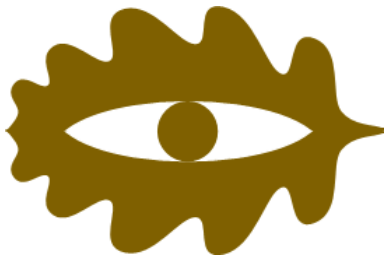


# Bonsai On A Budget

Alex Labram

MMM YYYY



Nemeta Bonsai  
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# Learning Outcomes

## Theory

- ▶ Be aware of the history and culture of bonsai
- ▶ Understand (at a high level) how a bonsai is produced
- ▶ Understand (at a high level) what distinguishes good and bad bonsai
- ▶ Know how to maintain a bonsai on a day-to-day basis
- ▶ Experience the key activities of re-potting, pruning and wiring
- ▶ Be aware of inexpensive options for further learning and practice

## Practical

- ▶ Watering bonsai
- ▶ Wiring a bonsai pot for re-potting
- ▶ Exposing the nebari
- ▶ Potting the prepared tree
- ▶ Pruning for bulk, congestion and taper
- ▶ Wiring for shape

# Bonsai: What & Why

## Defining bonsai

- ▶ A bonsai is a **living trompe-l'oeil**: a small tree that appears to be a scaled-down large tree.
- ▶ Almost any kind of tree can become a bonsai (plus a few things that aren't trees!)
- ▶ “Bonsai” traditionally referred to Japanese schools, but has become a generic term

## Why 'Sai?

- ▶ Hands-on education in plant science!
- ▶ Learn to see extra layers of beauty in nature
- ▶ Good practical hobby with interesting culture
- ▶ Sense of control and responsibility

*To see a World in a Grain of Sand  
And a Heaven in a Wild Flower  
Hold Infinity in the palm of your hand  
And Eternity in an hour*

- William Blake

# Bonsai: A Potted History

## China

- ▶ Daoist mysticism: recreation of magical sites in miniature
- ▶ Penjing (盆景) / Penzei (盆栽) = the art of miniature landscapes (pre 600AD)
- ▶ Popular amongst Buddhist monks, and - later - aristocracy
- ▶ Heavily impacted by Mao's Cultural Revolution: seen as a bourgeois pastime

## Japan

- ▶ First records c. 1200AD; known as Hachi-no-Ki ("potted trees" - also the name of a famous play!)
- ▶ Heavy Zen / Chan Buddhist influence: beauty through austerity, sophistication in simplicity and perfection from imperfection ("wabi-sabi")
- ▶ Increasingly popular from 1800s onwards; term "bonsai" (盆栽 - "tray planting") adopted
- ▶ Development of distinct styles (dramatic archetypes)
- ▶ Hit hard by World War 2, but revived in the aftermath (partly from enthusiasm of GIs)
- ▶ Exported to West from 1960s onwards, in parallel with Japan's "economic miracle"

# Bonsai: Art & Science

Good bonsai practice is:

- ▶ Authentic - makes you think “tree”
- ▶ Dramatic - makes you think “TREE”
- ▶ Pragmatic - doesn't make you think “*dead tree*”...



# Pragmatism 1

How Not To Kill Your Tree

# What Kind Of Tree Is A “Bonsai”, Anyway?

## Trick question alert!

- ▶ Tree: *“a large, tall, woody, perennial plant with a single, unbranched, erect, self-supporting stem holding an elevated and distinct crown of branches with a total height greater than ten feet and a diameter greater than three inches”* - oy vey!
- ▶ Almost any tree species can be trained into a bonsai; many smaller plants can too
- ▶ Requirements for bonsai-ing:
  - ▶ Vascular plant (no mosses!)
  - ▶ Woody growth / “lignification” (no daisies!)
  - ▶ Secondary growth of trunk (no palms!)
  - ▶ Free-standing (no lianas!)
  - ▶ Deep roots (no grasses!)
- ▶ Desirable features
  - ▶ Attractive / interesting species
  - ▶ Small or pinnate leaves
  - ▶ Long-lived
  - ▶ Reasonably fast-growing
  - ▶ Easy to maintain / shape
- ▶ “Honorary” bonsai species
  - ▶ Woody climbers: ivy, wisteria, honeysuckle
  - ▶ Succulent / fleshy: dwarf jade, geranium
  - ▶ Chrysanthemum

# I Had One Once, But It Died

## What a bonsai needs to survive

- ▶ Environment
  - ▶ Indoor vs Outdoor
- ▶ Watering!!!!
  - ▶ Single biggest killer of bonsai
  - ▶ “Root hairs” die easily in drought
  - ▶ Over-watering is also dangerous!
- ▶ Light
- ▶ Heat
  - ▶ Dormancy
- ▶ Airflow
- ▶ Pest Control
  - ▶ Animals: spider mites, scale bugs, aphids, caterpillars, vine weevil, squirrels
  - ▶ Plants etc: pearlwort, liverwort, wood sorrel, pennywort, nostoc
  - ▶ Caution: environmental issues!
- ▶ Fertiliser
  - ▶ “Balanced”: roughly even NPK
  - ▶ Organic => micronutrients
  - ▶ Caution: environmental & ethical issues!
- ▶ Bonsai are far harder to keep alive than most common pot plants!



