HADDINGTON WOODS “SOUTHERN SPECIES” EXPERIMENT: COMPARISON (FEBRUARY 2016–NOVEMBER 2017) OF SOUTHERN TREE AND SHRUB GROWTH AND HEALTH IN AN URBAN SETTING

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Background

Climate change, one of the global environmental issues of greatest concern in modern times, is occurring at a faster rate than it has during any geological period of time in the past 65 million years (Smith, 2014). Cities are studying how to maintain urban forests by planting climate change adapted species which are tolerant of drought, variation in temperature, and pests (McPherson & Albers, 2014; Muffly, 2008; Filmer, 2016). Philadelphia Parks and Recreation (PPR) is studying how to maintain its urban forest in a changing climate at Haddington Woods where southern tree and shrub species with northern limits just south of Philadelphia were planted in a deer exclosure in the fall of 2015 and measured and evaluated in Feb. 2016, Sept. 2016, and Nov. 2017.

Methods

- Data collection in Nov. 2017 using same methods as previous surveys:
  - Height (trees & shrubs)
  - Caliper 6” from ground (trees)
  - Spread along x & y axis (shrubs)
  - Observation of health and surrounding debris & vines
  - Data entered into phillyforescience.com

Results and Discussion

Table 1 (left): Southern species selected for planting

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
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<tbody>
<tr>
<td>Cladrastis kentuckea</td>
<td>Yellowwood</td>
</tr>
<tr>
<td>Pinus taeda</td>
<td>Loblolly pine</td>
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<tr>
<td>Quercus falcata</td>
<td>Southern red oak</td>
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<tr>
<td>Callicarpa americana</td>
<td>Beautyberry</td>
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<tr>
<td>Calycanthus floridus</td>
<td>Carolina allspice</td>
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<tr>
<td>Fothergilla major</td>
<td>Witch-alder</td>
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<tr>
<td>Halesia carolina</td>
<td>Carolina silverbell</td>
</tr>
<tr>
<td>Hydrangea quercifolia</td>
<td>Oakleaf hydrangea</td>
</tr>
<tr>
<td>Itea virginica</td>
<td>Virginia sweetspire</td>
</tr>
<tr>
<td>Leucothoe fontanesiana</td>
<td>Drooping laurel</td>
</tr>
<tr>
<td>Morella cerifera</td>
<td>Southern bayberry</td>
</tr>
</tbody>
</table>

Figure 4 and 5 shows average growth of tree species

- Q. falcata was the only tree to experience average height decline
- All tree species’ average caliper increased

Figure 6 and 7 shows average growth of shrub species

- H. carolina, L. fontanesiana, and M. cerifera experienced average height decline
  - H. carolina decreased 9.7cm, L. fontanesiana declined 0.9cm, and M. cerifera declined 60.7 cm
  - minimal spread growth compared to other species, H. carolina only 7.6cm and M. cerifera with 8.36cm
- Highest average height growth was C. americana with 42.2 cm
- Highest average spread growth was C. floridus with 49.9 cm

Figure 8 shows mortality rates in plot with fallen tree (intentionally cut down)
- Fig. 9 shows mortality rates with fallen tree removed
- Highest mortality rates in Q. falcata, H. carolina, and M. cerifera

Conclusion and Recommendations

- Most specimens of southern tree and shrub species planted in the fall of 2015 have survived through Nov. 2017 with all three tree species showing an average increase in caliper and two of three species showing an average increase in height with
- The average height of five of eight shrub species increased and all shrub species showing an average increase in spread
- Continued annual measurement and evaluation are needed to determine suitability for widespread planting
- Recommendations include:
  - Addition of rain gauge at site to better understand rainfall inputs
  - Plant species identification training for maintenance crew to avoid unintentional damage of plants while clearing
  - Engage students and community members in ecological studies

Works Cited