Amur Cork Tree and Lesser celandine in Wisconsin: inventory, outreach and control efforts, 2015-18.

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NR 40: WI’s Invasive Species Law

• Restricted Species – widely established
  • Cannot transport, transfer or introduce
  • Examples: garlic mustard, honeysuckles, buckthorn, barberry.

• Prohibited Species – new and not widely established
  • Cannot possess, transport, transfer or introduce
  • Examples: Amur cork tree and lesser celandine.
  • Split-listed – Prohibited and Restricted in different counties.

• DNR Suppression grants – help landowners come into compliance with NR 40. ~$25,000 annually.
Outline

Part 1: Lesser celandine *Ranunculus ficaria*
• Identification and Biology
• Introduction into Wisconsin
• Inventory
• Outreach
• Control

Part 2: Amur cork tree *Phellodendron amurense*
• Identification and Biology
• Introduction into Wisconsin
• Inventory
• Outreach
• Control
ID and biology of lesser celandine

- Underground tubers
- Bulbils
- Fleshy leaves, yellow flowers in April; plants gone in June.
Range of Lesser Celandine (*Ficaria verna*)

- *(syn. *Ranunculus ficaria*)

- **Native Range**: central Europe, North Africa and western Asia.
- **Native ecosystems**: seasonally wet or flooded, in both shaded woodlands and open areas.
- **Introduced Range**: Australia, New Zealand, Japan, Europe, North America.
- **Non-native ecosystems**: (un)disturbed moist deciduous forest, horticultural plantings, drainage and riparian zones.
Ecological Impacts as an invasive species

- Forms dense monospecific stands where introduced.
- Excludes or reduces native and non-native plant populations.
Ecological impacts

• Lesser celandine excludes most other vegetation including tree seedlings.
• With its short growing season, bare ground most of the year.
• Soil run-off can degrade water quality and contribute to algal blooms.
Spread in U. S.

- First reported in 1867 from Pennsylvania.
- Probably introduced as an ornamental.
- Now found in 26 states (principally NE ¼ of U. S. and Pacific NW).
- 79% of U. S. suitable for establishment*.
- 95+% of Upper Midwest suitable for establishment*.
- Listed as banned, prohibited or noxious weed in a few states, but still sold (rarely) as ornamental despite USDA classification as “High Risk*”.

*USDA Weed Risk Assessment for *Ficaria verna* Huds. (Ranunculaceae)-Fig buttercup (2015).
Arrival in Wisconsin

- When? Within the past 20 years or more.
- Where? Mostly urban areas in southeastern Wisconsin
- 5 Counties: Dane, Kenosha, Milwaukee, Racine, and Walworth.

Found in riparian zones, forests and yard plantings.
Inventory – a multi-prong approach

- Reports to WDNR – online, email, verbal
- Follow up on herbarium records
- Involve local cooperators – take local reports
- Letter to landowners asking for reports.
- Media communications
- Presentations to target audiences.
- Aerial survey – experimental, May 2018
- Verify reports.
Inventory in Walworth Co.

• In 2016 and 2017, visited the 3 sites documented as herbarium specimens a decade ago. Plant gone from one site.
• Found N of lake along Snake Rd.
• Roadside survey, so full extent unknown; but largest
2018 Aerial Survey – lesser celandine

- Flew L. G. & 5 river corridors (77.8 miles) in 3 hours (May 8).
- LC Shows up as lime green.
- Surveyed Fox & Des Plaines Rivers, 1\textsuperscript{st} time.
- No new populations found.
- Works for larger pops.
- Timing is important.
Inventory Results (n=no. of properties)

- Total: n=>207 properties (single plants – acres)
- Dane (n=2)
- Milwaukee (n=16)
- Racine (n=3)
- Kenosha (n=2)
- **Walworth (n≥184) concentrated around Lake Geneva.**
Control Efforts (no. treated/ no. of properties)

- Dane (2/2; private funding)
- Milwaukee (15/16; DNR and GLRI grants)
- Racine (2/3; DNR and GLRI grants)
- Kenosha (2/2; DNR and GLRI grants)
- Walworth (16/\geq 184; small SEWISC grant and private funding); individual initiatives.
Milwaukee River – large population

- **First treatment**: 22 April 2016. Aquaneat (a.i. glyphosate) at 2 oz./gallon with surfactant at 1 oz./gallon of water. 40-55 degrees F. Mixed results.

- 2016 results: 90-95% die-back. Warmer temperatures, more growth exposed to herbicide. Higher herbicide concentration used.

- 2017 results: good control.

- 2018 results: good control. Harder to find under reed canary grass.

