Making Girdling Work

by Cliff Tyllick
Organizer, Keep Walnut Creek Wild

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Definitions

- **Girdling**: Removing all layers of tissue that carry nutrients from the leaves to the root system.
- **Success**: With only minimal follow-up, 100 percent of the invasive trees we girdle die.
- **Botanical physiologist**: Not Cliff.*

* So don’t try to pass a botany exam based on this information.
Basic Anatomy of *Ligustrum lucidum*

The Lecture
Part I. The 4 Layers of the Trunk
Layer 1: Bark

1. Bark

Basic Anatomy of L. lucidum
Layer 2: Phloem

1. Bark
2. Phloem
Layer 3: Cambium

1. Bark
2. Phloem
3. Cambium
Layer 4: Xylem

1. Bark
2. Phloem
3. Cambium
4. Xylem

Basic Anatomy of L. lucidum
Part II: The Parts of the Tree
Part II: The 3 Parts of the Tree
Very Basically:

1. Top
2. Trunk
3. Roots
The Top Does Photosynthesis

\[ H_2O + CO_2 \rightarrow \text{Sugars} + O_2 \]

Sugars = Food;
Building Blocks
(for everything)
The Trunk Transports

Phloem: Carries sugar *up* and *down*

Xylem: Carries water *up*
The Roots Supply Water!

*Remember:*

\[ H_2O + CO_2 \rightarrow Sugars + O_2 \]

No Water, No Sugar;
No Sugar, No New Wood
The Theory of Girdling

More Lecture
To Kill a Tree, All Agree:

• Remove all layers of tissue that carry nutrients from the leaves to the roots.
• This means:
  • Bark (because it’s in the way)
  • Phloem
  • Cambium (it can make new phloem)
How Girdling Kills the Tree:

1. The roots get no new sugar.
2. The roots use up their reserves.
3. The roots die of starvation.
4. Then the top gets no water.
5. So the top dies.
Girdling in Practice

The Lab
The Keys to Success

1. Remove the phloem.

2. Remove the cambium.

3. Make sure you removed the phloem and the cambium.

4. Come back later to check again.
How to Girdle a Tree:

1. Cut two rings through the bark, down to the xylem.

2. Peel away the bark and phloem.

3. Using soapy water, scrub away residual phloem and cambium.

4. Do a final scrub with rubbing alcohol.
1. Cut two rings:

- Make them about a hand’s width apart.
- Be sure to cut all the way down to xylem.
- Tool used: Ringer, from IRL Supplies.
2. Peel everything from the xylem:

- Tool used: half-chisel putty scraper.
- Deep enough when both sides are smooth and shiny:
  - Inner surface of phloem.
  - Outer surface of xylem.
**Question:** Why peel?

- A single pass with a Ringer is too narrow. The tree will bridge it.
- Multiple passes still need to be cleaned. Smooth surfaces of peeled trunks are easier to clean.
3 & 4. Scrub the xylem clean:

- Tool used: [Scotchbrite scouring pad](https://en.wikipedia.org/wiki/Scotchbrite).
- Scrub twice:
  - first with soapy water
  - then with rubbing alcohol
What does clean sapwood look like?

- Soapy Water
- Rubbing alcohol
- Both
How to Make Girdling Fail:
1. Leave phloem in place.
2. Leave cambium in place.
3. Assume the tool works perfectly.
4. Don’t come back for a year.
Slicing bark away leaves phloem in place:

The tool doesn’t matter:

- Carpet knife
- Draw knife
- Hatchet
- Machete

Girdling in Practice
Residual phloem is often a bridge (and will heal):

- This exposed sapwood *might* not heal
- But this vertical sliver of phloem is a bridge
- And this “white wood” is a bridge of phloem
The Ringer can miss phloem:

- Creates circumferential cuts easily and quickly
- But doesn’t always get deep enough,
- Rarely gets wide enough,
- And can smear phloem around the girdle
Chainsaws aren’t the answer:

- He **removed too much xylem.** Less water will flow to the top, so more water will be available below the girdle. Sprouts will thrive.

- He **left a connection.** This lower girdle is useless.
The flip side of our chainsaw failure:

- **2 rings did not help:** On this side of the trunk, the top ring is too shallow...

- **And too narrow:** The cut is only the width of the chainsaw blade. New phloem will bridge it quickly.

- **Here he also cut too shallow:** Phloem is still in place, bridging this gap.
Chisels fail, too:

- White = phloem
- Cambium discolors in minutes when exposed to air
82 Days after Girdling by Chisel

“Peninsula” of new bark has formed over residual phloem.

New bark formed over residual phloem, which was left by the slicing action of the chisel.
Bottom Line: Clean Up, Follow Up

• Clean phloem and cambium from the gap.
  • At least scrub with rubbing alcohol.
  • For extra confidence, do a first scrub with soapy water.