# Watering Your Bonsai

## No, seriously, this is important

### Why so serious?

1. Trees usually have deep tap-roots to draw water; they don't handle drying out well
  - ▶ ...Especially conifers, for some reason
2. Good-quality bonsai soils / pots have really good drainage... so can dry off quickly
3. Bonsai soil is very compact and often moss-covered... so water tends to run off the surface
4. Traditional bonsai soil is inorganic, so lacks the "ladders" of plant fibre that let water rise up through the pot
5. Even gardening experts routinely kill their first bonsai!

### Watering methods

- ▶ Put in bucket of water (to just below brim) and wait for water to bubble up
  - ▶ ...Then take out and allow to drain fully.  
*Never* leave standing in water for long periods - roots need oxygen too!
- ▶ Water from above three times, allowing the water to sink in between passes

### Is it watered enough?

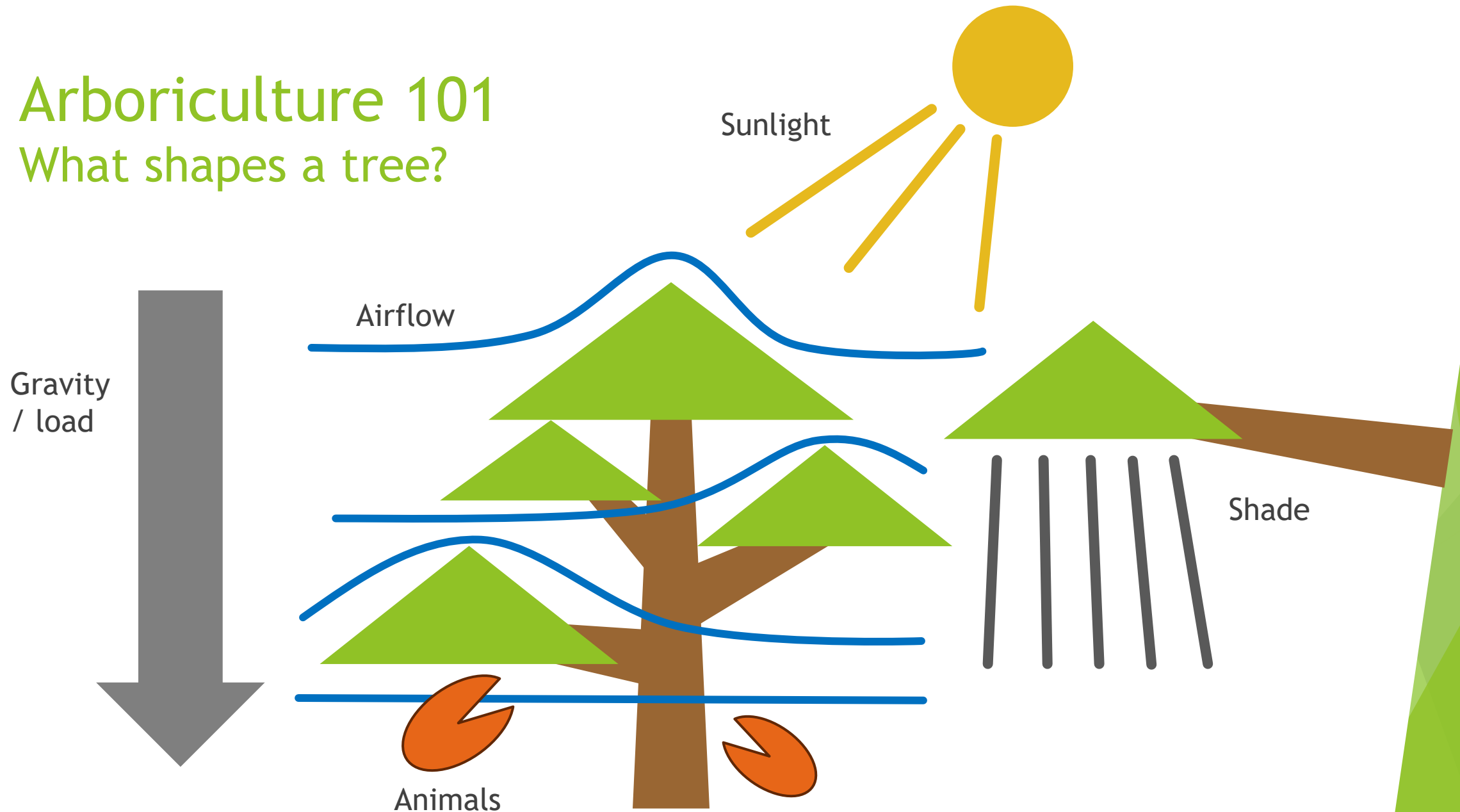
- ▶ Surface feels damp to back of hand
- ▶ Pot significantly heavier
- ▶ Water running out of hole in bottom when more is added

# Authenticity & Drama

Thinking Like A Tree (That's Seen Some S\*\*t)

# Arboriculture 101

## What shapes a tree?



# Authenticity & Age

## What makes a tree look mature?



### ► Taper

- “Nebari” (根張り) = root flare
- Trunk & branch flare: base to apex / tip
- Trunk-to-branch ratio

### ► Canopy shape

- Rounded triangle
- Composed of rounded-triangle “pads” (for species that back-bud less readily)

### ► Trunk & branch behaviour

- Short inter-node distance
- “Ramification”: fractal splitting of branches
- “Square-cube law”: big tree = proportionally heavier load = more curvature
- “Ruptures”: jagged direction changes

### ► Texture

- Bark
- Dead-wood: advanced bonsai topic!

