

Junipers as bonsai

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1- Introduction

a. Esthetic quality

- The main beauty of junipers lies in the contrast between the living part and the deadwood



California juniper

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Sierra juniper

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- The influence of the contrast between living portion and deadwood comes from nature



- We use this contrast seen in nature to style young junipers



b. Varieties of junipers

- Mature and compact foliage (e.g. Sargent juniper)
- Course foliage (e.g. Common juniper)
- Mature and juvenile foliage on same tree (e.g. San José juniper)



- Examples of junipers with delicate and compact foliage
 - Sargent juniper (*Juniperus chinensis sargentii*)
 - Itoigawa juniper (*Juniperus chinensis sargentii itoigawa*)
 - Rocky Mountains Juniper (*Juniperus scopulorum*)
 - Blaauw juniper (*Juniperus chinensis 'blauwii'*)

- Examples of juniper with mature but longer foliage
 - San José juniper (*Juniperus chinensis 'san jose'*)
 - California juniper (*Juniperus californica*)
 - Genévrier Sierra (*Juniperus occidentalis australis*)

- Examples of junipers with coarse foliage
 - Common juniper (*Juniperus communis*)
 - Needle juniper (*Juniperus rigida*)

c. Basic characteristics of junipers

- Relatively easy to cultivate
- Is ideal for most shape and styles of bonsai (except broom style)
- The wood is soft and easy to bend on younger trees
- Budding back ability varies greatly between sub-species
 - Some can bud back on the trunk
 - Others have a limited capacity
- Easy to find young specimen in nurseries
- We normally aim to create the look of an old tree with deadwood: branches should be pointing downward
- The strength of a juniper lies in its foliage
- Nice colour contrast between live veins and deadwood
- Deadwood will decay slowly
- Can develop a decent bonsai in relatively short time (4 to 5 years)
- Is an excellent species for all level of enthusiasts

2- Basic horticultural requirements

a. Sun

- All junipers should be placed in full sun (i.e. 6 hours or more of direct sunlight) to thrive and obtain proper density and size of foliage
- Rotate your trees on a regular basis (e.g. once every 3-5 days) to ensure that all sections received proper sunlight
- There will be limited back budding if the sun does not reach the interior of the foliage
- Exceptions are after a repot and during heat wave

b. Watering

- Do not allow the soil dry between watering
- Contrary to popular belief junipers like water even if they come from the desert!
- Shohin will require special protection and watering to remain in full sun all summer
- A mid-size tree with a lot of foliage and no organic components in the soil could easily require two watering per day
- Not susceptible to root rot
- My mix of Turface/Chabasai 50/50 does require two watering per days on sunny days above 25 degree Celsius

c. Wintering

- The majority of junipers require a dormancy period
- They can adapt to shorter dormancy period of a warmer climate
- Some are very hardy like the San José and other require more protection like the Itoigawa
- Do not let the foliage be exposed to the sun and strong wind during the winter. This will result in burnt foliage.

d. Repot

- Given that the strength of a juniper lies in the foliage, we can easily remove 50% of the roots on a young tree in the first repot
- Best time to repot is spring when the foliage becomes nice green but before the start of the new growth: we can go until late May in Ottawa for light repot
- We can also repot at the beginning of September but we must avoid frost for the next 4–6 weeks
- Young junipers can be repotted every 4-5 years while older specimen (100 years +) every 7-8 years.
- We need to avoid using organic components in our soil if we wish to repot less frequently
- We do not have access to good quality Pumice but we can use non organic components like Chabasai and Turface. Such a mix has less water retention capacity than a soil with organic components
- Use a soil with finer particle for Shohin

- It is important to keep a portion of the original soil during repot to keep a portion of the required microorganism which coexist with the roots and help absorbing some nutrients. There is no need to add mycorrhiza.



- Add moss on the soil after the repot:
 - Help keep the top of the soil humid which allow roots to grow in the top part of the pot.
 - Helpful in the development of a proper ecosystem in the soil
 - Is critical for a tree in a small pot to prevent the soil from drying too fast



- Watering with moss:
 - Need to ensure that the moss become wet before water can flow through it
 - Dry moss becomes a challenge in the winter in a garage or in a cold room
- An alternative to living moss
 - A layer of 1/2'' of sphagnum moss has the same benefits
 - Is less attractive



e. Fertilizing

- Organic fertilizers are superior to chemical fertilizers : they do not burn the roots and are compatible with the ecosystem living in the soil
- Be sure to dilute the chemical fertilizer 3 to 4 time the recommended dosage before applying
- We can apply organic fertiliser on a dry soil but we should apply the chemical fertilizer on a soil that has been humid for a few hours
- It is also recommended to apply micro nutrient
- Proper fertilization is important to obtain desired results. A tree in development should be fertilized twice a week while a mature tree could be fertilized once a week.
- Do not apply fertilizer during heat wave. Even organic fertiliser cake could burn the root in such condition due to reverse osmose.

f. Pruning of branches

- Junipers cannot heal over the wound of a cut branch. They cannot produce a callus over the area cut
- There will always be an unpleasant scar on the trunk
- It is suggested to transform unrequired branches into jin instead of cutting them

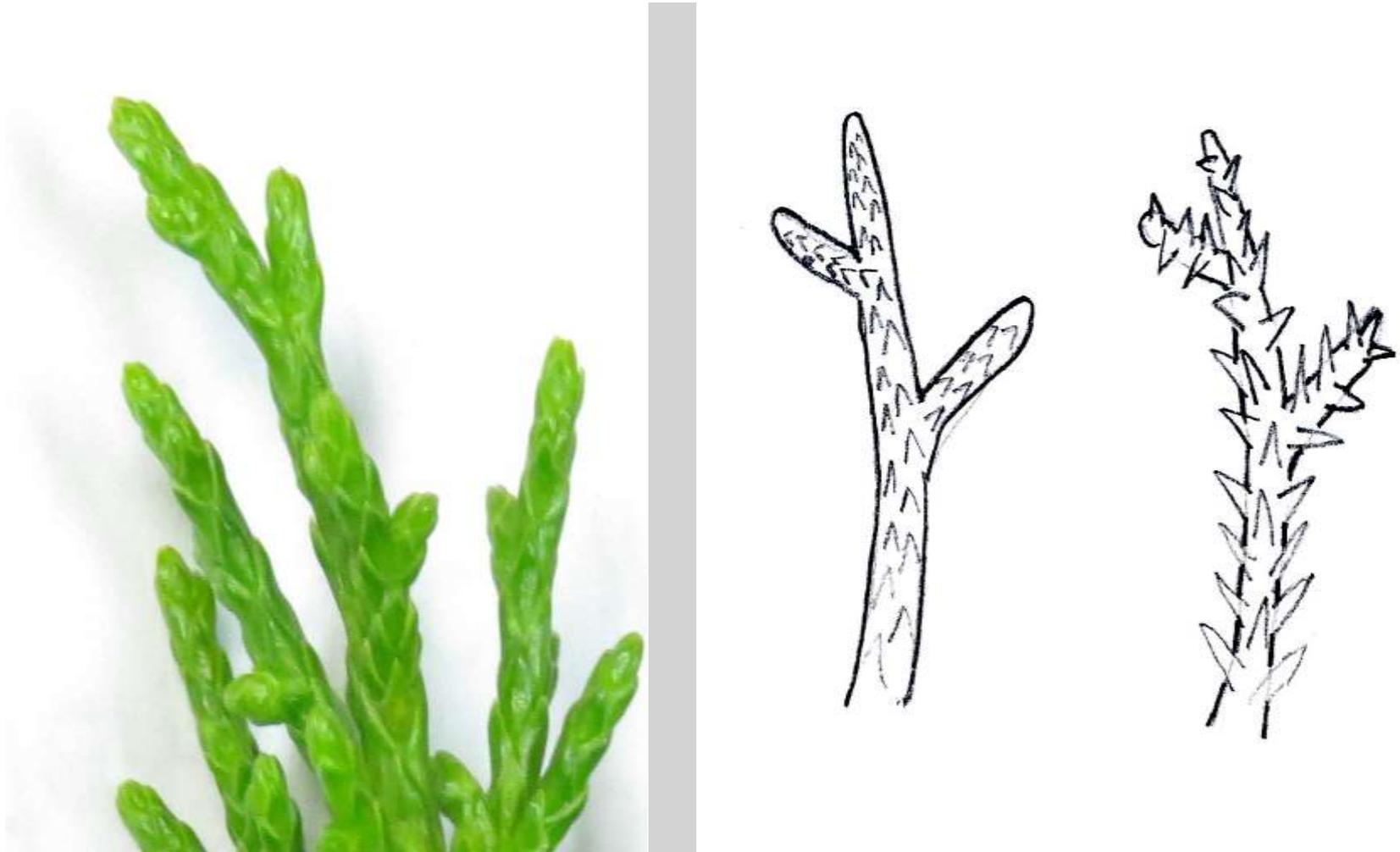


3- Management of foliage

a. Understanding the juvenile and mature foliage



- Juvenile foliage can be the result of poor horticultural method, stress and too much fertilizer
- We control all these factors and can obtain mature foliage only
- Mature foliage can open up and become juvenile

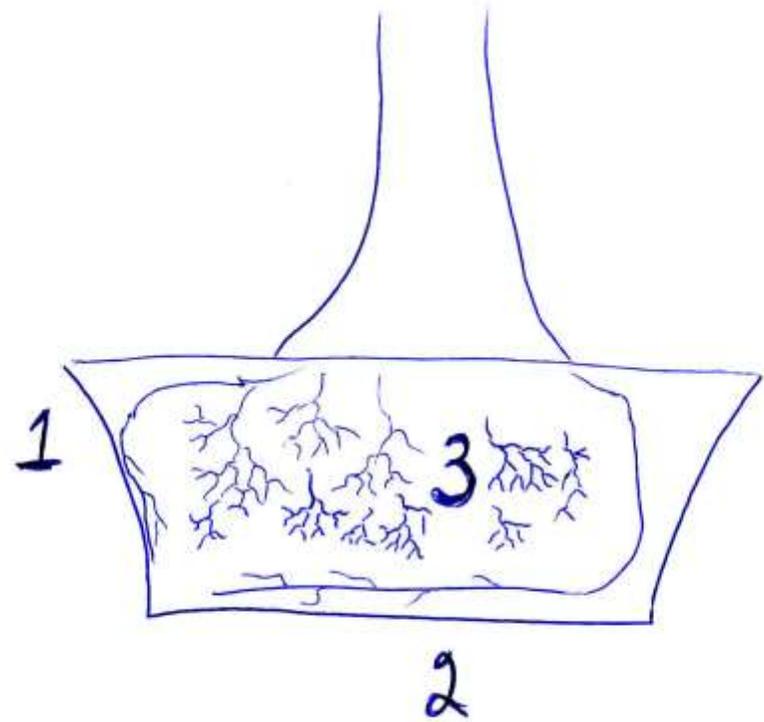


- Here are some conditions which can affect the foliage
 - Severe repot
 - Severe foliage pruning
 - Improper management of foliage: pinching
 - Change of environment

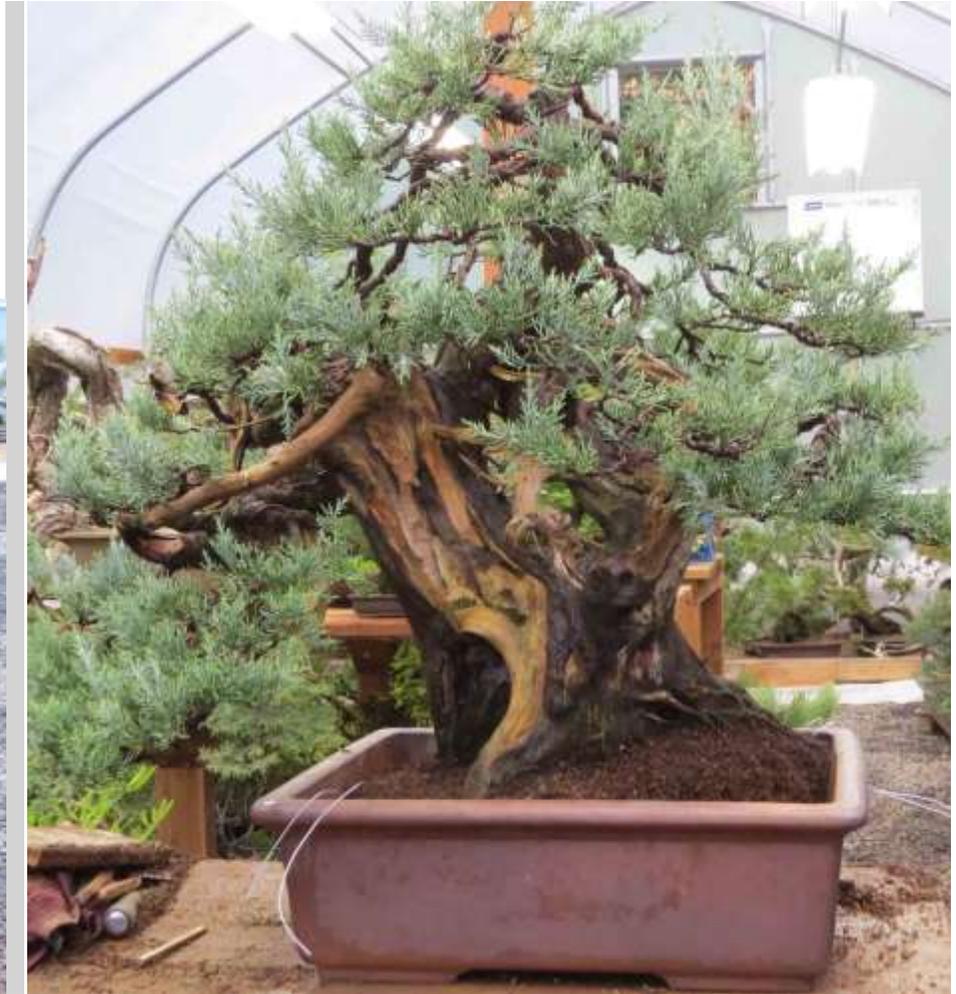
b. The relation between the roots and the foliage type (i.e. mature/juvenile)

- When most of the roots are long: juvenile foliage
- When most of the roots are short and small: mature foliage
- Roots will develop in three phases after an initial repot
 - Phase 1: long roots will develop on the side of the pot which lead to juvenile foliage
 - Phase 2: long roots will develop at the bottom of the pots which again lead to juvenile foliage
 - Phase 3: fine small roots will develop under the trunk and in the middle of the pot which lead to mature foliage!
- This concept applies to many coniferous trees!

- It is critical to keep these small delicate roots (section 3) for multiple repots or the foliage will go from mature to juvenile



- Example of repot where small roots are kept



- To keep this portion of the root ball intact for multiple repot require a soil which does not break down (i.e. no organic component)
- These small roots would be cut only after multiple repot if there are signs of a less vigour in the tree

- There are junipers which cannot develop mature foliage such as the common juniper and the needle juniper (*Juniperus Rigida*)



Photos utilisées avec la permission de Bonsai Mirai

c. To optimize the health of the tree

- The strength of a juniper is in the foliage and the new growth are the strongest sections of the foliage; these sections bring the most energy to the tree



- Allow the new growth to grow freely from spring to early August
 - The tree will lose its silhouette during that period
 - Fertilize properly during that period
- If the tree is weak or has been styled in the spring, allow the new growth to grow freely until August of the following year (or until the tree grows strongly again)
- Junipers will accumulate energy with this new growth
 - This energy will make the tree stronger and will help generating bud back

- Here is an example of a juniper that was allow to grow freely before being refined again



- This method of allowing the tree to grow freely for a period lead to faster result than the approach of constantly pruning to maintain the silhouette of the tree
- Maintaining a perfect silhouette all the time is actually a bad horticultural approach!
- In early August, use scissors and cut the new growth just above two vigorous secondary shoots



- Another example



- It is best to avoid performing this pruning after mid-August because the tree will start allocating its sugars in the foliage to prepare for the winter. Doing this pruning in September could severely impact the tree hardiness for the winter (unless kept in a controlled environment just above freezing)

- The negative impact of pinching the foliage
 - The tip of the new growth is the part of the foliage that brings the most energy to the tree. Pinching the tip remove the most efficient part of the foliage which can lead to a weaker tree
 - The tip of the new growth produce an hormone called ‘auxin’ which prevent back budding to ensure that the stronger part of the tree is a the tip with full sun exposure. Pinching will cause an hormonal imbalance on the tree
 - Pinching cause a stress to the tree which can respond by producing juvenile growth
 - Is the cause of lost branches on some variety which does not tolerate pinching at all
 - The negative impact is a lot more serious on an older tree (i.e. 100 years old and more) then on a young one

- On some variety of juniper, areas pinched will die a year later

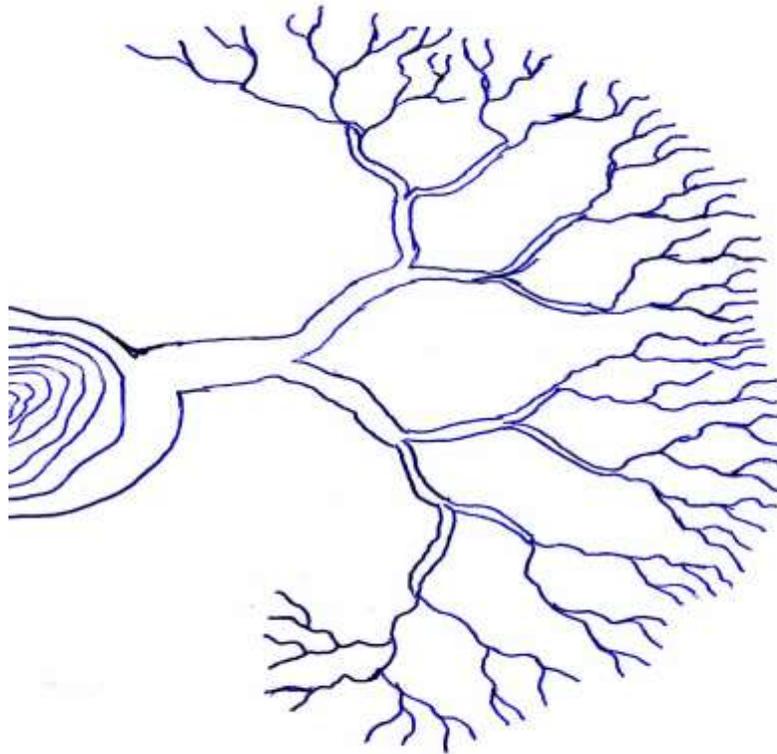


- Rebalancing of hormone after the proper pruning
 - The tip of the new growth being cut no longer produce the ‘auxin’ hormone which was preventing secondary shoots to grow
 - The secondary shoots will now both grow and start generating the ‘auxin’

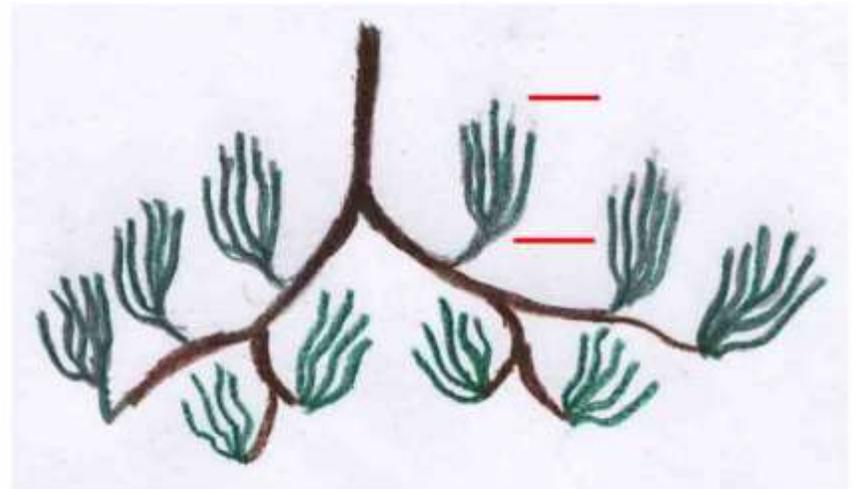
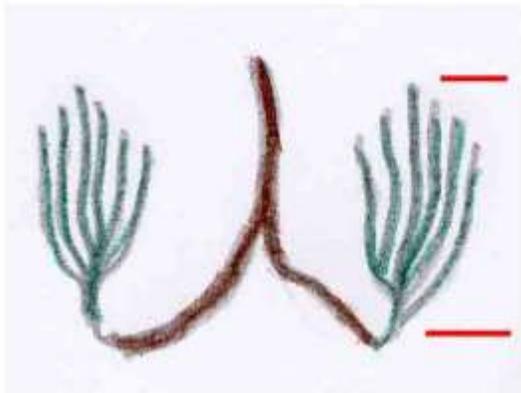


d. To optimize the esthetic of the foliage

- Other benefits of this method of pruning
 - The secondary shoots are going in opposite direction
 - These secondary shoots will elongate and will eventually requires the same pruning method which will lead to 2 other secondary shoots again going in opposite direction
 - This will lead to ramification and will result in fuller foliage pads



- The development of ramification will dilute the energy getting to each section of the foliage
- This dilution of energy will result in more compact foliage
- This principle also applies to some other coniferous
- Severe pruning will have the reverse effect: large or juvenile foliage
- It is important to combine this development of ramification with a reduction of fertilizer to get even more compact foliage



e. Removal of weak shoots

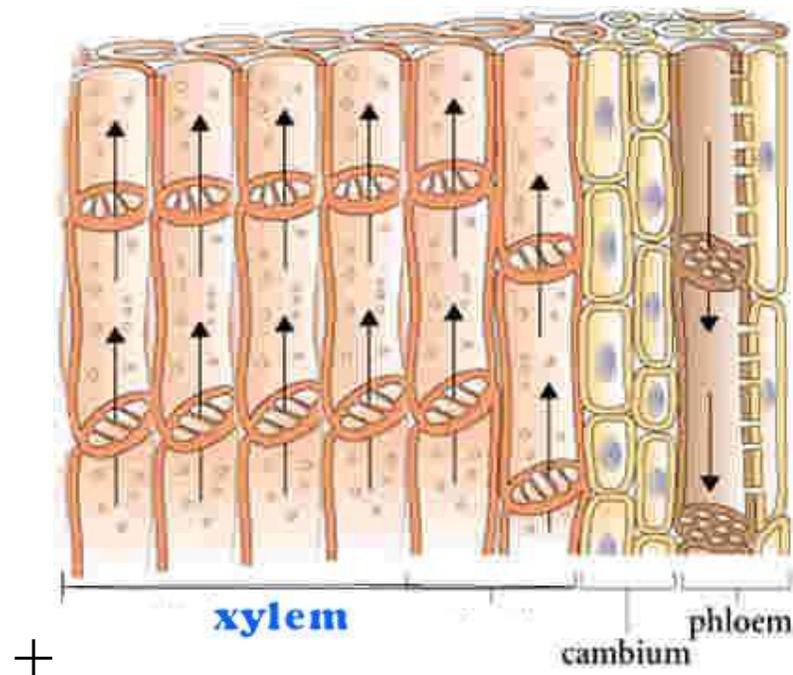
- The weak shoots do not bring much energy to the tree and in some case could even remove energy from the tree
 - We can prune these weak shoots at any time during the summer
 - Weak shoots do not show any sign of grow



4- The vascular system

a. What is a vascular system

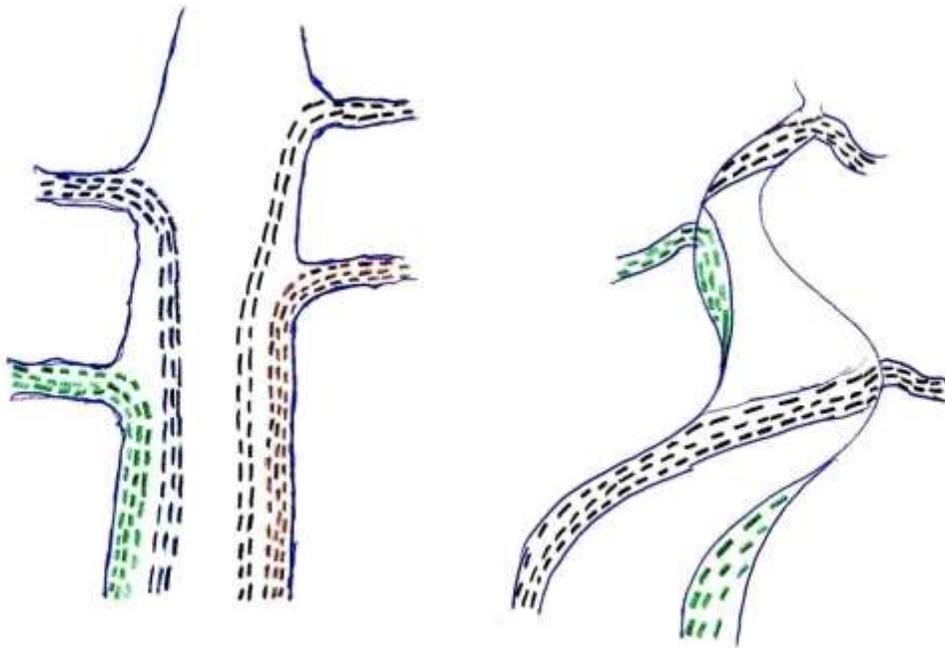
- A series of miniature veins which transport different liquid in all areas of the tree
- Xylem : responsible for the transport of water and mineral from the roots to the foliage
- Phloem : responsible for the transport of the sap created by photosynthesis from the foliage to different part of the tree including the roots
- Cambium : tiny layer of cells to build either Xylem or Phloem tissue



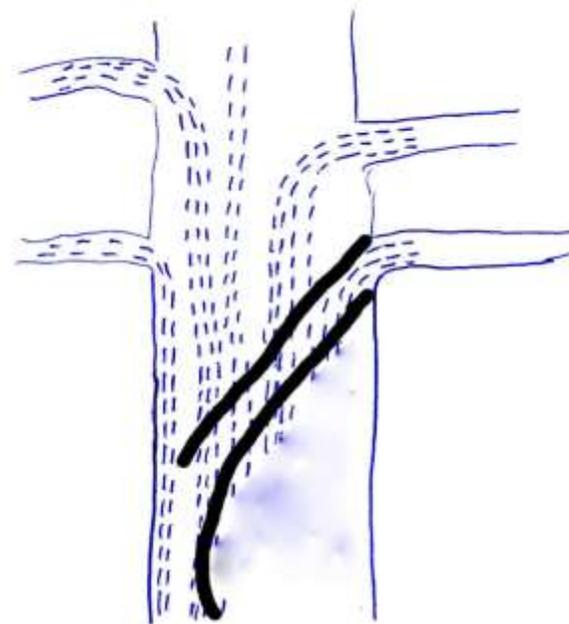
b. Limitation of junipers

- Like most coniferous, the miniature system of veins are dedicated to a branch or a series of aligned branches
- A young juniper has a limited ability to redirect water and sap to adjacent veins when the Xylem/Phloem tissues are damaged.
- An old juniper cannot redirect water and sap to adjacent veins when there is damage to the Xylem/Phloem
- It is critical to understand this limitation when creating Shari
- This limitation prevent us from doing undercut graft on older juniper

Example of veins established by the tree



We cannot dictate the direction of the veins

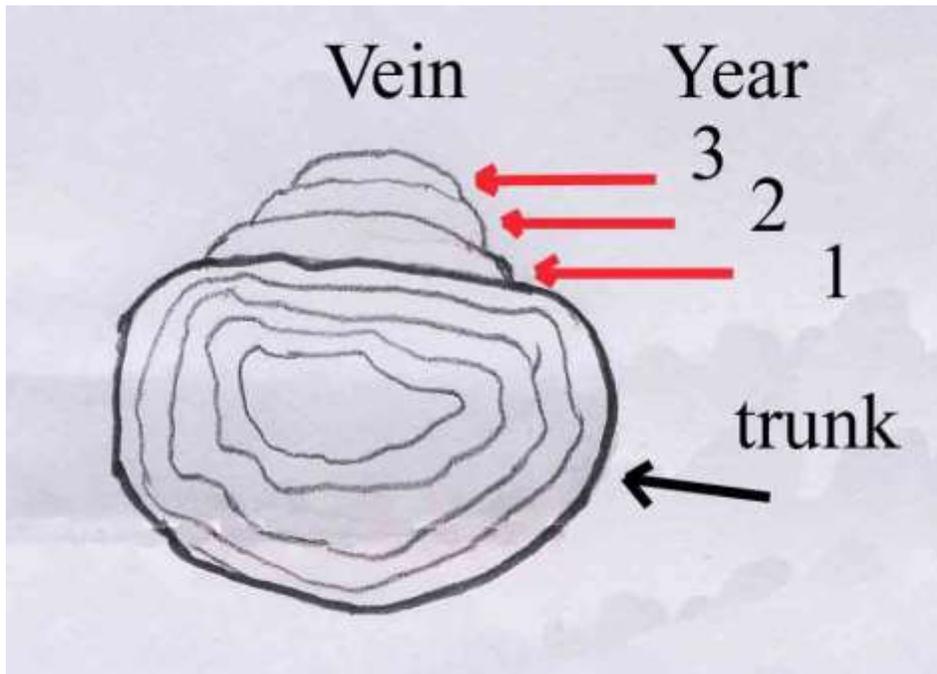


- We must respect the direction of the vascular tissues when creating Shari
- No damage will be done to the tree if we create a Jin and then follow the vascular tissue down the trunk to create a Shari



c. Reducing the size of the veins

- We can reduce the size of a living veins by 30% per year without causing any damage to the tree
- There is a risk when we remove 50% or more of a living vein in one shot
- The vein reduction should be done in the spring
- The goal is to create a bulging vein



Tree from Mr Kimura

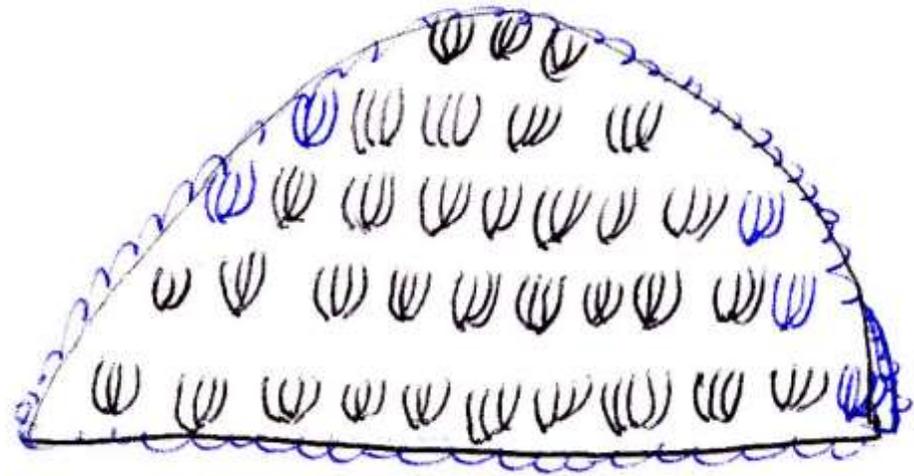
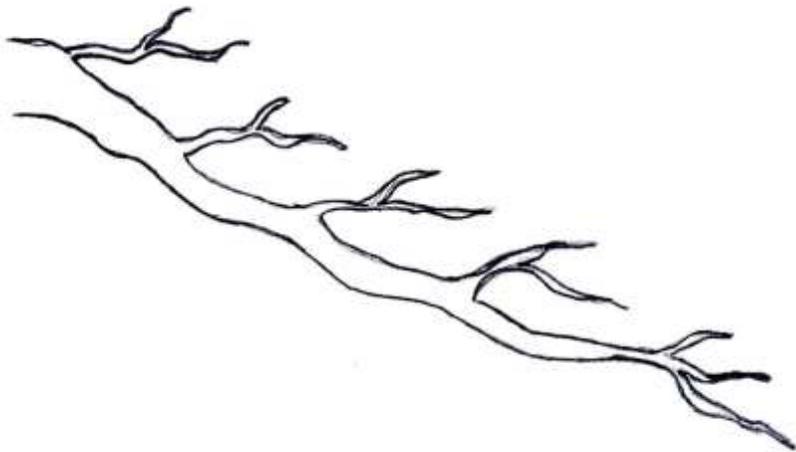
- Example of large vein which could benefit from a reduction



5- Development of foliage pads

a. General concept

- The goal is to create foliage pads in cloud type shape
- The foliage is arranged in different rows varying in height: the foliage sections furthest from the trunk are group together to form the lower row while the foliage section closest to the trunk form the top rows
- This arrangement ensure that all part of a foliage pads gets proper sun exposure



- The volume of foliage pads should be in proportion with the size of the trunk
- A powerful trunk will require larger foliage pads with less negative space
- A slim trunk will have smaller foliage pads with more negative space

b. Ramification

- Good ramification is important to create good foliage pads
- It is important to use the pruning method describe above to develop ramification

c. Cleanup of foliage before wiring

- Need to clean up the foliage before doing wiring
- Remove all weak foliage
- Remove foliage too close to intersections
- We keep the stronger part of the foliage (i.e. the part which bring the most energy to the tree)

Before the cleanup



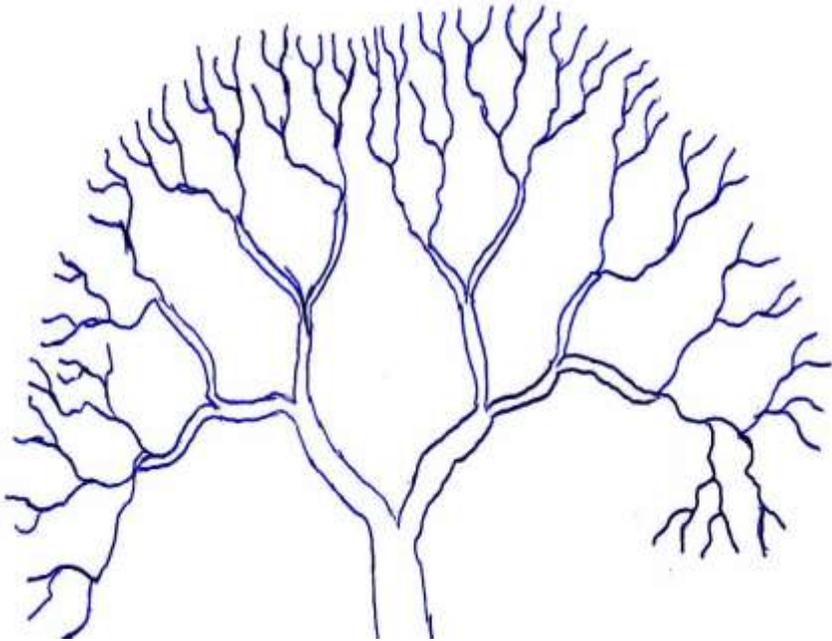
After the cleanup



d. The crown

- The crown will also have a cloud type shape
- Should match the personality of an old tree not a young one

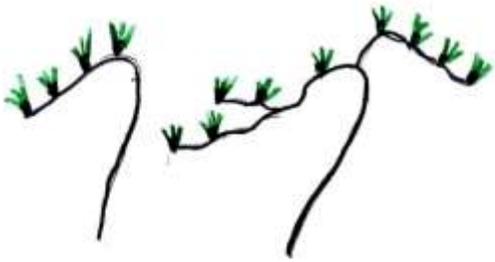
Crown of young leafy tree



Crown of old coniferous



- We often need to use multiple small branches to create the crown
- We can start building a crown from a single branch



6- Bark clean up

a. General concept

- The bark texture will vary between species but will often lack interest on many species
- We often choose to clean up the bark to give it a smooth look and to create a colour contrast
- There are different ways to clean up the bark but we must proceed carefully not to damage the vascular tissues below the bark
- The bark cleanup is a personal preference

b. Method 1

- Use a small knife to lift and peel the outer layer



- Use a soft tissue brush along with water to scrub the thin yellow surface
- The resulting colour will vary depending on the species



c. Method 2

- Use a small chisel to cut and lift the outer layer
- Use a sandpaper to smooth out the unequal surfaces



d. Bark maintenance

- The bark cleanup will have to be repeated every so many years after new layers of bark has developed
- We can increase the contrast between the live vein and the deadwood by applying a very fine coat of vegetable oil on the living portion that we then wipe with a towel
- Some Japanese do not like this method while European seems to use it more

7- Annual calendar of activities

Early spring	Mid spring	Early summer	Mid-summer	Mid-August	Fall
Ideal time for repot Severe bending	Fertilize and allow to grow freely	Fertilize and allow to grow freely	Do not fertilize during hot period Protect small trees from heat wave	Fertilize Pruning of new shoots	Repot in early September
Wiring and styling Creating Shari Air layer	Creating Shari Light wiring and styling	Light wiring and styling	Light wiring and styling	Light wiring and styling	Stop fertilizing around end of September Avoid pruning unless kept in cold room
Reducing size of live veins Scion graft or approach graft					Light wiring and styling if tree kept in cold room

8- Diseases and insects

a. Foliage fungus disease

- A miniature fungus which develop on the foliage
- The sign of this disease appears in spring
- It start by affecting only specific section of the tree (e.g. a branch)
- Cut the dead foliage and ensure proper air circulation
 - Disinfect your tools with alcohol after working on an affected tree to avoid spreading the disease
- Weaker trees are more susceptible to disease
- Apply horticultural oil, at half the strength, twice at interval of 7 days
- Keep your tree in the shade for two days after the oil treatment
- If the problem persist, contact a specialist who can treat the tree with a strong fungicide like Senator 70 (1gr per litre)
- Without treatment, the tree would be dead within 2-3 years

- The tip of the foliage are the first area affected



b. Hard shell scale insect

- The white-beige shell protect this insect from regular insecticide which work on contact
- Use horticultural oil :
 - Mix half the recommended dosage with water
 - Spray the foliage and remember to protect the soil with plastic
 - Keep tree in the shade for 2 days
 - The oil will seal the shell and choke the insect



Example of infestation



- The damage can be unnoticeable at first and is gradual



c. Root rot

- Junipers are not considered sensitive to root rot
- Chose pots with more drainage holes
- Avoid pots with uneven area at the bottom which can accumulate water
- Root rot will affect all sections of the tree at the same time
- A tree affected would die within a year
- A product called “Aliette” could help if applied at the early stage of the disease

9- Deadwood

(Under construction...)