• Check for recovery periodically.
  • New tissue bridging the gap.
  • Vigorously growing basal sprouts (*slides 31–33 in next section, “More Worth Knowing”).*
More Worth Knowing

Bonus Points
Basal sprouts will grow:

- Almost every girdled tree produces new sprouts below the gap.
- Reason why: Phloem carries hormones that suppress sprouting from treetop to base.
If gap remains, sprouts wither:

**Cliff’s Hypothesis:**
- Top draws all water that roots can absorb.
- So shoots do no photosynthesis.
- Starving roots have no sugar to spare.
If gap closes, sprouts thrive:

• Tissue grows in from top at ~0.5 in./year—fast enough to close a narrow gap.
• Bridging allows new sugar from top to feed growth below girdle.
Bark grows in from only the top:

- And only about 0.5”/yr
- Note the bottom has healed but does not expand. (*It gets no new sugar, so it can form no new wood.*)
Healing phloem forms a new trunk:

- Note inner bark (green tissue) *between* original trunk and new woody tissue.
- Must remove the whole structure.
Remove all the bridge—not just the outer bark:
Tools and Suppliers

How to Find the Tools that Work Best for Your Budget
The Ringer

Get it at:

• **IRL Supplies**
  • $219 Canadian
  • irlsupplies.com

• **Forestry Suppliers**
  • $222 American
  • forestry-suppliers.com
Knives

- Milwaukee Tool
- Vinyl or carpet knife:
  - Comfort grip
  - Wooden handle
- Pruning knife
- Hawkbill knife

Get them at:
- Hardware stores
- Home improvement stores
- Garden centers
- Sporting goods stores
Scrapers

- **1-1/2 inch stiff putty scraper**: Simple and effective
- **Painter’s tool**: Curves and corners simplify removing tissue from indentations

Get them at:
- Hardware stores
- Home improvement stores
Scrubbers

- Volunteers find *Scotch-Brite scouring pads* easiest to use.
- Brushes are unwieldy. Good to have one on hand in case the trunk has deep grooves.

Get them at:
- Grocery stores
- Hardware stores
- Home improvement stores
Strategy for Large-Scale Girdling Projects

What you tackle first matters to the natives
1. Look for Privets Piercing the Canopy

Privets grow into and through the canopies of larger trees. As they do, they shade out and kill any branches below them. The larger tree can’t produce all the sugar it needs, so it can’t survive prolonged stress—a drought, for example.
Find canopy-piercing privets. Girdle them first.
2. Look for Native Saplings

At left, the girdled glossy privet is shading out a young western soapberry hidden behind it. At right is the same soapberry, thriving only 3 years after the privet was girdled.
3. Look for Fruit-bearing Privets

The sooner you get fruit-bearing privets out of action, the easier it will be to get privets under control. The monster tree at right isn’t shading any other trees out, but look at all those berries!
4. Get the Rest!

At this point, I go back through an area systematically. I try to go from uphill to downhill and from upstream to downstream. Break the area up into manageable chunks and go through them one by one to girdle or uproot all remaining privets of any appreciable size.
5. Go Back for the Seedlings!

With the large privets gone, their seeds will sprout at groundcover density, as at left. At right is the 5-year-old who, with his mom and two of her friends, pulled up all those seedlings in June 2017. We have seen no new sprouts.
6. Follow Up to Touch Up!

Not every girdle will be perfect. Not every uprootable tree will be found on the first pass. Come back through and check your work at least once every couple of months. While you’re checking it out, admire your progress. You will be making a difference—and faster than you would have thought.
7. Observe and Adapt

Not everything I have told you will work as well for you as it did for me. Look at what’s going on in your own work. Ask yourself if there is a better way to get things done. You might have an idea that makes everything faster, easier, and more effective. If so, do it! And then tell the rest of us.
When Privets Die, What’s Next?
Dealing with Dead Trees
When the Privets Are Dead:

• Leave them standing (if you can).
• Or make them do penance for invading.
• Stop the cycle:
  • Uproot saplings.
  • Uproot or till in seedlings.
Leave dead privet standing

Glossy privet is not a hazard:
• Sturdy
• Lightweight
• Often enmeshed in canopy
• Not a ladder fuel (big down low; small up top)

Blown over by Hurricane Harvey, this live juniper is still standing, thanks to the two dead privets that broke its fall.
Privet Penance 1: Mulch

- Cut them down.
- Strip seeds.
- Chip the rest.
- Scatter the mulch under valuable trees or over bare ground to be restored.

Dealing with Dead Trees

~250 uprooted privets became 9 cu. yd. of mulch
Mulch Restoring Bare Ground

- Restoring an unapproved trail to natural habitat
- Chipped privet, composted 3 months, covered the old trail
Privet Penance 2: Redirect Trails

- Barriers at eye level discourage entry.
- Small dead privets or limbs of large privets stuck in the ground create such a barrier.
Privet Penance 3: Humus

1. Cut them down.
2. Inoculate the logs with turkey-tail fungus.
3. Let them rot.

Privet Penance 4: Erosion Control

1. Bundle them into wattles.
2. Lay the wattles along contours.
3. Stake in place with big cuttings.
4. Plant grasses, forbs.
5. Scatter seed.

Dealing with Dead Trees
Stopping the cycle: Saplings

- Uproot saplings before they bear fruit.
- Tools:
  - Extractigator
  - Uprooter
  - Pullerbear (only if in loose soil)
  - Lawn Jaws (small saplings)
Dealing with Dead Trees

Stopping the cycle: Seedlings

• Wait until next germination.
• Kid-friendly activity: Uproot or till in.
• My experience: First wave is all there is.

3 months after the girdling of canopy-level glossy privets, seedlings sprouted at the density of groundcover.
To the Field!

Let’s Girdle Invasives!
Harry Myers Park

• Google “Plus” Code for parking lot:
  WHJ2+45
• Google “Plus” Code for work site:
  WHJ2+R5

We got this done:
• Girdled 14 glossy privet (51 trunks)
• Uprooted 13 Chinese privet
• Uprooted 7 Chinese pistache

To the Field!
Contact Me...

@BaldEagle on iNaturalist

ciff.tyllick@yahoo.com