# Drama & Perspective

## What makes a tree stand out?



- ▶ Well-defined “front”
  - ▶ Style is firmly established
  - ▶ Sense of strength or movement captured
  - ▶ Clear view of lower trunk
  - ▶ No crossed branches
  - ▶ Tree’s “centre of mass” is in middle of pot
- ▶ Taper (again!)
  - ▶ Taper appears stronger from viewpoint at base of tree
- ▶ Pot: picture-frame for tree
  - ▶ “Heavy” earthenware vs “light” glazed
  - ▶ Depth  $\approx$  trunk thickness; width  $\approx$  2/3 canopy height (tall tree) or width (wide tree)
  - ▶ Style: heavy vs light, plain vs ornate
- ▶ Use of negative space
  - ▶ ...Often justified as effect of wind-flow or trunk death
- ▶ Scaled-down decorations
  - ▶ Moss “grass”, accent plants, rocks (“suiseki”)

# Flaws

## What gives the game away?

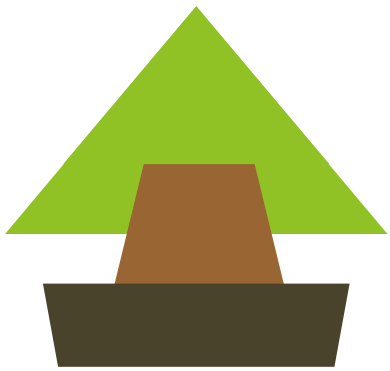


- ▶ “Weak” branches
  - ▶ Suckers
  - ▶ Congested nodes
  - ▶ Under-slung / elbow branches
  - ▶ Lack of clear “leader” (dominant trunk / branch)
- ▶ Obvious tool marks
  - ▶ ...Including wire scarring
- ▶ Excessive symmetry
  - ▶ ...Especially handlebar branches
  - ▶ Asymmetry is a common theme in Japanese gardening!
- ▶ “Reverse taper”
- ▶ Unusual “habit” for species / genus
  - ▶ Google for pictures of wild tree to get ideas!
  - ▶ This rule is frequently ignored: e.g. small shrubs portrayed as large trees, boringly-shaped species made interesting, unrealistic pads
- ▶ Dead leaves and (unwanted) deadwood

# Bonsai Styles

The most common four of... *thirty?* Really?!?

## Formal Upright



- ▶ Strong, proud, “yang”
- ▶ Pot: unglazed earthenware; simple shape; bulging
- ▶ Can be hard to develop taper, especially on conifers

## Cascade



- ▶ Flowing, falling
- ▶ Pot: deep to make space
- ▶ “Half-cascade” runs to base of pot; “cascade” goes below that

## Informal Upright



- ▶ Relaxed, elegant, “yin”
- ▶ Pot: glazed; fluting; flowery
- ▶ Broad range of possible shapes
- ▶ Basically the default style!

## Literati



- ▶ Solitary, melancholy, bleak
- ▶ Trunk: bare, ruptured, calligraphic
- ▶ Pot: small to emphasise plant’s extravagant loneliness
- ▶ Style derived from woodcuts in classic Chinese drawing guide

The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic visual effect.

