Nordmann fir collections in Georgia
Turkish and Trojan fir in Turkey
Seed Orchards-Everywhere

Feb. 7, 2020

Chal Landgren, OSU Christmas Tree Specialist
With many participating
<table>
<thead>
<tr>
<th>Region:</th>
<th>Ambrolauri</th>
<th>Borshomi</th>
<th>Borshomi</th>
<th>Bakhmaro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection:</td>
<td>Okriba</td>
<td>Tadzrisi</td>
<td>Bakuriani</td>
<td>Bakhmaro</td>
</tr>
<tr>
<td>Altitude</td>
<td>1050-1250</td>
<td>1350-1800</td>
<td>1350-1800</td>
<td>1400-1950</td>
</tr>
<tr>
<td>Summer Temp. (F)</td>
<td>86</td>
<td>80</td>
<td>73</td>
<td>77</td>
</tr>
<tr>
<td>Av. Winter Temp.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. Winter Temp. (F)</td>
<td>0</td>
<td>-18</td>
<td>-24</td>
<td>-6</td>
</tr>
<tr>
<td>Precip.</td>
<td>76 in.</td>
<td>44 in.</td>
<td>44 in.</td>
<td>100 in.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
*Hardiest Selection |          |          |          |          |
* Fastest Selection |          |          |          |          |
<table>
<thead>
<tr>
<th>Regions</th>
<th>Ambrolauri</th>
<th>Borjomi</th>
<th>Bakhmaro</th>
<th>Beshumi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selections</td>
<td>Tlughi</td>
<td>Nikortsminda</td>
<td>Nedzvi</td>
<td>Tazrsi</td>
</tr>
<tr>
<td>Altitude above sea level</td>
<td>1050 – 1250</td>
<td>1200-1600</td>
<td>1100-1400</td>
<td>1350-1800</td>
</tr>
<tr>
<td>Av. Winter Temp. C°</td>
<td>-8 -4</td>
<td>-7 -3</td>
<td>-4 0</td>
<td>-8 -4</td>
</tr>
<tr>
<td>Max. Summer Temp C°</td>
<td>+30</td>
<td>+29</td>
<td>+32</td>
<td>+26</td>
</tr>
<tr>
<td>Min. Winter Temp C°</td>
<td>-18</td>
<td>-20</td>
<td>-22</td>
<td>-28</td>
</tr>
<tr>
<td>Precipitation (per year in mm)</td>
<td>1900</td>
<td>1750</td>
<td>750</td>
<td>1100</td>
</tr>
<tr>
<td>Sun shining (hours per year)</td>
<td>1950</td>
<td>1950</td>
<td>2150</td>
<td>2230</td>
</tr>
</tbody>
</table>
Nedzvi – National Park
ONLY YOU CAN SAVE THE FOREST FROM THE FIRE!
Scouting and fixing
Next year.. Good crop
Ambrolauri - Nikortsminda
Ambrolauri - Okriba
The plan

- 300 seedlings/tree
- 50 trees (families)/US test site
- 1500 seedlings / US test site (including a Nordmann, Fraser and Balsam standard)
- 10 test sites with 30 trees per family
- 8 families collected this Sept.
- 40 families collected in 2020
- 2 ports of entry
- Seedling sown in 2021
- Planting in 2023
Trojan and Turkish fir collections
CoFirGE-2010
It’s always time for tea and fungus
Well used forests
Collecting in parks and high elevations
Foliage difference in same area
2010 Seed sorting and germination
OCT. 2012
### Field Trial Design

<table>
<thead>
<tr>
<th>Regions</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests/Region</td>
<td>2</td>
</tr>
<tr>
<td>Blocks/Test/Region</td>
<td>30</td>
</tr>
<tr>
<td>Provenances</td>
<td>5</td>
</tr>
<tr>
<td>Families/Provenance</td>
<td>20</td>
</tr>
<tr>
<td>Trees/Family/Provenance/Block/Test/Region</td>
<td>1</td>
</tr>
</tbody>
</table>

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**30,000** Total Turkish & Trojan Fir Trees

3 Checklots: Fraser, Noble & Nordmann Fir

300 Seedlings/Checklot (30 Seedlings/Test)

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**900** Total Checklot Trees

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**30,900** Total Study Trees
Feb. 2013
Sorting and boxing
March 2013
Mapping the site
Now what?????
Evaluating Performance

- What is “Best”? 
  - Stand out characteristic(s) 
  - Strong needle retention 
  - Qualitative and Quantitative characteristics 
  - Beauty is relative and changes over time and with different evaluators
How we evaluated progeny

- Height- (taller is better)
- Quality- # of 1’s and 2’s in reps
- Top whorl branch count average (more is better)
- Color average (darker is best)
- Needle loss rating (2 or less)
- Complications- gopher and deer damage

- Did not worry about
  - Bud break
  - Winter damage

- My rank- 2019 Evaluation
  - 106
  - 80
  - 76
  - 67
  - 62
  - 78
  - 77
  - 79
  - 75
  - 65
  - 52
How to set up an orchard

• Start now!!
• Field or bench graft
• Progeny tests and/or pick great trees in your fields
• 1 species per orchard
• Mix it up
• Minimum of 15 families
• You will learn as you go
• It is easy to get overwhelmed
• Keep great records and mark trees
• You need space for picking, pollination
Capturing the best for the future

Types of seed orchards
- Totally private
- Co-op
- Growers Association - Volunteers
- Growers Association - Professionally Managed
- Public-Private partnership
Seed Production