test, according to Student’s t analysis at P = 0.05.

†Berries cold-stored for 4 days.
‡Berries cold-stored overnight.
§Berries dip-inoculated with Alternaria sp.
¶Contains one Botrytis-decayed berry per pint.

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have demonstrated that shelf life can be greatly extended and excellent quality maintained by storing berries at 1–2 C.

LITERATURE CITED