

PURDUE EXTENSION
MASTER GARDENER PROGRAM



BEST PRACTICES WHEN PLANTING AND PRUNING TREES AND SHRUBS

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HO-4-W

PLANTING – BEST PRACTICES

ORNAMENTAL TREES AND SHRUBS



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TYPES OF PLANTING STOCK

- Bare Root
- Balled & Burlapped (B&B)
- Containerized
- Other variations



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BALLED AND BURLAPPED (B&B)



- **Find root flare*** – might be buried below top of bag! Must be **VISIBLE** above finished soil grade. Dig hole that deep to match.
- Handle only by soil ball to maintain root/soil contact
- Remove twine, cut top one-third of burlap after placement in hole so none above soil line

a.k.a. Trunk flare

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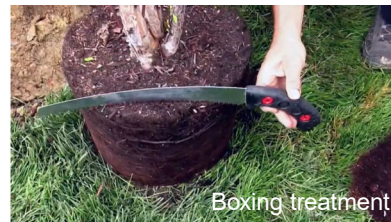
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CONTAINER GROWN

- Pot of plastic or metal
- Remove pot, check for circling roots (prune with saw, boxing/ slicing treatment – cut outer inch in 4 cardinal directions)
- *Similar – Root control bags – open top*



Tree Planting Part 2: Planting a Tree, FNH 540-WV

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WHEN TO PLANT

- **Most trees are best planted in spring or fall**
- Trees can be planted anytime the ground isn't frozen and the ground is suitable to work
- Arbor Day is _____ in Indiana



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MASTER GARDENER PROGRAM**SHOPPING FOR TREES/SHRUBS**

- Plants that look **healthy**
- Plants that have evidence of **good care**
- Plants that have **good structure**
 - Small trees – good single central leader, wide branch angles, good branch spacing
 - Multi-stemmed shrubs – good symmetry

Image from FNR-506-W

What about this tree?



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- **Avoid drying**
 - Tarp for transport from nursery
 - Keep root ball moist until planted
 - Store in shady spot until planted
- **Handle only by root ball or container**
- **Take care to not damage stems**


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BEFORE YOU DIG...

- Plan your Project
- Call Indiana 811
- Wait for the marks
- Confirm the marks
- Dig with care



Know what's below.
Call before you dig.



Know what's below. Call before you dig.

To Submit a Locate Request
24 Hours a Day, Seven Days a Week:
Call 811 or 800-382-5544

811NOW.com



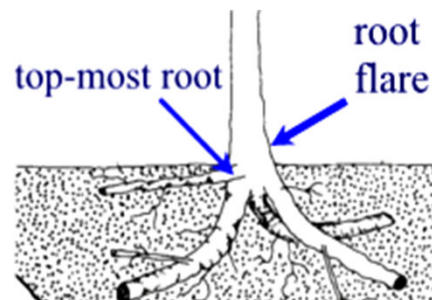
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HOW DEEP TO PLANT: FIND THE ROOT FLARE

- The root flare (trunk flare, root crown) should be **visible** above finished soil grade
- THIS IS CRITICALLY IMPORTANT!



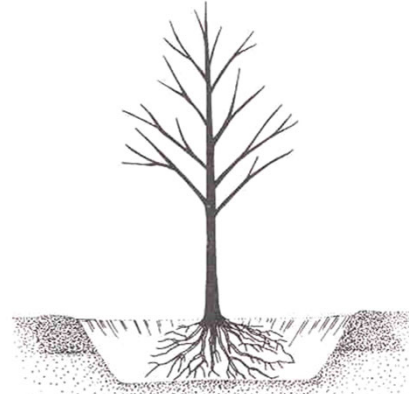
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PLANTING HOLE

- **1 to 1½ times wider*** than roots but *no deeper* (recent research – width not as important as proper depth). **Poorer soil – wider hole.**
- Avoid settling - roots should rest on **undisturbed soil**. Re-compact if disturbed.
- **Break up clods** – granular backfill
- Score sides of hole if slick
- **Replace soil** and gently tamp to eliminate air pockets (stop and water 2-3 times)
- Ensure tree is **vertical**