# Pragmatism 2

Making Life In Miniature



# Bonsai Lifecycle

## Sources

### Slow

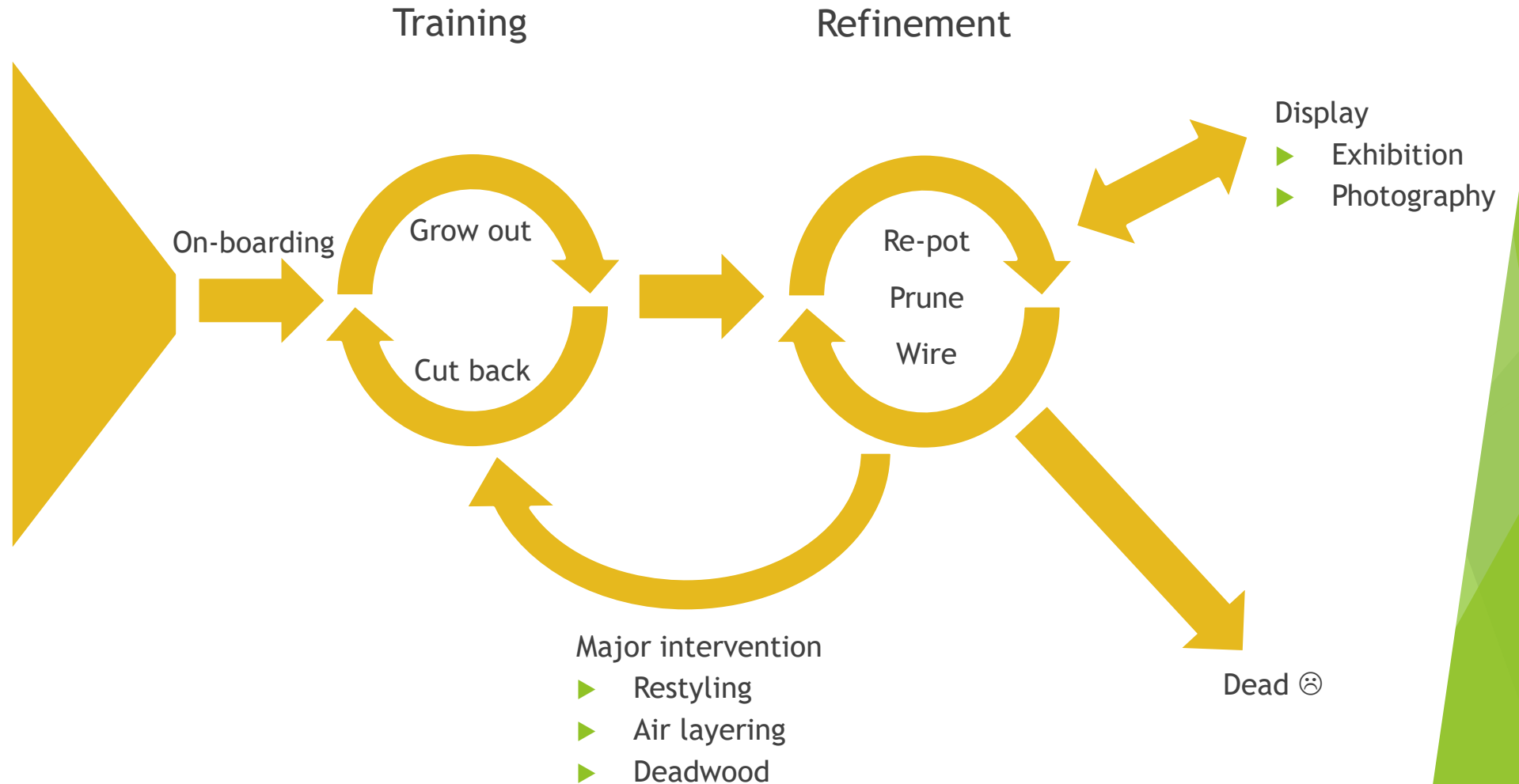
- ▶ Seeds
- ▶ Cuttings

### Fast

- ▶ Garden centre seedlings
- ▶ Scavenging

### Ready

- ▶ “Nonsai”
- ▶ Garden centre mature trees
- ▶ Yamadori



# Why We Prune

It's not just repressed sadism, honest

- ▶ Shape the tree
  - ▶ “Structural” pruning to shape trunk + primary branches and fit a Japanese bonsai style (archetype)
  - ▶ Canopy pruning to create rounded-triangle shape(s)
- ▶ Shape the branch - encourage ramification and taper
- ▶ Pick winners (before the tree can pick for us!) - improve spacing and remove congestion
- ▶ “Balance energy” to fight apical dominance and force growth in more interesting areas
- ▶ Crowd management - reduction of green mass
  - ▶ Let light through to lower areas of the tree (pruning for “inner growth”)
  - ▶ Reduce water shock when re-potting
- ▶ Remove “fluff”

# Botany and Pruning

## Not all trees are alike

- ▶ Back-budding
  - ▶ Broadleafs (e.g. Japanese maple) typically have **lateral** growth from behind the tip, **adventitious** growth from the base of branches, and **epicormic** growth from random spots on the trunk
  - ▶ Needle-carrying conifers (e.g. Japanese black pine) typically have strong lateral growth, weak adventitious growth and no epicormic growth
  - ▶ Spiky/scaly conifers (e.g. Itoigawa juniper) don't have any *more* lateral growth - all the growth tips are already active - and have weak adventitious growth and no epicormic growth
  - ▶ Weak or no back-budding (adventitious + epicormic) means we have to plan further ahead and maintain more sacrificial branches to thicken the trunk
  - ▶ Densely ramified growth (per spiky/scaly) means we have to think in terms of zones rather than / as well as individual branches
- ▶ For broadleafs: opposite vs alternate branches - leave three nodes vs two pairs of nodes
- ▶ Apical dominance: some trees (conifers especially) grow more strongly upwards
- ▶ Flushes per year: usually two (Spring and Lammas) except for mountain-growing pines

# Pruning Broadleaf Trees

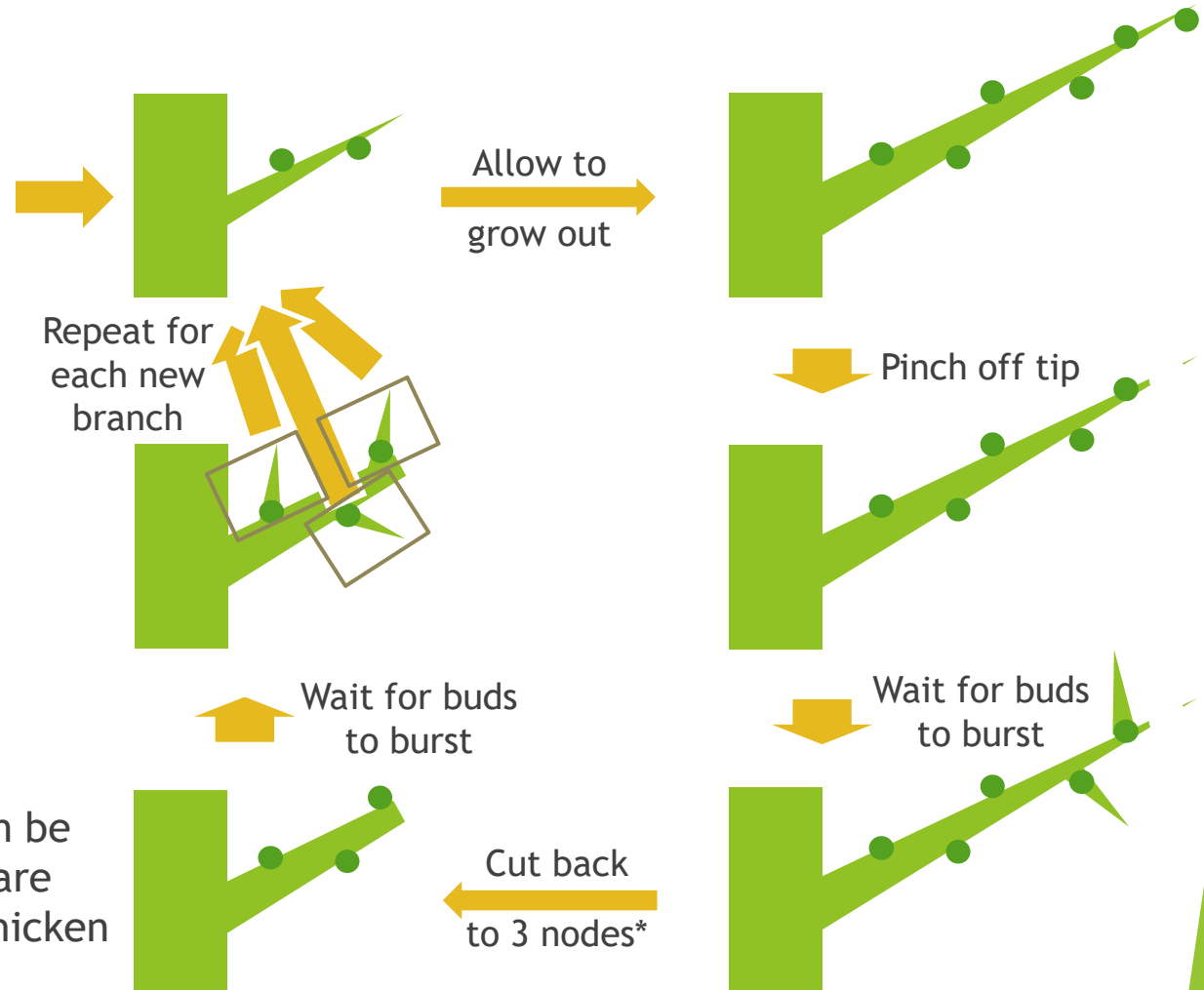
## Playing in easy mode

### ► Conditions

- Can handle loss of mass
- Back-buds readily
- Leaves may be simple or compound
- Leaves may be alternating or opposite

### ► Philosophy

- Minimal wasted growth
- Each branch should have “two heirs and a spare” (at least)
- The spare is a “sacrificial” branch: it can be removed later, once the chosen “heirs” are established, or allowed to grow out to thicken the parent branch



\* Or 2 nodes (4 buds) for opposite leaves

# Pruning Conifers

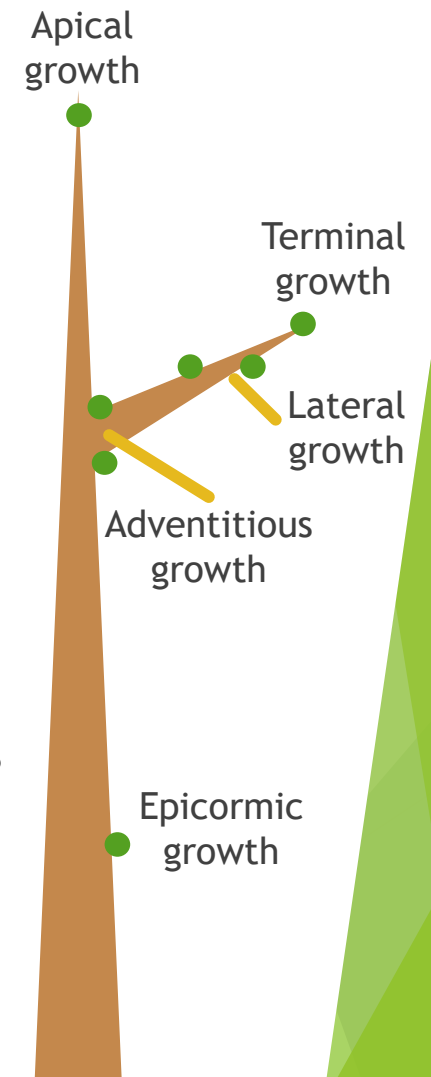
## Getting trickier

### Needle-bearing (e.g. pine)

- ▶ Context:
  - ▶ No epicormic growth
  - ▶ Often weak adventitious growth
- ▶ Philosophy
  - ▶ Green growth should form pads / clouds or layers
  - ▶ Leave lower branches as sacrificial branches to thicken up the trunk
  - ▶ Control apical growth carefully to stop premature die-off of lower branches (“energy balancing”)
  - ▶ Cutting back tips (removing current-year terminal growth) is called “de-candling”

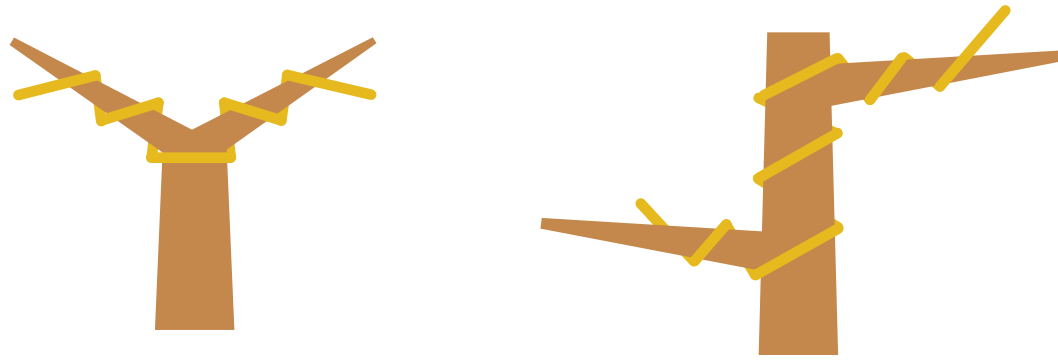
### Scaly-spiny (e.g. juniper)

- ▶ Context:
  - ▶ No epicormic growth
  - ▶ Lateral growth is already present!
- ▶ Philosophy
  - ▶ Green growth should form pads / clouds or layers
  - ▶ Per branch:
    - (1) remove tip entirely;
    - (2) remove growth nearest trunk;
    - (3) thin out growth in 2<sup>nd</sup> quarter;
    - (4) shape-prune growth in 3<sup>rd</sup> quarter
  - ▶ ...Then repeat (fractally!) for each branch in 2<sup>nd</sup> quarter



# Wiring

## The rules guidelines



1. If it's daft and it works, it's not daft
  - ▶ We use anodised aluminium wire because it is an easy and attractive way of imitating the effect of gravity on a larger tree
  - ▶ Weights, strings, corks, rubber bands, etc are all completely valid alternatives
2. Use the thinnest gauge of wire that will still bend the branch
  - ▶ E.g. if either 2mm and 1.5mm would work, but 1mm wouldn't, use 1.5mm
3. Always wire two branches together!
  - ▶ ...Or wire a branch to the trunk, or the trunk to the root ball / pot; just don't try to wire a single branch on its own
4. Wire at 45° to the branch / trunk
  - ▶ Rule of thumb: the wire needs to be the length of branch / trunk to be wired  $\times 1.5$
5. The wire is a *cage* not a *corset*
  - ▶ I.e. use as little pressure as possible: the less it digs in on Day 1, the longer you have before it leaves wire-marks on the bark
  - ▶ It's OK to leave an "open coil" spiral at the end to gently control green growth
6. Leave wire on for one growth season
  - ▶ Usually 6 months - covering either Spring or Lammas growth - except for some mountain pines which only have one growth flush per year
  - ▶ If the branch hasn't "set" after one flush, you just have to reapply the wire

# Stress Management

...No, I meant for the *tree*

## Sources of water stress

- ▶ Root pruning
- ▶ Under-watering
- ▶ Over-watering / poor drainage → root rot
- ▶ Over-fertilising
- ▶ Summer

## Sources of wood stress

- ▶ Heavy removal of green growth
- ▶ Branch removal past the “collar”
- ▶ Some kinds of deadwood work
- ▶ Insect attacks

- ▶ It's best to space stresses out over as much time as possible - e.g. 1 major stress per tree per growth season
- ▶ Water stress and wood stress are not (necessarily) additive: if you prune the foliage *and* the root ball, there is less demand for water so less work for the remaining root surface area

The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic feel.

# Next Steps

Becoming a Bonsai Practitioner



# Practice, Practice, Practice

Practice, practice, practice, practice... you get the picture

1. Keep your tree alive and bonsai-ish
  - ▶ Remember: WATERING!!!
  - ▶ Remove wire in ~6 months
2. Find rogue seedlings to “adopt”, and transfer them to pots
  - ▶ ...*Without* killing them, I mean
  - ▶ Once you’re sure they won’t die, prune them and gradually move them to smaller / shallower pots
3. Start to build a bonsai toolkit
  - ▶ Start with cheap / improvised tools: chopsticks, pliers, wire-cutters, tamper, nail scissors
  - ▶ Consider buying: root shears, straight-edged branch cutter
4. Build a collection of pots for all bonsai styles and phases of development
  - ▶ Make your own - e.g. with crockery and a diamond tile hole saw
5. Contemplate trees in nature
  - ▶ What principles do they reflect, and how did they get that way??

# Learn From Others

## Apart from yours truly

1. Buy a book
  - ▶ I like the DK Bonsai book: <https://www.dk.com/uk/book/9781409344087-bonsai/>
2. UK Bonsai Association: <https://www.ukbonsaiassoc.org>
3. Local clubs
  - ▶ Currently none in central London, but several out in the suburbs
  - ▶ The UKBA site has a very complete list (albeit not the easiest to search)
4. Bonsai shows and car boot sales
  - ▶ Again: the UKBA has a calendar
  - ▶ Again: none in central London, but some in Twickenham, Bracknell, Kent...
5. Youtube
  - ▶ Channels: Mă-Kè Bonsai, Herons Bonsai, Bonsaify, Notion Bonsai, Bonsai Empire, ...
6. Drop me an email! [alex@nemeta.co.uk](mailto:alex@nemeta.co.uk)

The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic design.

Thanks For Attending!

# Appendices

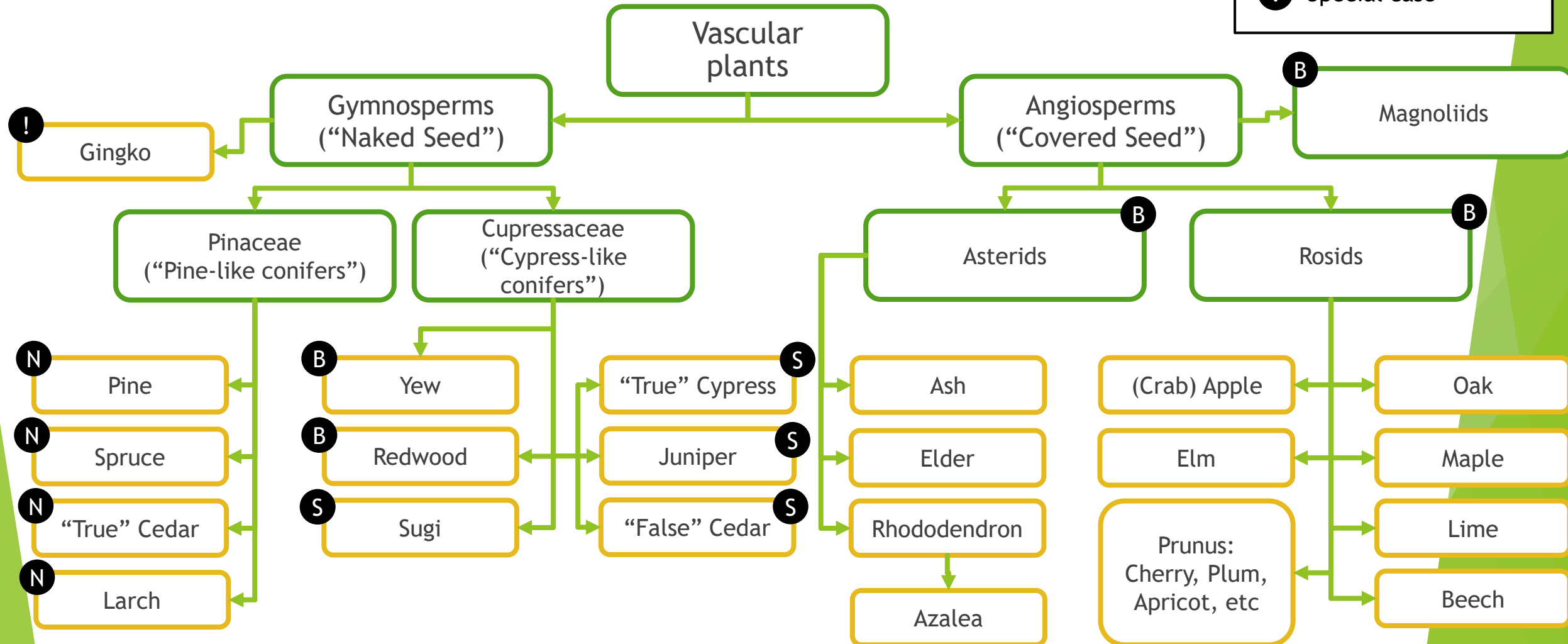
Miscellaneous Technical Notes

# Woody Plants: A Family Tree

## Evolution From A Bonsai Pruner's Perspective

Prune as:

- B** Broadleaf
- N** Needlely conifer
- S** Spiky / scaly conifer
- !** Special case



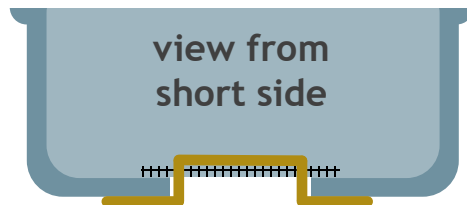
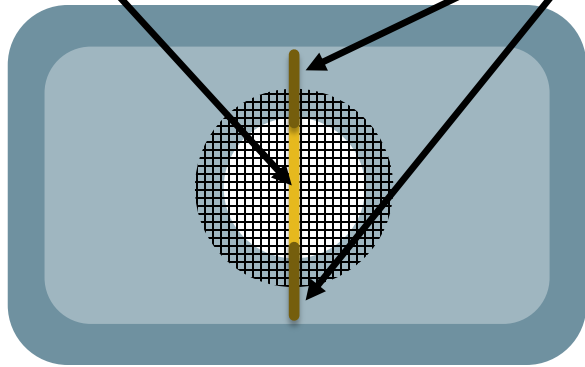
# Wiring a Bonsai Pot

