National Elm Trial in Colorado

- Established: 2005
- Located in Fort Collins, CO on west side of Centre Drive just south of Prospect Street.
- Visitors are welcome anytime
- 19 cultivars of elms originally in trial
- Soil conditions are poor from heavy machinery compaction
- Irrigation consists of a drip system with two emitters 18 inches from stem
- Insects: European elm scale and woolly elm aphid
- Diseases: No biotic diseases but winter hardiness is an issue.
- Good cultivars: Homestead, Triumph, Red Tip, Commendation and Accolade. New Harmony is the only American elm to show some resistance to European elm scale.
- Unacceptable cultivars: based on scale damage or winter mortality: Emerald Sunshine, Pioneer, Patriot Lewis and Clark, Valley Forge, Princeton, and Lacebark
<table>
<thead>
<tr>
<th>Cultivar Number</th>
<th>Cultivar Name</th>
<th>Parentage</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Emerald Sunshine' or 'JFS Bieberich' (Originally 'Clone D')</td>
<td><em>U. propinqua</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>2</td>
<td>‘Princeton’</td>
<td><em>U. americana</em></td>
<td>Princeton Nurseries</td>
</tr>
<tr>
<td>3</td>
<td>‘Frontier’</td>
<td><em>U. carpinifolia X U. parvifolia</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>4</td>
<td>‘Homestead’</td>
<td><em>U. glabra X U. carpinifolia X U. pumila</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>5</td>
<td>‘Morton Glossy’ Triumph</td>
<td><em>U. pumila X U. japonica X U. wilsoniana</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>6</td>
<td>‘Morton Plainsman’ Vanguard</td>
<td><em>U. pumila X U. japonica</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>7</td>
<td>‘Morton Red Tip’ Danada Charm</td>
<td><em>U. japonica X U. wilsoniana</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>8</td>
<td>‘Morton Stalwart’ Commendation</td>
<td><em>U. carpinifolia X U. pumila X U. wilsoniana</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>9</td>
<td>‘Morton’ Accolade</td>
<td><em>U. japonica X U. wilsoniana</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>10</td>
<td>‘New Horizon’</td>
<td><em>U. pumila X U. japonica</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>11</td>
<td>‘Patriot’</td>
<td><em>(U. glabra X U. carpinifolia X U. pumila) X U. wilsoniana</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>12</td>
<td>‘Pioneer’</td>
<td><em>U. glabra X U. carpinifolia</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>13</td>
<td>‘Prospector’</td>
<td><em>U. wilsoniana</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>14</td>
<td>‘Valley Forge’</td>
<td><em>U. americana</em></td>
<td>J. Frank Schmidt &amp; Son Co</td>
</tr>
<tr>
<td>15</td>
<td>‘New Harmony’</td>
<td><em>U. americana</em></td>
<td>Princeton Nurseries</td>
</tr>
<tr>
<td>16</td>
<td>‘Jefferson’</td>
<td><em>U. americana</em></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>‘Prairie Expedition’</td>
<td><em>U. americana</em></td>
<td>Lee Nursery, Inc.</td>
</tr>
</tbody>
</table>
Athena® Classic Lacebark elms & Everclear® Lacebark elms planted May 2, 2007

Jefferson' and 'Lewis & Clark' Prairie Expedition™ American elms planted April 27, 2007

Additional irrigation bubblers installed by Calvin Bly & crew May 8, 2006

'Emer II' Allee replaced with 'Princeton' May 6, 2006

New Harmony Planted May 6, 2006

Trees Planted April 6, 2005

‘Emer II’ Allee replaced with ‘Princeton’ May 6, 2006

Additional irrigation bubblers installed by Calvin Bly & crew May 8, 2006

Jefferson’ and ‘Lewis & Clark’ Prairie Expedition™ American elms planted April 27, 2007

‘Athena’® Classic Lacebark elms & Everclear® Lacebark elms planted May 2, 2007

= DEAD tree as of September 13, 2007
National Elm Trial Contacts

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Table 1. Relative susceptibility of elm cultivars to elm leafminer (ELM), European elm flea weevil, European elm scale, and woolly elm aphid. Evaluations are summarized from observations made at the National Elm Trial study site in Fort Collins, CO. 2009-2014 by Dr. Whitney Cranshaw. Note: European elm flea weevil populations as of 2012-2014 were minimal and should not be a concern for choosing cultivars. Current ratings are listed under each cultivar on following pages.