* Per FNR-433-W. EMG Manual still recommends 2-3x root ball diameter width. While nothing is wrong with this recommendation, it may not be necessary if you have good loamy soil. However, **DEPTH IS CRITICAL!**



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AVOID THE "BATHTUB EFFECT"



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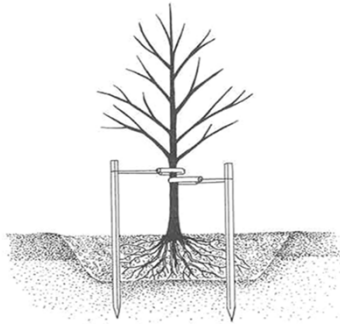
- Caused by amending backfill, *especially* in clay soils, so **don't amend backfill!**
- *The soil that came out goes back in*
- **EXCEPTION:** Sandy soils - improves water holding capacity, better rooting

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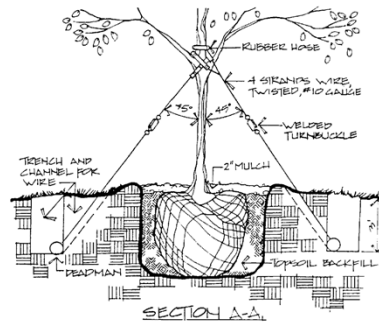
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VERTICAL SUPPORT – BRACING FOR WINDY SITES 1-2 SEASONS MAX.

Staking



Guying



See FNR-547-W

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OTHER PLANTING GUIDELINES

- Always carry by the root ball, not the stem
- Cut and remove all twine, remove top 1/3 to 1/2 burlap
- Mulch 2" around root zone, none at trunk, construct small mulch berm at edge to catch water
- Water as needed
- Fertilizing – best to wait a year



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OTHER PLANTING GUIDELINES: WINTER PROTECTION

• **Tree Wrap**

- Use on *thin barked trees* (e.g. maple, fruit trees) to **protect against sunscald and frost crack**
- Bottom up to first branch
- Apply in late fall, remove in early spring
- Paper wrap discouraged

Note: recent research suggests that adequate watering in summer & fall may be the best protection



White, plastic expandable wraps may provide some protection. Paper wraps are now discouraged.

Joseph O'Brien, USDA Forest Service, Bugwood.org



Red maple with winter damage>

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OTHER PLANTING GUIDELINES: ANIMAL DAMAGE

Voles or rabbits – tree guards (best if buried a few inches)



Deer – fencing (min. 5 ft. tall)



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WATERING – IMPORTANT!

- Water newly planted stock as needed for *at least for first year.*
- Water where roots are – below branches and beyond drip line on established trees
- A thorough, deep watering should generally penetrate 8-12 inches of soil. (5+5 rule)
- Goal: 1-1.5 inches rain every 7-10 days



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MULCHING

- 2-3 inches deep around tree.
- *Do not* mound the mulch against the trunk. (Volcano mulching)
- *Do not* use solid black plastic under landscape rock – limits air and water to roots
- Advantages: reduce water stress, visual cue for mowers!



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SOURCES AND RESOURCES

- **Tree Installation: Process and Practices**, Purdue Extension Publication FNR-433-W
 - **Tree Planting**, Second Edition, from Best Management Practices series, International Society of Arboriculture (not available at Purdue Education Store)
 - **Tree Planting Part 1: Choosing a Tree (FNR-538-WV)**
<https://www.youtube.com/watch?v=ilaYvtqY7-l>
 - **Tree Planting Part 2: Planting Your Tree (FNR-540-WV)**
<https://www.youtube.com/watch?v=k5rUqd7BmiA>
- www.edustore.purdue.edu



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PRUNING – BEST PRACTICES



ORNAMENTAL TREES AND SHRUBS

Please note that while these principles will be helpful for ornamental pruning, they may not necessarily apply to the pruning of fruit trees in all cases.



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IS THIS GOOD PRUNING?



Let's explore the **why, when, how, what, where, and who** of pruning...



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WHY PRUNE?

- Remove **broken, dead, diseased, and damaged** branches.
- **Establish good structure** on young trees – 1 central leader, good branch spacing
- **Stimulate flower and fruit** development (more buds for next season)
- **Decrease danger** of personal injury and property damage.
- **Renew or Rejuvenate** old, established shrubs. (e.g. spirea, forsythia, privet, and lilac)
- **Shape** plants into unnatural form
- **Reduce overcrowding** on weak plants
- **Control size** (primarily shrubs)



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WHEN TO PRUNE?

GENERALLY: PRUNE DURING THE GROWING SEASON – TIME TO “SEAL”. AVOID THE DEAD OF WINTER.

If a tree or shrub flowers before the end of June (like magnolia), prune immediately after flowering.



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If the tree or shrub flowers after June 30, prune during late winter or early spring before the new growth starts.



Late winter is also a good time to evaluate pruning needs for when you do prune. Without foliage, it's easy to see branch structure.

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WHEN TO PRUNE?

- **Evergreens** may be pruned any time of the year when the wood is not frozen.
- Pines/spruce/fir –
 - **Spring**, during “candle” elongation
 - Pinch off portion of candle



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WHEN NOT TO PRUNE

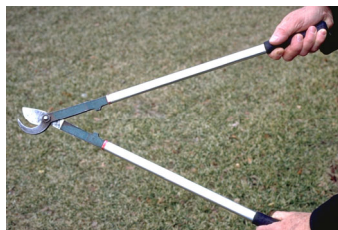
- Delay spring pruning of heavy “bleeder” trees like maple, yellowwood, etc. until heavy spring sap flow subsides (no ill health effects on tree if you do, though)
- **Avoid late summer pruning** (August through mid-September)
 - New tender growth may not properly “harden off” before winter.



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TOOLS OF THE TRADE

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SUGGESTED PRUNING STEPS/GOALS

- Step 1: Identify and establish 1 central leader
- Step 2: Identify lowest permanent branches; branches below this point are temporary until tree is well established
- Step 3: Establish permanent tree architecture *over time* by branch removal cuts establishing vertical spacing (scaffold branches)

Young Trees: Remove other non-beneficial growth as it develops (broken, dead, diseased, damaged, crossing/rubbing branches, root suckers, water sprouts, narrow crotch angles)



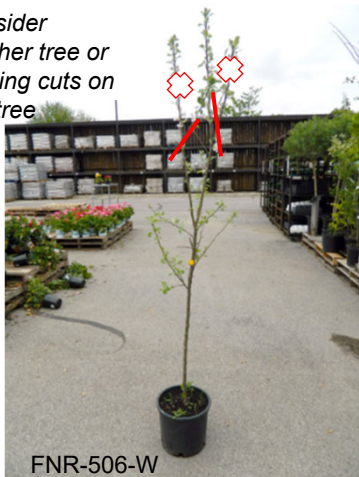
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1 CENTRAL LEADER & GOOD LATERALS

Consider another tree or pruning cuts on this tree



FNR-506-W



- Establish 1 central leader (dominant stem)
- Remove or reduce branches of similar size at top to break co-dominance (1:1 branch aspect ratios)
- Lateral branch aspect ratios should be at least 2:1 (50% of trunk size or less) for strong branch unions.
- Use reduction cut(s) as needed to establish apical dominance.

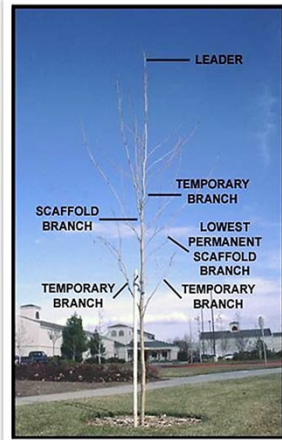
*Branch aspect ratio =
Size of Trunk:Lateral Branches*

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IDENTIFY LOWEST PERMANENT BRANCHES



- Branches below the lowest permanent branches are temporary until the tree is well-established
- Temporary branches are eventually removed to improve clearance (safety), line of sight, etc.

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ESTABLISH PERMANENT TREE ARCHITECTURE

- Use branch removal cuts establishing vertical spacing (scaffold branches)
- Young trees: about 8-inch vertical spacing
- Mature: about 18-24 inches vertical spacing
- Guidelines vary with tree maturity and species
- May involve a gradual pruning process over years to achieve goals.



Proper spacing will allow strong development of permanent lower branches.

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PRUNING TECHNIQUES



Reduction cut

***Indiscriminate heading cuts back to buds, branches <1/3 size, or ones that leave stubs (internodal) are rarely appropriate for established trees!**



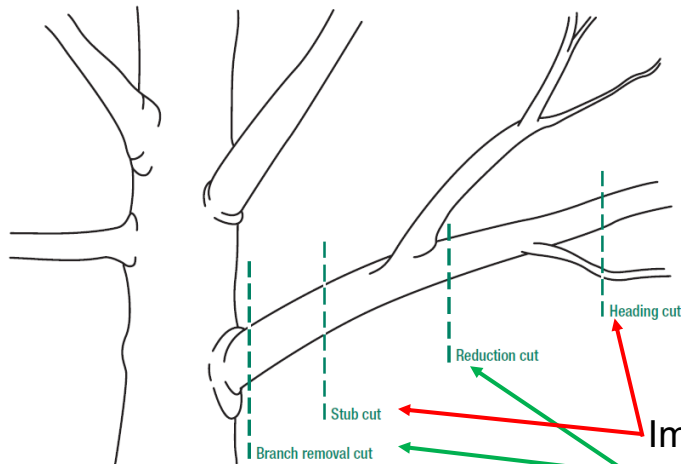
➤ **Branch Removal Cut (Removal Cut or Thinning)** – branch removal - cut back to point of origin (e.g. trunk, crown)

➤ **Reduction Cut (Cutting to a Lateral or Heading Back)** – larger of 2 branches cut to strong lateral branch *at least* 1/3 its size; **or** co-dominant branches reduced to 1

➤ **Heading Cut* (Heading Back)** – cut back to lateral branch <1/3 size or to bud (*best used on small or current year's growth; otherwise discouraged*)

➤ **Pinching** – “heading back” on small twigs, evergreen candles

PRUNING CUTS



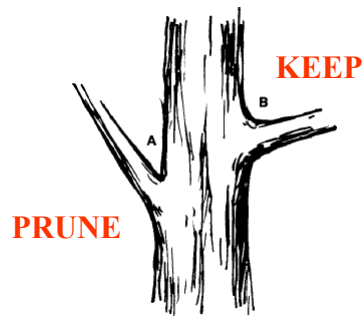
Graphic: Penn State University

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PRUNING TIPS



- **Select *wide* crotch angles**, branches spaced well around tree and vertically
- **Prune out *narrow* crotch angles** to avoid bark inclusion and weak joints.



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PRUNING TIPS - CONTINUED

- Prune **broken twigs and branches** as they occur.
- Prune **crossing branches, water sprouts (vertical), root suckers**
- **Don't use wound dressing** – let nature take its course. Few exceptions: *reduce risk of oak wilt and Dutch elm disease, (beetle vectors attracted to fresh wood cuts in Spring), some other borers*
- **DON'T TOP MATURE TREES!!!**



TOPPING – INAPPROPRIATE!

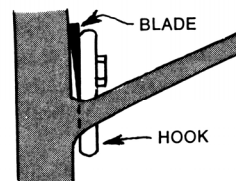
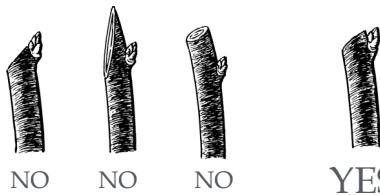
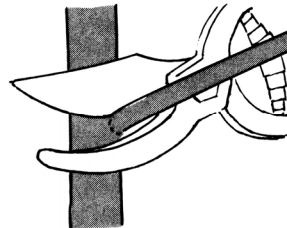
Photo: Colorado State University



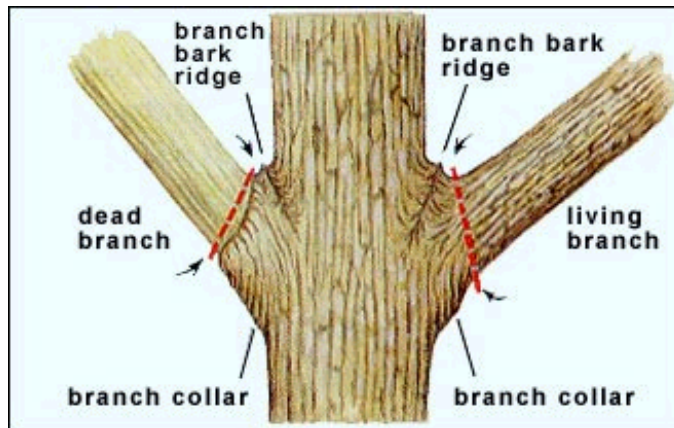
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PRUNING CUTS

