Pruning Timber Trees for Form & Function

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Outline

- The Mechanics Behind Pruning (Pruning Cuts)
- Pruning for Form (Corrective Pruning)
- Pruning for Function (Lateral Pruning)
- When should I prune?
- Which trees should I prune?
- Summary
Goals of this Presentation

- The focus of this presentation is pruning for form and, equally important, pruning for function:
  - Why should you Prune?
  - How do you prune?
  - When should you prune?
Basic Concepts
Pruning Lingo

- **Target Pruning** – pruning technique developed by Dr. Alex Shigo:
  - Focus on branch bark ridge, branch collar, and optimum callus tissue development

- **Callus tissue** – scar tissue made up of large thin-walled cells that forms around wounds / injuries.

- **Woundwood** – is a very tough, woody tissue that grows behind callus and replaces it in that position.
  - After wounding, callus tissue forms first about the margins of the wound. When woundwood closes a wound, normal wood continues to form.
Branch Bark Ridge

**Defined:** a ridge of “folded” bark in a branch crotch that marks where branch and trunk tissues meet and often extends down the trunk.
Branch Collar

- Defined: tissue, usually marked by a swelling or collar, that forms around the base of a branch between the main stem and the branch; or between a branch and a lateral.
Figure 1.- Target pruning steps

1. Begin by locating the branch bark ridge.
2. Find **target** A outside of the branch bark ridge.
3. Find **target** B-the swelling where the branch meets the branch collar.
4. If B is hard to find, drop a line at AX. The angle XAC is equal to the angle XAB.
5. If the branch to be pruned is large, first make a stub cut a few inches from the branch collar.
6. Make the final cut at line AB.
7. **Caution**: Do not cut behind the branch bark ridge or cut the branch collar, do not leave stubs, do not paint cuts—except for cosmetics, and do not leave flat top when topping.
Tree Heal Thyself...
Trees Don’t Heal

- Trees form a barrier zone around the wound
  - This barrier zone separates the wound/injury from the healthy wood or cells.
  - The barrier zone is an anatomical and chemical boundary that forms after wounding!

Source: home.ccil.org/~treeman/shigo/SURVIVE.html
Basic Pruning Tools
Basic Pruning Tools

• Use equipment that is specific to pruning

• Proper tools, and proper pruning techniques, will hasten wound closure time

• It translates into greater financial revenues now and into the future for the woodland owner!
Hand Pruners

Bypass pruners (right) are generally considered to be considered superior to anvil-style (left) pruners.

Good for small branches ≤ 1 in. diameter
Bypass Loppers

Good for branches ≤ 2.25 in. diameter
Hand Pruning Saws

- Folding saws
- Rigid or fixed-blade saws
- Branches $\leq$ 4-6 in.
Pole Pruners

Fixed Length
Telescoping
Pole Saws

Fixed Length
Telescoping (shown)
Gas-powered

Allows users to reach butt long lengths of 17 feet
Gas-powered Pole Saws

Not to be used for fine pruning cuts!
Major Brands

- Felco
- Fiskars
- Corona
- Silky
- Fenco
- Fanno
- STIHL
Right Way / Wrong Way
Pruning a Large Limb

1. Undercut 8-10 inches from the branch collar. This stops the bark from tearing and damaging the branch collar and trunk tissue.

2. Make the second cut from the top all the way through the branch 2-3 inches above cut 1.

3. The final cut should be just beyond the branch collar. Support the stub so it does not tear the bark.

Illustration Copyright © Robert O’Brien
Proper Pruning Cuts

- Branch bark ridge
- Branch collar
Pruning for Form

“Corrective Pruning”
Show of Hands

- How many of you actively prune your hardwood trees for form? For Function?

- How many of you have ever pruned conifers for function?

- How many of you feel comfortable selecting and pruning your future crop trees?
Corrective Pruning

- Used to correct form, multiple leaders, poor branch angles, broken tops, low forks, etc.

- Corrective pruning is almost exclusively applied to recently planted stands, stands that are 3-12 years old
  - These young trees, if defective, can still be corrected to overcome minor issues
  - Trees beyond corrective pruning should be ignored or coppiced...not worth your time or money!
Rules of Thumb

- Never remove more than 50% of the live crown...foliage is the photosynthetic engine of a tree.

- Never remove more than 1/3 of the live crown during a pruning operation.
Rules of Thumb

- Prune live branches during the latter part of the dormant season...late-December through February or early March.

- Prune dead branches anytime of year
Pruning for Function

“Clear-stem Pruning”
“Lateral Stem Pruning”
Lateral Branch Pruning

- The goal and underlying purpose of *lateral branch pruning* is to produce “future” knot free wood that is free of defect

- Begin when trees are 8-12 feet tall

- Prune to a minimum height of 9 feet for high-value hardwoods!
  - Prune up to 17 feet if you can reach that high!
Self-Pruning

- Certain hardwoods are good self-pruners
  - Shed branches without much assistance; red oak, yellow-poplar, black cherry, etc.

- Unfortunately, many high-value hardwoods need corrective pruning
  - Walnut and white oak species

- E. White Pine will self-prune; dead branches persist

- Red Pine doesn’t self-prune
Rules of Thumb

- Prune up to 9-ft if nut production is your goal
- Prune your best formed trees
- Prune your highest value species
- Prune branches while they are small
  - Avoid pruning branches > 3-inches
Pruning Dos...
Pruning Don’ts...