- **NOT visible during 2018 aerial survey.**
## Treatments of Milwaukee River pop.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. treatments</th>
<th>Treatment Acreage</th>
<th>Treatment Cost ($)</th>
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<tr>
<td>2016</td>
<td>2</td>
<td>3.25</td>
<td>2400</td>
</tr>
<tr>
<td>2017</td>
<td>3</td>
<td>2.2</td>
<td>1900</td>
</tr>
<tr>
<td>2018</td>
<td>2</td>
<td>2.2</td>
<td>1900</td>
</tr>
<tr>
<td>2019</td>
<td>-</td>
<td>-</td>
<td>1900 (estimate)</td>
</tr>
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</table>
Planned activities for 2019

• Continue control treatments in all counties.
• Dane – contractor continues work with clients.
• Great Lakes Basin:
  • Milwaukee – with GLRI funding.
  • Racine – with GLRI funding.
  • Kenosha – with GLRI funding.
• Walworth – establishing a cost-share arrangement with landowners with funding from U. S. Forest Service and DNR.
Don’t move lesser celandine

- Prohibited by law (NR 40) to transport, exchange, possess, or introduce lesser celandine.
- Known only from urban areas away from forestry.
- Spread by moving soil around Lake Geneva.
- Not sold anymore. No nursery inspection reports.
- Big concern: homeowners will transplant lesser celandine to non-urban forests.
Part 2: Amur cork tree

- Identification.

spreads aggressively
Range of Amur cork tree

• Native range: Eastern China, Manchuria.
• Introduced into U. S. in 1856.
• Now found in eastern Canada; 15+ eastern and midwestern U. S. states.
Amur cork tree in Wisconsin – 8 counties
Amur cork tree in Columbia Co.

Started here w/ 11 trees?
DNR’s MacKenzie Center, Columbia Co.

- Eleven Amur cork trees planted in 1941 or earlier.
- Now ~3000 ACT on the property.
- Has spread to at least 3 neighboring properties.
- Spread as far as 3.5 miles to state natural area.
Outreach and inventory

- Mailings to landowners in Adams, Columbia and Dunn Cos.
- Good response in Adams and Dunn Cos., NGOs or individual as contacts.
- Low response in Columbia Co., DNR as contact.
Additional Inventory planned

• Aerial survey next week in Adams, Columbia and Dunn Cos.
  ACT has bright yellow, pinnately compound leaves.
• Following up on reports in 5 other counties with site visits.
Control of Amur cork tree

• Control started in three largest known populations with cut-stump and basal bark treatments.
  • Adams (DNR and USFS grants)
  • Columbia (DNR and USFS grants)
  • Dunn (DNR grants)
Future and ongoing activities

• Continued control in Adams, Columbia and Dunn Cos.
• Continued outreach to landowners in these 3 counties.
• Additional control work will start in Adams Co. with Pittman-Robertson funding.
• Continue outreach and inventory.
• Study dispersal of ACT from MacKenzie Center in Columbia Co.
Dispersal study during control work.

- Measure age of controlled trees (growth rings) at MacKenzie.
- Measure distance from original planting of 11 trees.
- Create polygons of different aged trees to infer spread and direction of spread over time.
Thank you for your attention!

Questions?

Dane County

• Local contractor working with two clients to eradicate small populations from their yards.
Milwaukee County

- Found in yards, forested nature centers, roadside ditch, stream and river banks.
- **Fox Point, Greendale, Milwaukee, Franklin, Wauwatosa.**
- Outreach to land owners alerting them of lesser celandine and control measures.
- Many complied with control work.
Racine County

• Control work in Racine’s Colonial Park.
• 4.5 acres successfully treated in 2017
• Follow-up treatment done in 2018
• Private properties treated, too.
Kenosha County

• Found in 2017 in UW – Parkside natural area.
• Treated in 2018.
• One private property, too.
Walworth County - 2018

• Outreach started in 2018. Letters to landowners, press releases, presentations.
• Secured US Forest Service grant for 2019-2021 treatments.
Walworth County situation

• Found both north and south of the lake.
• Confirmed on 184 properties.
• 2018: reported treatments: 13 herbicided; 2 dug; 1 hand-pulled.
• Grant from SEWISC; private funding in 2018.
Control efforts in Milwaukee Co. Park

2011 - Found at Wehr Nature Center, Franklin, WI
2011-2014 - Treated dense areas with 5% *glyphosate* before flowering. Results were mixed. Dense areas contained and somewhat reduced.
2015-2016 - Controlled satellite populations near lake and stream to Root River.
2017 – Effective control, collateral damage to trees with imazapyr.
2018 – Treated again.