A COST EFFECTIVE ANALYSIS OF CONTROLLING INVASIVE AMUR CORKTREE

By: Landon Neumann, Cole Jones, and Nic Seaman
Amur corktree (*Philodendron amurense*)

Photo Credit: Missouri Botanical Garden

MSU Extension

massaudubon.org
AMUR CORKTREE
ID

- Grows to 40 feet tall, reaches 50 feet wide
- Distinct blocky and corky bark
  - Gray in mature corktree/golden tan in younger saplings
- Pinnately compound leaves
- Bright yellow cambium layer
  - Most effective identifier

Mature corktree bark

Younger corktree bark/ yellow cambium
WHY ARE THEY SO INVASIVE?

● Corktree regenerates vigorously in high disturbance and is highly shade intolerant.
  ○ It regenerates well in burns, open fields, etc.

● Produces a large number of seeds that can be dispersed by gravity or by birds.

● Seeds remain viable for more than two years in the soil.

● It tolerates a range of soil conditions, pH, drought, and pollution.

● It is widely planted as an ornamental.
WHERE DID THEY ORIGINATE?

- Native to NE China, Russia, and Hokkaido Japan.
- Brought to Harvard University Arnold Arboretum in 1906.
- Naturalized in New York Botanical gardens by 1933.
- Currently found in Illinois, Indiana, Michigan, Missouri, Wisconsin, New York, Pennsylvania, Virginia, and Massachusetts.
- Well established in New York parks as an ornamental species presently.
EDDMapS Distribution:

This map is incomplete and is based only on current site and county level reports made by experts and records obtained from USDA Plants Database. For more information, visit www.eddmaps.org

Amur corktree (Phellodendron amurense)

OUR OBJECTIVE

- To determine which of the three methods currently being utilized by the Indiana Department of Natural Resources is the most effective and cost efficient.
OUR HYPOTHESIS

- Hack and squirt will be the most effective treatment.
- Girdling using the machete, or the hack method, will be the cheapest option.
METHODS
STUDY AREA
HACK TREATMENT

Equipment Used

- Brush clearing machete
BASAL SPRAY TREATMENT

Equipment Used

- Herbicide resistant spray bottle
- Nitrile Gloves
- Basal Spray (Triclopyr – 20%, Imazapyr – 5%, Super Marking Dye)
HACK AND SQUIRT TREATMENTS

Equipment Used

- Herbicide resistant spray bottle
- Nitrile Gloves
- Brush Thinner Machete
- PATHWAY Herbicide
RESULTS
## RESULTS – REMOVAL

<table>
<thead>
<tr>
<th>Removal Method</th>
<th>Number of Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hack</td>
<td>20</td>
</tr>
<tr>
<td>Basal Spray</td>
<td>20</td>
</tr>
<tr>
<td>Hack and Squirt</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>60</strong></td>
</tr>
</tbody>
</table>
CRITERIA FOR DETERMINING DEAD/ALIVE
RESULTS - HACK

The diagram shows the percentage of outcomes labeled as 'Dead' and 'Alive'. The percentage for 'Dead' is higher than that for 'Alive'.
RESULTS - BASAL SPRAY

![Bar graph showing the percentage of outcomes for Basal Spray]

- **Dead**: Percentage around 0.4
- **Alive**: Percentage around 0.7
RESULTS - HACK AND SQUIRT

The graph illustrates the percentage of outcomes for Hack and Squirt. The majority of outcomes are 'Dead'.
## RESULTS - COSTS

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
<th>Total Cost/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brush thinner</td>
<td>$46</td>
<td>$80.25</td>
</tr>
<tr>
<td>machete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herbicide resistant</td>
<td>$25.50</td>
<td></td>
</tr>
<tr>
<td>spray bottle x3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrile Gloves (1000)</td>
<td>$8.75</td>
<td></td>
</tr>
<tr>
<td><strong>Labor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor Hours</td>
<td>$18/acre</td>
<td>$18</td>
</tr>
<tr>
<td><strong>Herbicide Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PATHWAY</td>
<td>$50.70/Gallon</td>
<td>$50.70</td>
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<tr>
<td>Basal Spray</td>
<td></td>
<td>$37.23</td>
</tr>
<tr>
<td>Triclopyr – 20%</td>
<td>$28</td>
<td></td>
</tr>
<tr>
<td>Imazapyr – 5%</td>
<td>$8.48</td>
<td></td>
</tr>
<tr>
<td>Super Marking Dye</td>
<td>$0.75/oz</td>
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</table>
## RESULTS - TREATMENT COSTS

<table>
<thead>
<tr>
<th>Removal Method</th>
<th>Total Cost/Acre</th>
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</thead>
<tbody>
<tr>
<td>Hack</td>
<td>$64</td>
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<tr>
<td>Basal Spray</td>
<td>$153.48</td>
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<tr>
<td>Hack and Squirt</td>
<td>$166.95</td>
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</tbody>
</table>
DISCUSSION

- The hack and squirt treatment was the most effective treatment, although the hack treatment was more cost effective and only slightly less successful.
  - Omitting herbicide from the treatment can save the landowner $102.95/acre

- Combat the spread of Amur corktree with sound forest management strategies
  - Reducing disturbances can reduce the spread
  - Monitoring openings and edges for new corktree seedlings
ALTERNATIVE METHODS

- Hand tools are not the most efficient tools for the job
  - Chainsaws may be far more efficient for heavier infestations

- Further research/testing should be done on other invasive control methods
  - Cut stump treatment
  - Foliar application
  - Girdling
  - Prescribed fire
REFERENCES


QUESTIONS?