- Good technique
 - clean cut
 - fairly close to bud, lateral branch or trunk
 - outside swelled portion – branch collar zone and branch-bark ridge
 - no stubs!



BRANCH COLLAR ZONES, BRANCH-BARK RIDGE, AND PROPER PRUNING CUT

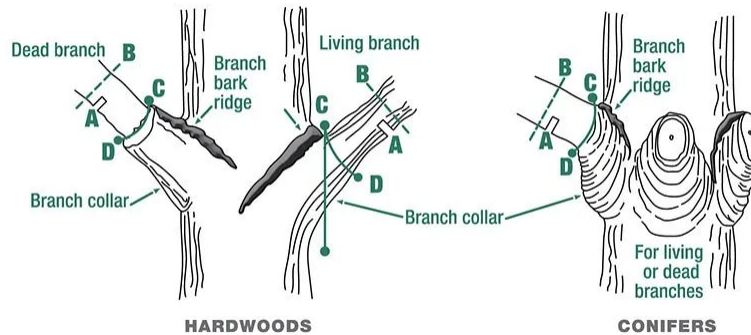


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PRUNING LARGER LIMBS (> 1")

Natural target pruning properly removes a branch while protecting the branch collar, which is essential for wounds to close. First cut A, second cut B, and third cut C-D.



HARDWOODS

CONIFERS

Graphic: Penn State Extension

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PLANT HORMONES & PRUNING

Auxins

- Made in growing shoot tips, move to roots
- Prevent axillary buds from growing (apical dominance), stimulates root growth, causes phototropism (bending)

Cytokinins

- Made in root tips, moves to shoots, present in fruit and seeds
- Stimulates shoot growth, bud development

Other hormones: ethylene, abscisic acid, gibberellins, plus other minor hormones that help regulate plant processes.

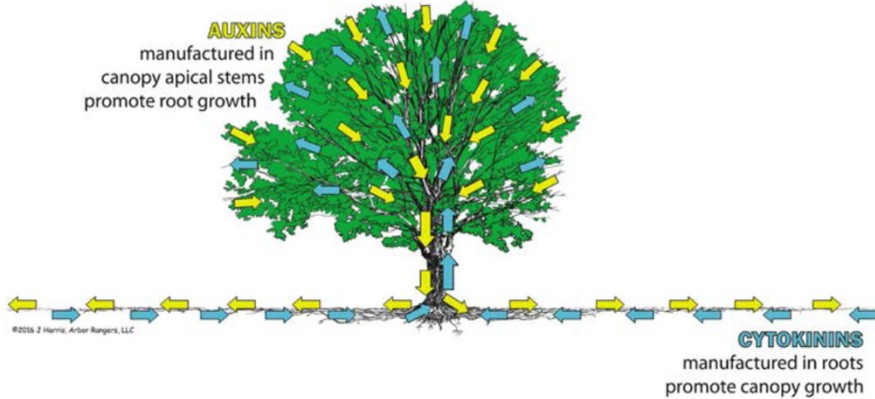
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**PRUNING LIVE, GREEN TISSUE
 IMPACTS THE AUXIN-CYTOKININ PATHWAY**

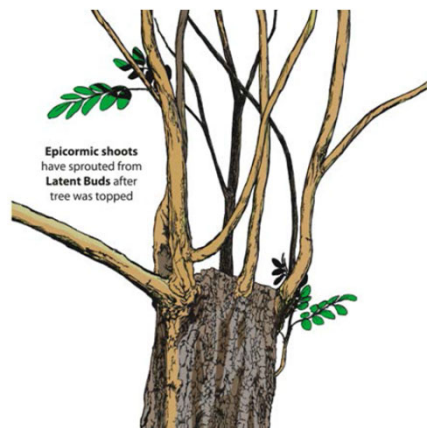


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**WEAKLY ATTACHED SPROUTS
 ARE PRONE TO WIND AND ICE DAMAGE**



- **Epicormic shoots** are growth from previously dormant buds
- **Latent buds** are concealed buds, normally dormant with growing apical shoot



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MASTER GARDENER PROGRAM**PRUNING YOUNG VS. MATURE TREES****Young Trees**

- Minimal pruning at planting
 - dead, broken, damaged branches; unbeneficial parts
- At about 2+ years:
 - one central leader
 - establish good branch spacing
 - "scaffold" branch system
- Clean cuts - no wound dressing

Mature Trees

- Only what's necessary
 - Dead
 - Damaged
 - Diseased
- Threat to life/property
- Don't "Top!"



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MASTER GARDENER PROGRAM**LARGE LIMBS –
HIRE A PROFESSIONAL IF YOU LACK THE EXPERTISE**

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PRUNING SHRUBS

- Use combination of removal/thinning cuts (renew vigor) and reduction/heading back cuts (control size)
- Vary heights of these cuts
 - No “haircuts” unless it is a formal hedge
- Multi-stemmed shrub – **renewal pruning**
 - Thin 1/3 oldest growth out for 3 years
- Select shrubs – **rejuvenation pruning**
 - Cut to ground!



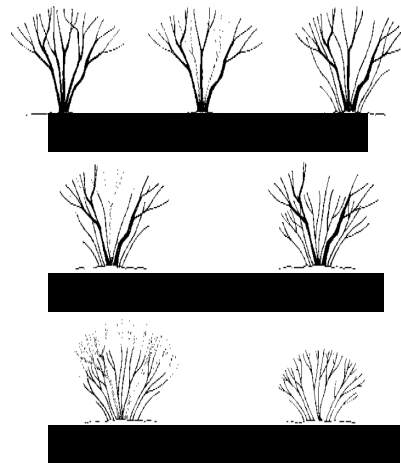
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RENEWAL PRUNING OF SHRUBS

- Thin 1/3 of oldest growth out each of 3 consecutive years.
- Keep best water sprouts each year and prune to varying lengths.



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Source: HO-4

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REJUVENATION PRUNING

➤ Some shrubs can be radically pruned to the ground to stimulate new growth:

- Orange-eye butterflybush
- Forsythia
- Shrub-althea
- Hills of snow
- Oakleaf hydrangea
- Privet
- Spirea
- Lilac



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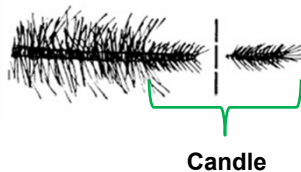
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Source:HO-4

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PRUNING EVERGREEN SHRUBS



➤ Mugo Pine: pinch $\frac{1}{2}$ the "candle" in spring to maintain compact form



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PRUNING EVERGREEN SHRUBS

- Broadleaved evergreens (arborvitae, juniper): combination of thinning and heading back.
- Avoid pruning most evergreen shrubs back to bare wood! Branch death, won't grow back.
- *Taxus* spp. (e.g. English, Japanese Yew) is the exception – new growth will occur on bare wood stems



2 years later

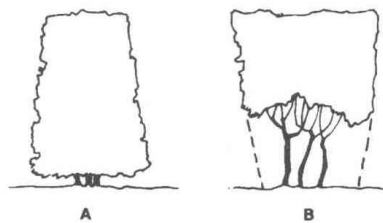
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PRUNING HEDGES



- Which Hedge is Properly Pruned? Why?
- Prune row of plants as a single unit

Image from HO-4

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MASTER GARDENER PROGRAM**SOURCES AND REFERENCES**

- ***Tree Pruning Essentials***, FNR-506-W, Purdue Extension
- ***Pruning Ornamental Trees and Shrubs***, HO-4-W, Purdue Extension
- ***Pruning: Best Management Practices***, Third Edition, International Society of Arboriculture
- ***Tree Pruning: What Do Trees Think?*** FNR-534-W, Purdue Extension
- ***Tree Pruning Essentials video***
<https://www.youtube.com/watch?v=ZiWrTtL5Q88>



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