Potential Allelopathy In Different Tree Species

by Dr. Kim D. Coder, Daniel B. Warnell School of Forest Resources, University of Georgia 4/99

Allelopathy is a significant tree health care issue. Allelopathy is the chemical modification of a site to facilitate better tree growth, and control ecological volume and essential resources. The proportion of allelopathy within each species’ interference effect is highly variable depending upon the site, species, and individual. The table below attempts to list trees in three broad categories of allelopathic effect: strong, moderate, and slight.

The table below has been prepared from the research literature to show relative and potential allelopathic effects of a given tree species. The relative ranking of species are based upon the completeness of the allelopathic literature, growth strategies of the species, species successional position, and conjecture of the author. At this point, not all the species listed have been shown to have measurable and demonstrable allelopathic effects in a landscape environment, but each one has been shown to have the chemical potential to be considered allelopathic.

Note that many organisms in a tree-filled landscape will have proven allelopathic impacts greater than most of the trees listed. Many grasses, perennials, and even some lichens can greatly modify the chemical ecology of the site.

Trees As Conveyors of Allelopathic Impacts

<table>
<thead>
<tr>
<th>Species</th>
<th>Pathway of Effect</th>
<th>Literature Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia spp.</td>
<td>rls</td>
<td>70</td>
</tr>
<tr>
<td>Acer saccharum</td>
<td>roots</td>
<td>29</td>
</tr>
<tr>
<td>Ailanthus altissima</td>
<td>rls</td>
<td>73,76,84,1,9,18,19</td>
</tr>
<tr>
<td>Celtis laevigata</td>
<td>rls</td>
<td>15,16</td>
</tr>
<tr>
<td>Celtis occidentalis</td>
<td>rls</td>
<td>58,14</td>
</tr>
<tr>
<td>Eucalyptus camaldulensis</td>
<td>volatile, litter</td>
<td>30</td>
</tr>
<tr>
<td>Eucalyptus globulus</td>
<td>fog drip, rls</td>
<td>31,32</td>
</tr>
<tr>
<td>Eucalyptus spp.</td>
<td>rls</td>
<td>68,79,71,72</td>
</tr>
<tr>
<td>Juglans cinerea</td>
<td>rls</td>
<td>21,22,23</td>
</tr>
<tr>
<td>Juglans nigra</td>
<td>rls</td>
<td>1,6,20,21,22,23,24,25,2</td>
</tr>
<tr>
<td>Leucaena spp.</td>
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<tr>
<td>Myrica cerifera</td>
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<td>87</td>
</tr>
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<td>Plant Name</td>
<td>Part(s)</td>
<td>Effect</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------</td>
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</tr>
<tr>
<td><em>Picea engelmannii</em></td>
<td>rls</td>
<td>6,32</td>
</tr>
<tr>
<td><em>Platanus occidentalis</em></td>
<td>rls, litter</td>
<td>13,14,58</td>
</tr>
<tr>
<td><em>Populus deltoides</em></td>
<td>rls</td>
<td>4,52,53,74</td>
</tr>
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<td><em>Prosopis juliflora</em></td>
<td>rls</td>
<td>78,79,85</td>
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<tr>
<td><em>Prunus cornuta</em></td>
<td>rls</td>
<td>81</td>
</tr>
<tr>
<td><em>Prunus serotina</em></td>
<td>leaf</td>
<td>33</td>
</tr>
<tr>
<td><em>Quercus falcata</em></td>
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<td>27,12</td>
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<tr>
<td><em>Quercus marilandica</em></td>
<td>rls</td>
<td>28</td>
</tr>
<tr>
<td><em>Quercus rubra</em></td>
<td>rls</td>
<td>58</td>
</tr>
<tr>
<td><em>Quercus stellata</em></td>
<td>rls</td>
<td>28</td>
</tr>
<tr>
<td><em>Robinia pseudoacacia</em></td>
<td>bark, roots</td>
<td>20,6</td>
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<tr>
<td><em>Sassafras albidum</em></td>
<td>rls</td>
<td>17</td>
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<tr>
<td><em>Ulmus americana</em></td>
<td>rls</td>
<td>58</td>
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**-Moderate Effect**