## What could go wrong?

### Mesh & Staple

(Plastic mesh, 2mm alum. wire)

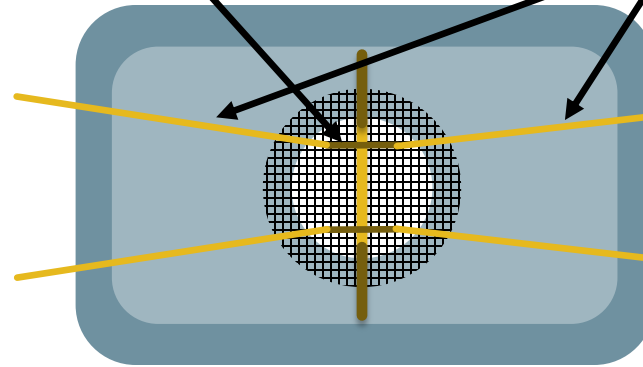
wire above mesh      wire below mesh & pot



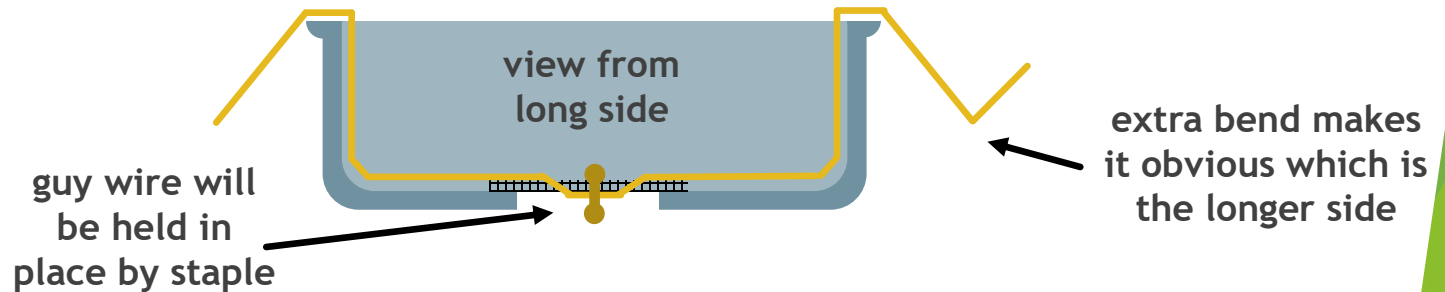
### Guy wires

(1.5mm alum. wire x 2)

wire below mesh      wire above mesh & along sides of pot



one side of each  
wire longer than  
the other



# Repotting step-by-step

Regular repotting - often back into the same pot! - helps limit tree size via “root-to-shoot ratio”

## 1. Prepare pot

- ▶ Pick a (tentative) pot
- ▶ Scrub clean
- ▶ Staple mesh over holes
- ▶ Add guy wires

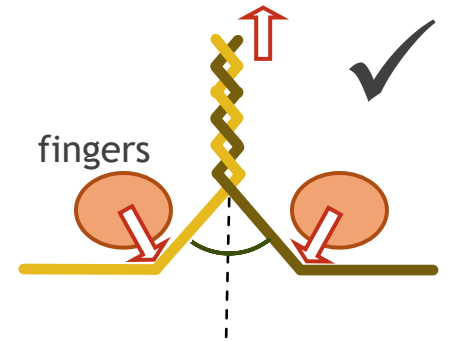
## 2. Prepare tree

- ▶ Remove from pot
- ▶ Clean off soil surface
- ▶ Dig down to expose nebari
- ▶ Dig up / in to define root-ball

- ▶ Untangle lateral roots where poss. (esp. girdling roots)
- ▶ Clear any growth from lower trunk
- ▶ Spray with water if starting to dry!

## 3. Insert tree into pot

- ▶ Add shallow layer of soil to base
- ▶ Place root ball in pot and pack soil around
- ▶ Compress soil to “brownie” hardness
- ▶ Pull guy wires over root ball, twist pairs together tightly, and trim to 3-4 twists
- ▶ Cover with dried, grated, rehydrated sphagnum and compress surface
- ▶ Sprinkle with grated acrocarpous (upward-growing) moss



# How Often To Water

## Some key factors

### Pot

- ▶ Depth: deep → less frequent
- ▶ Shape: bulbous → less, fluting → more
- ▶ Inner surface: glazed → more

### Soil

- ▶ Drainage: well-draining → more
- ▶ Degradation: older → harder to water
- ▶ Dressing: dead sphagnum and/or live moss covering → harder to water but slightly less (in theory)

### Tree

- ▶ Maturity: older → less (in theory)
- ▶ Fertilisation: heavy → more
- ▶ Re-potting: recent → more

### Environment

- ▶ Wind: windier → more
- ▶ Sun: sunny → more, shady → less
- ▶ Heat: hotter → more, colder → less
- ▶ Season: Winter = least, Summer = most
- ▶ Warning: these factors are “non-linear”! A small increase in e.g. sun can mean a big increase in watering.

...Mostly it's not worth the effort to figure out the “right” watering frequency. Just keep checking the pot every day!