DEPRESSION IN NUT SIZE AND WEIGHT
BY DOWNY SPOT DISEASE (Microstoma juglandis)

William W. Coates

ABSTRACT: Downy spot (Microstoma juglandis) was shown to depress walnut size and weight in infected ‘Chandler’ walnuts versus uninfected nuts. There was no apparent effect on kernel percentage or Kernel quality from downy spot infection.

OBJECTIVES:

Downy spot disease (Microstoma juglandis) of walnuts has been observed occasionally on walnut leaves and nuts during wet springs, however it was not believed to be an economic pest and no control measures have been tested. During the especially wet spring of 1995, a number of ‘Chandler’ orchards were observed to be infected with downy spot which was confirmed by laboratory analysis.

Symptoms were typical including white, angular blotches on the lower surface of leaves, light green raised areas on the upper surface of the leaves and light green raised areas on the surface of the nuts delimited by a blackened margin that in some cases might be confused with walnut blight (Xanthomonas campestris pv. juglandis).

The objectives of the trial were to document the effects of downy spot at harvest, on ‘Chandler’ nuts that were tagged in June.

PROCEDURES:

1. Thirty-five single infected nuts (5 per tree) and thirty-five healthy nuts (5 per tree) were tagged on June 26 in a ‘Chandler’ orchard north of Hollister. Ten pairs of nuts (both infected) and ten pairs (both healthy) were also tagged. Nut samples were collected on October 20, just prior to commercial harvest. All nuts were dried at a commercial dehydrator and then measurements were made for width, length, in-shell weight and kernel weight. Kernel percentage was calculated and visual quality ratings were made.

RESULTS:

Nut weight, kernel weight, percent kernel, nut width and nut length are shown in Table 1 for single healthy versus diseased nuts. Table 2 compares doubles with two healthy paired nuts versus two diseased paired nuts.

For both single nut and double nut comparisons, in-shell nut weight, kernel weight, nut width and nut length comparisons were all significant at the 1% level. Kernel percent was not significant in either test.

There were no significant differences in nut quality. Almost all nut samples were light (106/108) with occasional slight shrivel (6/108) typical of the ‘Chandler’ variety.

DISCUSSION:

Downy spot was shown to have a detrimental effect upon in-shell nut weight, kernel weight, nut width and nut length that was highly significant at the 1% level. Downy spot appears to be a potentially significant economic pest based upon the nut weight lost and reductions in nut size. The fact that quality and percent kernel are unaffected and that the disease does not penetrate past the hull may have obscured the damage noted in this study when compared to past observations.
### TABLE 1: WALNUT DOWNY SPOT - HEALTHY VERSUS DISEASED SINGLE NUTS

<table>
<thead>
<tr>
<th></th>
<th>In-shell weight(g)</th>
<th>Kernel weight(g)</th>
<th>% kernel</th>
<th>Nut width(mm)</th>
<th>Nut length(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy single nuts</td>
<td>12.4**</td>
<td>5.9**</td>
<td>47.6</td>
<td>32.9**</td>
<td>41.1**</td>
</tr>
<tr>
<td>Diseased single nuts</td>
<td>10.1**</td>
<td>4.8**</td>
<td>47.5</td>
<td>30.1**</td>
<td>37.5**</td>
</tr>
</tbody>
</table>

** significant difference at 1% level

### TABLE 2: WALNUT DOWNY SPOT - HEALTHY VERSUS DISEASED DOUBLE NUTS

<table>
<thead>
<tr>
<th></th>
<th>In-shell weight(g)</th>
<th>Kernel weight(g)</th>
<th>% kernel</th>
<th>Nut width(mm)</th>
<th>Nut length(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy double nuts</td>
<td>12.5**</td>
<td>5.9**</td>
<td>47.2</td>
<td>32.2**</td>
<td>41.9**</td>
</tr>
<tr>
<td>Diseased double nuts</td>
<td>9.2**</td>
<td>4.2**</td>
<td>45.7</td>
<td>29.3**</td>
<td>36.1**</td>
</tr>
</tbody>
</table>

** significant difference at the 1% level