Conifer Transplant Survival in Urban Forests

**Objective**

What is the effect of mulch and/or supplemental irrigation on the survival and growth rate of two transplanted shade tolerant conifer seedlings:

1. western red cedar (*Thuja plicata*)
2. western hemlock (*Tsuga heterophylla*)

**Background**

Native conifer trees in Puget Sound area urban forests are in decline. Logging in the late 1800’s lead to a paucity of conifers and conifer seed source. The native deciduous trees (bigleaf maple & alder) that replaced the conifers are nearing the end of their lifespan. At the same time, invasive plants in urban forests prevent new tree establishment. Because of these issues, little new natural conifer regeneration has occurred. This study examines ways to improve establishment success of two coniferous species (western red cedar and western hemlock) that are particularly difficult to get established in urban forest restoration.

**Methods**

- Study conducted at three urban forest parks on Mercer Island, WA
- Cleared each planting plots of all weeds (5’ diameter)
- 2 species: Bare-root western red cedar and western hemlock seedlings (500+ total)
- Four treatments planted in a randomized block design:
  - Bare ground (control)
  - 3’ ring of mulch (arborists woodchips) (4” deep)
  - Irrigation supplement (a cellulose based gel that slowly releases 1qt of water over a 3-month period)
  - Mulch + irrigation supplement
- Survival and Growth (height & diameter) monitored for two years

**Results**

<table>
<thead>
<tr>
<th>Survival:</th>
<th>average % survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mulched trees had a significantly higher survival rate than non-mulched trees (for both cedar and hemlock).</td>
<td>cedar</td>
</tr>
<tr>
<td>There was no significant difference in survival between plants with and without the irrigation supplement (IS)</td>
<td>51%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Growth:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>There was no significant difference in growth over the two year period for either the mulch or IS treatment.</td>
<td>34%</td>
</tr>
</tbody>
</table>

**Recommendations**

- Use mulch to increase the chances of survival.
- (Even more mulch may be better.)
- Don’t waste money on irrigation gels, they didn’t make a difference in this study.
- Neither mulch or IS increased tree growth, so if increased growth is your goal, try something else.

Thanks to: Amanda Stuckey, Kern Ewing, Soo-Hyung Kim, Paul West

Ben is currently pursuing a masters degree in Restoration Ecology with Dr. Kern Ewing. Additional research was part of this study. To find out more you may contact him at bmp4@u.washington.edu