American Chestnut and Eastern Forest Wildlife communities

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History

- Tree species ancient

- Plant communities recent
  - Last glacial max – 20,000 years b.p.
  - 6,000-9,000 years b.p. – modern community

- Repeated glaciations last 1.5-2.0 million years
  - last 4 centuries – unprecedented change.
Eastern Deciduous Forest and Range of American Chestnut
Most Common and Widespread Genera

- Mast Producers:
  - Quercus – Oaks
  - Fagus – Beech
  - Carya – Hickory
  - Castanea – Chestnut

- Acer – Maple
- Tilia – Basswood
- Fraxinus – Ash
- Ulmus – Elm
- Betula – Birch
- Liriodendron – Yellow poplar
Foundation Species:

- Locally abundant and regionally common, and by their structure or functional attributes they can define ecological communities.
White Oak Loaded with Acorns
Wildlife Abundance and Diversity
Old Hunting Journals
Large predators were abundant
Passenger Pigeon
Quantity of Mast Production

- 1.1 Billion passenger pigeons
- 8,712,000 bushels of mast per day!
- Beech, acorns, and chestnuts from autumn through early spring
Chestnut Productivity

- American Chestnut – most consistent and prolific mast producer
- 1919 Agriculture Census – Patrick County, Va. sold 160,000 pounds of chestnuts
- 5-county area – 360,000 pounds of chestnuts; about half of Virginia’s nut crop.

• GINORMOUS!
<table>
<thead>
<tr>
<th>Character</th>
<th>American beech</th>
<th>Red Oak subgenera</th>
<th>White Oak subgenera</th>
<th>American chestnut</th>
<th>Hickory spp.</th>
<th>Walnut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flower Seed</td>
<td>Apr-May</td>
<td>Apr-May 2011</td>
<td>Apr-May</td>
<td>Jun-Jul</td>
<td>Apr-May</td>
<td>May-Jun</td>
</tr>
<tr>
<td>Germinate</td>
<td>Spring</td>
<td>Spring</td>
<td>Immediately</td>
<td>Spring</td>
<td>Spring</td>
<td>Spring</td>
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<tr>
<td>Good crops</td>
<td>2-3 yr irregular</td>
<td>2-3 yr</td>
<td>4-10 yr</td>
<td>1 yr</td>
<td>1-3 yr</td>
<td>2-3 yr irregular</td>
</tr>
<tr>
<td>Digestibility</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Calories</td>
<td>High</td>
<td>Intermediate</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Protein</td>
<td>High 22%</td>
<td>Low 5-8%</td>
<td>Low 5-8%</td>
<td>Low 6%</td>
<td>High &gt;20%</td>
<td>High &gt;20%</td>
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<tr>
<td>Fat</td>
<td>High 50%</td>
<td>High 14-23%</td>
<td>Low 3-9%</td>
<td>Low 3%</td>
<td>High &gt;20%</td>
<td>High &gt;20%</td>
</tr>
<tr>
<td>Carbs</td>
<td>Low</td>
<td>High 37-46%</td>
<td>High 37-46%</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Tannins</td>
<td>0</td>
<td>High 5-13%</td>
<td>Low 1-3%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Healthy Beech Trees
Patterns of Mast Production
Fig. 1. Mean annual acorn production per m$^2$ of crown area from thinned and unthinned treatments of a central Massachusetts oak stand, 1986 through 1996. Each treatment had 60 sample trees.
Individual Variation

Fig. 2. Year-to-year patterns of mean annual production (acorns/m² of crown area) for groups of good, fair, and poor producers. Production classes are defined in Fig. 3.
W.Va. Index of Acorn Production
W.Va Index of All Mast Species