<table>
<thead>
<tr>
<th>Elm Cultivar</th>
<th>ELM</th>
<th>European Elm Flea Weevil</th>
<th>European Elm Scale</th>
<th>Wooly Aphid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morton Stalwart Commendation</td>
<td>HS</td>
<td>HS</td>
<td>R</td>
<td>-</td>
</tr>
<tr>
<td>Morton Red Tip Danada Charm</td>
<td>HS</td>
<td>HS</td>
<td>HR</td>
<td>+</td>
</tr>
<tr>
<td>Homestead</td>
<td>HS</td>
<td>HS</td>
<td>S</td>
<td>+</td>
</tr>
<tr>
<td>New Horizon</td>
<td>HS</td>
<td>S</td>
<td>HS</td>
<td>+</td>
</tr>
<tr>
<td>Pioneer</td>
<td>S</td>
<td>MR</td>
<td>S</td>
<td>+</td>
</tr>
<tr>
<td>Morton Accolade</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>-</td>
</tr>
<tr>
<td>Morton Plainsman Vanguard</td>
<td>MR</td>
<td>HS</td>
<td>HS</td>
<td>-</td>
</tr>
<tr>
<td>Patriot</td>
<td>MR</td>
<td>S</td>
<td>HR</td>
<td>++</td>
</tr>
<tr>
<td>Frontier</td>
<td>MR</td>
<td>MR</td>
<td>HS</td>
<td>+</td>
</tr>
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<td>Prairie Expedition</td>
<td>MR</td>
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<td>Prospector</td>
<td>R</td>
<td>MR</td>
<td>HR</td>
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<td>R</td>
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<td>Morton Glossy Triumph</td>
<td>R</td>
<td>MR</td>
<td>R</td>
<td>+</td>
</tr>
<tr>
<td>New Harmony</td>
<td>R</td>
<td>MR</td>
<td>HR</td>
<td>+</td>
</tr>
<tr>
<td>Emerald Sunshine</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>-</td>
</tr>
</tbody>
</table>

Rating of leaf mining: elm leafminer and European elm flea weevil based on a 0-10 proportional scale: 0 = no leaf mines; 1 = 1-10% of leaves with mines; 2 = 11-20% of leaves with mines; 3 = 21-30% of leaves with mines; 4 = 31-40% of leaves with mines; 5 = 41-50% of leaves with mines; 6 = 51-60% of leaves with mines; 7 = 61-70% of leaves with mines; 8 = 71-80% of leaves with mines; 9 = 81-90% of leaves with mines; and 10 = 91-100% of leaves with mines.

Rating of shothole injury by European elm flea weevil based on counts of numbers of holes in 10 leaves on each cardinal point. S= susceptible, (rating 6,7), HS= highly susceptible (rating 8,9,10)

R= resistant (rating 4), MR= moderate resistance (rating 2,3), HR= highly resistant (rating 1)

European elm scale and *Eriosoma americanum* (woolly elm aphid) based on presence (+) or absence (-). Cultivars observed to be very heavily infested with European elm scale were ranked ++
‘Emerald Sunshine’ (*Ulmus propinqua*)

- Date: 5/20/2014
- Survival: 20% (100% Resprout)
- Diameter at 1.4m (cm): 0.8
- Height (m): 2.5
- Crown shape: Vase
- Crown width (m): 0.6
- European Elm Leaf Weevil: 20% crown affected
  - 5% leaf affected
- European Elm Scale: 0% crown affected
  - 0% branch surface affected
- Disease: None

