The Newly Planted Tree: Living on the Edge

Gary Watson
TREE ESTABLISHMENT

Resumption of pre-transplant twig growth rate.

Gilman (1993): the time required for the tree to have regenerated enough roots to keep it alive without supplementary irrigation.
Compare every landscape situation to this
How much of the root system is in a root ball?

Root balls of trees up to 3-inch dbh contained 53%–100% of root biomass. 3- to 8-inch diameter retained 29%–83% of their root biomass.

5%–18% of the fine roots (<2 mm) are retained in the root ball.
Quality soil
## Root Growth and Backfill Type

<table>
<thead>
<tr>
<th>Backfill Type</th>
<th>Back fill</th>
<th>Site-soil</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unamended clay</td>
<td>7.3</td>
<td>3.2</td>
<td>0.44</td>
</tr>
<tr>
<td>Amended Clay</td>
<td>9.4</td>
<td>4.1</td>
<td>0.44</td>
</tr>
<tr>
<td>New Topsoil</td>
<td>7.4</td>
<td>3.8</td>
<td>0.51</td>
</tr>
</tbody>
</table>

One Year After Planting, 15 cm From the Root Ball, mm$^2$ SA/cc soil.
How long will it take for trees to establish after planting?
Can anything be done to speed up establishment?

- Fertilizer?
- Soil amendments?
- Soil Additives?
- Bigger root ball?
- Bare root?
Balled and Burlap

Bare Root

When Transplanted
After 8 weeks in Missourri Gravel Bed
After Year 1
After Year 5

Balled and Burlap

Bare Root

Transplanted
Year 1
Year 2
Year 3
Year 4
Year 5
The Burnley Method

Six factors were selected as being indicative of successful or poor establishment:

• whether trees had been planted too deeply (or too shallow)
• whether trees have trunk movement at or below the soil surface,
• damage to the trunk,
• trunk sunscald injury,
• presence of epicormic shoots on the trunk/branches
• whether there were co-dominant stems

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Table 2. Number of trees exhibiting the conditions used as criteria for tree establishment.

<table>
<thead>
<tr>
<th>Number of trees</th>
<th>Trunk Movement</th>
<th>Trunk Damage</th>
<th>Epicormic shoots</th>
<th>Sunscald</th>
<th>Codominance</th>
<th>Planted too deep</th>
</tr>
</thead>
<tbody>
<tr>
<td>510</td>
<td>214</td>
<td>42</td>
<td>61</td>
<td>64</td>
<td>25</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>41.96%</td>
<td>8.23%</td>
<td>11.96%</td>
<td>12.55%</td>
<td>4.9%</td>
<td>12.16%</td>
</tr>
</tbody>
</table>
Average tip extension of trees with and without trunk movement. The asterix indicates measurements with significant difference (p<0.05), using a two sample t-test.

<table>
<thead>
<tr>
<th>Species</th>
<th>Months after planting</th>
<th>Number of trees</th>
<th>No. of trees with trunk movement</th>
<th>Average tip extension of affected trees (mm)</th>
<th>Average tip extension of non-affected trees (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angophora costata</td>
<td>12</td>
<td>37</td>
<td>19</td>
<td>*44</td>
<td>67</td>
</tr>
<tr>
<td>Brachychiton acerifolia</td>
<td>44</td>
<td>10</td>
<td>8</td>
<td>1yr = 112</td>
<td>1yr = 72</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2yr = 119</td>
<td>2yr = 102</td>
</tr>
<tr>
<td>Celtis australis</td>
<td>12</td>
<td>28</td>
<td>16</td>
<td>104</td>
<td>81</td>
</tr>
<tr>
<td>Corymbia maculata</td>
<td>12</td>
<td>89</td>
<td>64</td>
<td>*39</td>
<td>52</td>
</tr>
<tr>
<td>Eucalyptus scoparia</td>
<td>12</td>
<td>17</td>
<td>9</td>
<td>104</td>
<td>84</td>
</tr>
<tr>
<td>Olea europaea</td>
<td>40</td>
<td>66</td>
<td>16</td>
<td>201</td>
<td>190</td>
</tr>
<tr>
<td>Platanus x acerifolia</td>
<td>12</td>
<td>40</td>
<td>10</td>
<td>126</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>38</td>
<td>7</td>
<td>*1yr = 219</td>
<td>1yr = 294</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*2yr = 259</td>
<td>2yr = 278</td>
</tr>
<tr>
<td>Pyrus calleryana</td>
<td>12</td>
<td>37</td>
<td>10</td>
<td>*15</td>
<td>34</td>
</tr>
</tbody>
</table>
CONCLUSION
For the field arborist, three practical criteria for street trees establishment:

• tip extension,
• percentage of canopy dieback
• trunk movement in the root ball

Provide useful data for management decisions

All three criteria can be easily and quickly applied and do not require specialist or expensive equipment.
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