Return on Investment

Cost-share Availability

Attend a hands-on Workshop
Quick Tips

• Prune your best, most vigorous trees

• Avoid pruning during the growing season
  • Late winter, close to bud break best

• Avoid pruning branches larger than 3” diameter

• Leave at least 50% live crown

• Avoid removing > ⅓ of live crown
Quick Tips

• Start from the top down

• Identify the main leader and remove any competing branches

• Proceed with removal of lower limbs and vigorous branches growing up into the tree’s crown
Assessing Individual Trees
Develop a Plan

Start at the top first!
Start Pruning...

Slowly progress to the bottom of the tree...maintain good branch / crown symmetry!
Initiating Pruning Cut

[Is your goal to grow high-value hardwood veneer and sawlogs?]
The Ultimate Goal
Pruning for Wood Quality

- The ultimate goal of pruning is wood quality!
  - Shape and cultivate only those trees that have the potential to yield a future veneer log or prime sawlog!
Natural Target Pruning

- Concentrates defects towards the interior, low quality zone of the log
- Facilitates fast wounding of hardwood and conifer species

Figure 1. A proper cut (right) and improper flush cut (left) on red oak. Both samples are from the same tree 6 years after pruning. Decayed wood developed above and below the Rush cut.
Figure 2. Quality zones in a hardwood log. Abnormalities must occur in both the inner and outer quality zones to be considered a defect for grading purposes. Defects in the heart center are ignored for grading purposes. Adapted from McKenna, 1981.
Lateral pruning for veneer logs

- Select Best Formed Trees
  - Remove live branches
    - \( \leq 3'' \) diameter
  - Remove the dead branches

- Tally each tree by:
  - Species
  - DBH
  - Merchantable height
  - Defect
  - Grade or Product Class

[Lateral pruning black walnut]
[Is your goal to grow high-value hardwood veneer and sawlogs?]
Clear-stem Pruning – 17-ft – Black Walnut
Clear-stem Pruning – 17-ft – N. Red Oak

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Correcting Poor Form

[Veneer Quality Tree]

[Is your goal to grow high-value hardwood veneer and sawlogs?]
When Should you Prune?
When Should You Prune?

• I’m a staunch advocate of dormant-season pruning!
  • That is what I was taught and that is what I’ve always read!

• I never prune during the growing season – never!
  • Exception: Major weather-related event resulting in storm-damaged limbs!
Dormant Season Pruning

- Dormant Season Pruning
  - Best for hardwoods and conifers
  - Less sap and/or resin flow to contend with
  - No airborne pathogens
  - No insects
Dead Branches

- Dead branches can be pruned or removed any time during the year
How High Do We Go?
Clear-stem Pruning Height

• Ordinarily prune to heights of 9-ft and 17-ft

• Why?
  • 8’ 6” is generally the minimum sawlog length
  • 17’ is known as the butt log
    • More than 75% of the value in the tree is in the butt log
Ideal Pruning Height

First Lift = 9 ft
Second Lift = 17 ft
Pruning Height

Min. Sawlog length = 9 ft
Butt log length = 17 ft
Pruning Conifers
Pruning Conifers

Image: www.ext.colostate.edu/mg/gardennotes/images/617-1.jpg
Pruning Conifers

• Cost/Benefit Analysis
  • Is it a sound investment/decision?
  • Will you get your money back?

• Need to work directly with a professional forester to determine cost/benefit when it comes to pruning conifers in the Iowa and Illinois; better ROI in Wisconsin
Removing Dead Limbs

Leave Callus Ridge Intact
Pruning Height

Min. Sawlog length = 9 ft
Butt log length = 17 ft
Clear-stem Pruning – Red Pine – Sinnissippi Forest
Pruning

**Advantages**
- Correct tree form
- Correct tree quality
- Increase grade
- Increase value

**Disadvantages**
- Expensive
- Time Consuming
- Incorrect technique
Summary

- Pruning is a lot of fun and I personally find it very exciting; however,
  - Pruning is time consuming and expensive
  - Maximize ROI...prune your best potential trees and only prune your high-value trees
  - Very best 50-200 trees per acre (hardwoods)
    - Number will vary...
Summary

- Adhere to the philosophies and general guidelines set forth in this presentation:
  - 1st...Prune for form
  - 2nd...Prune for quality

- Try to prune only those branches ≤ 3 inches; however, it is acceptable to remove larger branches (4-5 in.) if the tree is vigorous.
Recommended Readings

• **Corrective Pruning of Black Walnut for Timber Form**
  - www.extension.purdue.edu/extmedia/FNR/FNR-76.html

• **USDA Forest Service: Pruning Red Pine**
  - www.nrs.fs.fed.us/fmg/nfmg/rp/silv/established/p4_prune.html

• **USDA FS: How to Prune Trees**

• **USDA FS Walnut Notes**
  - www.ncrs.fs.fed.us/pubs/wn/walnutnotestoc.html

• **USDA FS Pruning Central Hardwoods**
  - www.ncrs.fs.fed.us/pubs/ch/ch_6_09.pdf
Questions?

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