‘Princeton’ (*Ulmus americana*)

- Date: 5/20/2014
- Survival: 100%
- Diameter at 1.4m (cm): 5.2
- Height (m): 5.3
- Crown shape: Vase
- Crown width (m): 1.3
- European Elm Leaf Weevil: 0% crown affected
- European Elm Scale: 38% crown affected
  - 16% branch surface affected
- Disease: None
‘Frontier’ (*Ulmus carpinifolia X U. parvifolia)*

- Date: 5/20/2014
- Survival: 40%
- Diameter at 1.4m (cm): 3.9
- Height (m): 3.3
- Crown shape: Vase
- Crown width (m): 1.5
- European Elm Leaf Weevil: 0% crown affected
- European Elm Scale: 0% crown affected
- Disease: None

‘Homestead’ (*U. glabra X U. carpinifolia X U. pumila)*

- Date: 5/20/2014
- Survival: 100%
- Diameter at 1.4m (cm): 6.5
- Height (m): 4.4
- Crown shape: Round and Vase
- Crown width (m): 2.2
- European Elm Leaf Weevil: 0% crown affected
- European Elm Scale: 0% crown affected
- Disease: None
‘Morton Glossy’ Triumph

\[ U. \textit{pumila} \times U. \textit{japonica} \times U. \textit{wilsoniana} \]

Date: 5/20/2014
Survival: 80%
Diameter at 1.4m (cm): 8.4
Height (m): 4.9
Crown shape: Vase
Crown width (m): 2.5
European Elm Leaf Weevil: 0% crown affected
0% leaf affected
European Elm Scale: 0% crown affected
0% branch surface affected
Disease: None

“Morton Plainsman” Vanguard

\[ U. \textit{pumila} \times U. \textit{japonica} \]

Date: 5/20/2014
Survival: 80%
Diameter at 1.4m (cm): 5.7
Height (m): 4.0
Crown shape: Pyramid, Round and Vase
Crown width (m): 2.4
European Elm Leaf Weevil: 0% crown affected
0% leaf affected
European Elm Scale: 0% crown affected
0% branch surface affected
Disease: None
‘Morton Red Tip’ Danada Charm™️ (*U. japonica X U. wilsoniana*)

- Date: 5/20/2014
- Survival: 80%
- Diameter at 1.4m (cm): 7.1
- Height (m): 4.4
- Crown shape: Pyramid, Round and Vase
- Crown width (m): 2.5
- European Elm Leaf Weevil: 0% crown affected
- 0% leaf affected
- European Elm Scale: 8% crown affected
- 3% branch surface affected
- Disease: None

‘Morton Stalwart’ Commendation™️ (*U. carpinifolia X U. pumila X U. wilsoniana*)

- Date: 5/20/2014
- Survival: 100%
- Diameter at 1.4m (cm): 6.0
- Height (m): 3.9
- Crown shape: Pyramid, Round and Vase
- Crown width (m): 2.2
- European Elm Leaf Weevil: 0% crown affected
- 0% leaf affected
- European Elm Scale: 0% crown affected
- 0% branch surface affected
- Disease: None
‘Morton’ Accolade ® *(U. japonica X U. wilsoniana)*

- **Date:** 5/20/2014
- **Survival:** 100%
- **Diameter at 1.4m (cm):** 5.9
- **Height (m):** 3.7
- **Crown shape:** Pyramid and Vase
- **Crown width (m):** 2.5
- **European Elm Leaf Weevil:** 0% crown affected
- **European Elm Scale:** 0% crown affected
- **Disease:** None

‘New Horizon’ *(U. pumila X U. japonica)*

- **Date:** 5/20/2014
- **Survival:** 40%
- **Diameter at 1.4m (cm):** 8.5
- **Height (m):** 5.7
- **Crown shape:** Vase
- **Crown width (m):** 3.3
- **European Elm Leaf Weevil:** 0% crown affected
- **European Elm Scale:** 45% crown affected
- **Disease:** None
‘Patriot’  
(U. glabra X U. carpinifolia X U. pumila) X U. wilsoniana

Date: 5/20/2014  
Survival: 60%  
Diameter at 1.4m (cm): 4.3  
Height (m): 4.6  
Crown shape: Oval and Vase  
Crown width (m): 1.7  
European Elm Leaf Weevil: 0% crown affected  
0% leaf affected  
European Elm Scale: 58% crown affected  
40% branch surface affected  
Disease: None

‘Pioneer’  
(U. glabra X U. carpinifolia)

Date: 5/20/2014  
Survival: 100%  
Diameter at 1.4m (cm): 8.3  
Height (m): 4.7  
Crown shape: Round and Vase  
Crown width (m): 2.4  
European Elm Leaf Weevil: 0% crown affected  
0% leaf affected  
European Elm Scale: 32% crown affected  
10% branch surface affected  
Disease: None
‘Prospector’ (*U. wilsoniana*)

- Date: 5/20/2014
- Survival: 100%
- Diameter at 1.4m (cm): 5.7
- Height (m): 3.6
- Crown shape: Oval, Pyramid and Vase
- Crown width (m): 2.3
- European Elm Leaf Weevil: 0% crown affected
- European Elm Scale: 0% crown affected
- Disease: None

‘Valley Forge’ (*U. americana*)

- Date: 5/20/2014
- Survival: 60%
- Diameter at 1.4m (cm): 5.7
- Height (m): 4.8
- Crown shape: Oval, Pyramid and Vase
- Crown width (m): 3.0
- European Elm Leaf Weevil: 0% crown affected
- European Elm Scale: 98% crown affected
- Disease: None
‘New Harmony’ (*U. americana*)

Date: 5/20/2014  
Survival: 100%  
Diameter at 1.4m (cm): 5.2  
Height (m): 4.5  
Crown shape: Round and Vase  
Crown width (m): 1.7  
European Elm Leaf Weevil: 0% crown affected  
0% leaf affected  
European Elm Scale: 18% crown affected  
5% branch surface affected  
Disease: None

‘Jefferson’ (*U. americana*)

Jefferson was found to be the same cultivar as Princeton

Date: 5/20/2014  
Survival: 20%  
Diameter at 1.4m (cm): 2.1  
Height (m): 4.72  
Crown shape: Vase  
Crown width (m): 0.3  
European Elm Leaf Weevil: 0% crown affected  
0% leaf affected  
European Elm Scale: 0% crown affected  
0% branch surface affected  
Disease: None
‘Lewis and Clark’ Prairie Expedition®

(U.americana)

Date: 5/20/2014
Survival: 100%
Diameter at 1.4m (cm): 4.1
Height (m): 3.3
Crown shape: Oval, Pyramid and Vase
Crown width (m): 1.7
European Elm Leaf Weevil: 0% crown affected
European Elm Scale: 98% crown affected
Disease: None

‘Athena Classic’ Lacebark Elm (U. parvifolia)

Date: 5/20/2014
Survival: 0%
Diameter at 1.4m (cm): NA
Height (m): NA
Crown shape: NA
Crown width (m): NA
European Elm Leaf Weevil: NA
European Elm Scale: NA
Disease: None

No Picture Available
‘Everclear’ Lacebark Elm (*U. parvifolia*)

Date: 5/20/2014
Survival: 0%
Diameter at 1.4m (cm): NA
Height (m): NA
Crown shape: NA
Crown width (m): NA
European Elm Leaf Weevil: 0% crown affected
0% leaf affected
European Elm Scale: 0% crown
0% leaf affected
Disease: None

Winter kill and scale
European elm scale images
Fort Collins Elm Trial Planting in 2005
Trees in 2007
Pruning