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Part(s)</th>
<th>Effect</th>
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<tbody>
<tr>
<td><em>Abies amabilis</em></td>
<td>rls</td>
<td>31,36</td>
</tr>
<tr>
<td><em>Abies balsamea</em></td>
<td>rls</td>
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</tr>
<tr>
<td><em>Abies grandis</em></td>
<td>rls</td>
<td>31,36</td>
</tr>
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<td><em>Acer circinatum</em></td>
<td>rls</td>
<td>31,36</td>
</tr>
<tr>
<td><em>Acer negundo</em></td>
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<td>37</td>
</tr>
<tr>
<td><em>Acer platanoides</em></td>
<td>leaf, root</td>
<td>37</td>
</tr>
<tr>
<td><em>Acer pseudoplatanus</em></td>
<td>leaf, root</td>
<td>38</td>
</tr>
<tr>
<td><em>Acer saccharinum</em></td>
<td>root</td>
<td>34,35</td>
</tr>
<tr>
<td><em>Aesculus glabra</em></td>
<td>seed or fruit, leaf</td>
<td>40</td>
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<tr>
<td><em>Aesculus octandra</em></td>
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<tr>
<td><em>Arbutus menziesii</em></td>
<td>stem</td>
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</tr>
<tr>
<td><em>Carya illinoensis</em></td>
<td>seed or fruit</td>
<td>42</td>
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<tr>
<td><em>Carya ovate</em></td>
<td>seed or fruit</td>
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<td><em>Corylus spp.</em></td>
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<tr>
<td><em>Crataegus spp.</em></td>
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<td><em>Fraxinus excelsior</em></td>
<td>root</td>
<td>37,39</td>
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<tr>
<td><em>Ginkgo biloba</em></td>
<td>seed or fruit</td>
<td>43</td>
</tr>
<tr>
<td><em>Gleditsia triacanthos</em></td>
<td>root</td>
<td>34,35</td>
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<tr>
<td><em>Juniperus monosperma</em></td>
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<td>36</td>
</tr>
<tr>
<td><em>Juniperus scopulorum</em></td>
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<td>rls</td>
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</tr>
<tr>
<td><em>Picea pungens</em></td>
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<td><em>Pinus banksiana</em></td>
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<tr>
<td><em>Pinus ponderosa</em></td>
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<tr>
<td>Plant Name</td>
<td>Part(s)</td>
<td>Effect</td>
</tr>
<tr>
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<tr>
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<td>Quercus douglasii</td>
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<td>Quercus gambelii</td>
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<td>67</td>
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<tr>
<td>Quercus michauxii</td>
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<td>Quercus shumardii</td>
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<tr>
<td>Rhododendron maximum</td>
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<td>Rhus copallina</td>
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<tr>
<td>Sorbus sitchensis</td>
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<tr>
<td>Tsuga canadensis</td>
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<td><strong>-Slight Effect</strong></td>
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<tr>
<td>Aesculus spp.</td>
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<tr>
<td>Betula pendula</td>
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<tr>
<td>Carpinus spp.</td>
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<td>Casuarina spp.</td>
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<td>Fagus spp.</td>
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<tr>
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<td>Populus tremula</td>
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<td>Pseudotsuga menziesii</td>
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<tr>
<td>Quercus petraea</td>
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<tr>
<td>Quercus robur</td>
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<td>Salix pellita</td>
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<tr>
<td>Sambucus racemosa</td>
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<tr>
<td>Sequoia sempervirens</td>
<td>fog drip, leaf</td>
<td>6,32</td>
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<tr>
<td>Taxus brevifolia</td>
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</tr>
<tr>
<td>Thuja plicata</td>
<td>litter</td>
<td>31,36</td>
</tr>
<tr>
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</tr>
<tr>
<td>Tilia cordata</td>
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<tr>
<td>Ulmus laevis</td>
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<td>Ulmus parvifolia</td>
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</tr>
<tr>
<td>Umbellularia californica</td>
<td>leaf, wood, seed or fruit</td>
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</tbody>
</table>
Notes for Table:
“rls” = Denotes root, leaf, and stem pathways.

“fog drip” = Occurs in specialized forest communities as a cause of foliage leaching

Pinus litter has an inhibiting effect on its own seed germination and seedling growth.
Old growth pine stands slow in growth rates partially due to an auto-toxic effect.

References for Table


Additional publications:

