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Winter Care

WINTER IS COMING...

A few check points to get your trees ready for spring.

1. Clean everything:
 - Pick away all dry leaves
 - discard all unnecessary needles
 - take away or thin mosses and ground covers
 - In fact: get rid of everything that can cause diseases, insects or infections.
2. Decide what will have to be repotted next spring: control compactness and calibre of the soil-mix, and even if the root balls are not pot-bound, select the tree to be repotted if the mix is getting dusty.
3. Trees that have to grow through without repotting have to be kept on the dry side.
4. Preventive spraying (winter treatment) with lime Sulphur:
First cover the soil surface, and tilt the trees. Leave the trees outdoors for a few days after spraying, before tucking them in for the winter.
 - Foliage trees: 1/30 = 1 part of Lime Sulphur in 30 parts water
 - needle trees: 1/40
 - flowering in winter: no treatment.
5. Keep your shelter well ventilated, with lot of light and check for sufficient air moistness. Not too heavy frost is no problem (tender species are placed elsewhere), no heating in the shelter.
6. Trees that are over wintering outside:
 - Beware of heavy rain (Tilt the pots regularly or cover them with plastic oil - ideal is foil such as used for PC parts packaging)
do not let your trees get too dry however: during frost, you can cover them with moist sphagnum moss or pine bark. Last year, many trees get caught by heavy dry frost and watering is impossible in that case; moist sphagnum prevents this problem.
7. If your trees are placed on the ground, make a small elevation; don't put them directly on the ground.
 - Necessary winter trimmings, such as thick ends or twin tops: can best be done in June - July, not earlier or later (trees should be sufficiently cold).
8. Before repotting, check that you have sufficient soil mix.
9. Early repotting should only be done if you have at your disposal a greenhouse or other closed shelter with lot of light.
10. Evergreens that have been shaped and potted 1 or 2 years ago - wait as long as possible with the final repotting, Ideal period is end of September - beginning October. Rinse the pots meticulously and make sure all old soil is removed. So, don't

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carry out this operation too early: evaporation through the leaves or needles and rooting are not balanced at this moment.

11. During long freezing periods, the roots of trees wintering outside have to be protected.
12. Try to get your trees out in the open before they come to life again, if early spring is announces itself. This avoids a lot of to and fro. Take care that recently repotted trees stay sheltered!
13. Clean and reshape deadwood, especially at ground level (and underneath); apply treatment. New Jin's Shari's etc are very attractive to mould in closed shelters.
14. Never use the same set of tools on your potensai / container plants and on your more refined bonsai unless properly cleaned. This is to avoid diseases. This may sound far-fetched, but a few examples prove this isn't the case:
 - Root trimming on a tree with root rot can infect the scissors or hook and spread the problem, even if the tree is kept reasonably dry.
 - Mould is trimmed on branches with the same scissors used on other trees: mould can infect the second tree.
 - Use Organocure!
 - Insecticide Spray – Dursban / Chlorphyriphos

LOOKING AFTER BONSAI DURING THE COLD SEASON

WINTER CARE

- Not all plants are as frost hardy below ground as they are above. In some species the previous season's once properly hardened off, can tolerate up to 10°C lower temperatures than the roots. Common species are trident maple (*Acer buergerianum*) and Chinese elm (*Ulmus parvifolia*). Many flowering garden shrubs are also 'root-tender', such as ceanothus, osmanthus and fuchsia.
- Pots standing on benches are more susceptible to root damage due to cold because the cold air can circulate beneath the pot as well as around the sides and top. The main damage occurs when the moisture in the soil expands as it freezes and literally bursts the tissue. Rapid freezing after watering or heavy rain can have opposite effect. The water in the soil expands as it freezes and crushes the fleshy roots. Try burying the pots in the ground and covering with mulch, or pack plenty of bubble-wrap or loft insulation around and especially underneath the pots. Keep soil evenly moist but not wet all winter.
- During winter trees can be kept in total darkness provided they are cold below 7°C and so do not break dormancy. They have no need of light during this period and have no mechanism for detecting light levels. Dormancy is broken when temperatures rise above 10°C or so for several consecutive days. In the wild northern Europe the frost penetrates way below ground level, freezing the roots of all the trees. As this happens the sun dips below the horizon and doesn't reappear for as much as sixty days or more, forcing people to live in total darkness for at least two months. If over-wintering bonsai in total darkness, make sure that they remain really cold at all times.
- If you are over-wintering your bonsai in a garage that you also use for your car, make sure you switch the lights off as soon as you have driven in. When starting the car, back it out of the garage and let the engine warm up outside. The exhaust fumes from a car engine can do far more damage to dormant bonsai than the cold. The heat produced may also encourage early break of dormancy.



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- Trees grown in containers will often break dormancy several weeks before others of the same species in open ground. The compact roots warm up quickly as the air surrounding the pots increases in temperature, which causes the pot to warm up.

WINTER HYGIENE

- Many fungal spores and small pests spend the winter in the debris that accumulates on the soil surface, between the nebari, in forks in the branches and in fissures in the bark. Most will be present all year round, in one form or another, and are relatively harmless under normal circumstances. However, small bonsai in the cosy, predator-free environment of a polytunnel, are more vulnerable. So before you tuck your trees up for winter...
- Clear all leaves and other debris from the twigs and branches. Remove all small cobwebs and keep an eye out for scale insects. Tweezers, a soft wire brush and an old toothbrush will come in handy.
- If trunks and branches have algae growing on them, clean this off with water spray and an old toothbrush. Algae grow rapidly in damp enclosed environments during autumn and winter. Cleaning it now will save you many more hours of work in spring, when you'll have other things to do. It will also help the bark to 'breathe' and preserves emerging adventitious buds.
- Some harmful pests over winter or lay eggs in the fissures of the bark. Trees with flaky or cracked bark will benefit from an application of a proprietary winter wash. Winter washes such as tar oil and lime sulphur have now been superseded by new and more effective products which, if used according to the manufacturers' instructions will protect your trees all winter and help prevent early re-infestation next year. Some of these products will also kill algae, but you'll still need to brush it away afterwards.
- The cosy spaces in and beneath the nebari (exposed roots) are favourite hiding places for woodlice and other insects. Whilst these are not a particular danger to the tree's health, they do burrow in loose material, disturbing surface roots, making gaps between the soil and the pot and dislodging flaky bark. Use tweezers to pick them out - and keep watch for strays!
- Although you've spent all summer trying to keep the moss on your pots green and lush, it will provide a home for harmful insects and their larvae. Besides, in a polytunnel or shed, moss becomes lank and weak, and will normally wither as soon as you put the trees out in spring. If you want to keep the moss carpet for next year, peel it up in large pieces and replant them in a seed tray of moist soil, cover it with chicken wire to keep the birds and cats off, and put it outside on the benches.
- Check all drainage holes and clean if necessary. Pay particular attention to removing woodlice which may have burrowed up through the mesh. These pests can excavate copious amounts of precious soil in their search for decaying vegetable matter to eat.
- Pull yellow or dead needles off conifers. Many will have died because their natural useful term has ended, but others may have been killed by a pathogen or insect pest, so best remove the lot. Take special care to clean the inner branches of dead needles as well, taking your time in order to be thorough. Many pests, especially spider mites, live in this detritus where they reproduce and feed remarkably quickly under winter protection and could devastate a spruce or juniper in a matter of a few weeks.

WATERING

- The best time to water is before 10 am in the morning and no later than 3 pm in the afternoon.

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- Only water the Bonsai if it is dry. If it is windy, your trees will dry out very quickly.
- They must be moist at all times to avoid damage by frost or wind.

WINTER JOBS

- Sharp tools are essential for efficient working and for the health of your trees, and nothing blunts tool quicker than pruning grit-covered roots. It's worth keeping one set of essential tools for root pruning only if you can afford it. Take some time out now to sharpen all your tools carefully.
- Inspect your staging and benches now and replace any rotten or broken slats. Now is a good time to apply a wood preservative as well. Use a horticultural preservative for all timber that is in close proximity to the trees. Creosote gives off harmful fumes for several weeks. Non-horticultural preservatives must never be used for overhead timbers. The rain will constantly wash residue onto your trees which will do them no good at all!
- Have you noticed that you never seem to have the right pot for the tree when you need it? This is the time of year when decisions like that are made, so prepare for next year by deciding on what pots you really need and ordering them now. This is much better than turning up at a show in mid-summer and buying that nice-looking pot that seems about right. Nine times out of ten, you get home and find that it's not right at all, and there's one more pot destined to remain on the shelf and one more tree without the right pot for one more year!

PRUNING

- The only problem with pruning in late autumn is protecting the wound from damage before it begins to heal in spring. Cut paste and protection from frost are mandatory.
- Deciduous species gain nothing from being pruned in autumn rather than early spring, but it can be done perfectly well if you want to save time later. Leave a slightly longer stub than you would if you were pruning in spring. Hollow the wound next year - in summer.
- Shoot pruning is possible but, because the buds are still small on many species, it's difficult to tell which are likely to fail before spring. Birch and red-leaved maples are notorious for unpredictable failure of buds, so best leave these until spring.
- Pines, spruce and cypresses will both respond enthusiastically to November/December pruning by producing adventitious buds. They also don't bleed resin so much at this time, making the whole job cleaner.
- Pruning Chinese junipers in autumn is of no significant benefit and may result in a flush of juvenile foliage next year
- On established deciduous trees the late winter or early spring prune sets the framework for the coming season's growth and has a profound effect on the appearance of the tree in future dormant seasons. If you don't prune hard enough you will be building bigger and bigger problems as the years go by. The summer season is when deciduous trees are developed for their winter display, so some sacrifice of summer appearance may be necessary to get the best result in the long term. Best advice is prune back to one or two buds. But just because you don't see buds, it doesn't mean there are none there. At the base of each shoot you will see a series of rings - scars where last year's bud scales fell away. At each of these rings there will be a perfectly willing dormant bud, just waiting for you to help it grow.
- Look for buds on older wood, even if pruning back to them might mean compromising the outline of the tree for a while. Generally speaking, the harder you prune the stronger will be the ensuing growth, so the area will quickly refill with vigorous, trainable shoots which can be wired to shape when they are still green.

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- Every few years, thin out congested areas, cutting out old heavy spurs, leaving smaller ones intact.
- One last general principle: If in doubt, cut it out. If something looks wrong to you now, it will always look wrong and may even get 'wronger' each year. Removing ugly bits of branch structure when they are young results in scars that heal quickly and a regular taper from trunk to tip. Waiting until they are old and heavy before pruning will leave large scars and sudden jumps from thick to thin on the branch, which is always unsightly.

Pruning Figs

Ficus varieties are among the most popular subjects for indoor bonsai. Many of them will continue growing all year round in warm bright homes where the air is not too dry and it can be a problem keeping them compact and well-branched. Hard pruning is the key. Wait until early spring and cut very hard back, right to the base of the previous season's growth or to an internode even further back - rather like you would (or could, or should) on trident maple. Put the tree in a sunny window. This will invigorate the tree and result in a proliferation of shoots emerging from one, two and three year-old wood. Select the ones you wish to keep to improve the branch structure and cut the rest out. Pinch tiny growing tips as the shoots reach desired length - they're less likely to bleed excessively at this stage. Early next spring, cut back hard again, and so on.... Repeated often enough, this regime will eventually generate strong, angular, well-ramified branches with many dense shoots.

FERTILISING

- Wait for a few weeks after repotting before feeding newly-potted trees. If you used a proprietary potting compost in your mix, wait even longer these already contain nutrients which will deplete over a six- to eight-week period. Adding more nutrients too soon may do more harm than good.
- Start with a mild fertiliser, like Fish Emulsion, as soon as the first leaves emerge before moving to a stronger balanced feed (or high nitrogen for developing trees) as the new leaves harden off. Finally, in late summer, give a few applications of a nitrogen-free feed.

Organic vs synthetic fertilisers

- If you use an inert (read lifeless) growing medium - calcined (baked) clay, pumice, pure grit or even pure akadama, it will very likely not contain sufficient quantities of the bacteria necessary to break down the organic fertilisers in order to release their contents, especially the nitrogen. Although the fertilisers themselves will have some of these bacteria, the release of nutrients will be slowed by the absence of others in the soil. Ammonia or urea-based fertilisers also require bacteria for their breakdown. Either use chemical fertilisers or include some 'live' soil ingredients in your mix.

Quick vs slow-release

- Commercial fertilisers are manufactured to be either quick-release or slow-release. Whichever you choose makes little difference to your trees, provided you follow the instructions on the pack. Quick-release fertilisers are essentially readily soluble in water and contain nutrients that the plant can absorb straight away, without the need for any intermediate process. They are normally dissolved in water before application and applied either as a soil drench or as a foliar feed.



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- Slow-release fertilisers fall into two categories: chemical and organic, and are always solid matter. Chemical slow-release fertilisers use a variety of devices to delay release of nutrients. Pellets such as Osmocote have a semi-porous shell which permits the nutrients to pass through by osmosis. Others have been formulated to physically break down over time.
- Organic fertilisers need to be broken down by bacteria and other tiny organisms before the nutrients they contain can be converted to a form that plants can readily absorb. This process also generally requires soil temperatures to be above 12 - 15 degrees before it can take place.

Pines

- Pines are constantly undergoing a process of development producing buds on old wood to replace overgrown shoots. Also, unlike most species, pines normally only have one surge of growth every year. There is also the need to reduce the length of the needles in order to create and maintain a neat appearance. These three factors indicate that the normal feeding regime should be reversed. Start the season with nitrogen-free 0-10-10 or similar. This will retard the growth of the new shoots without harming the health of the tree. They will be compact and will bear shorter needles (helped by a controlled reduction in water). Once the needles have hardened off and you have re-started regular watering, use a high nitrogen feed right through to the early autumn. This will encourage the tree to grow, but since it is only programmed for one growth cycle per year, the energy will be used to produce many strong buds ready for next year. Applying a nitrogen-free fertiliser to most species from the middle of August until leaf-fall will help roots and shoots to harden off in preparation for winter. Moving the pots to a cooler location in late summer will retard the growth of tender young roots which are more susceptible to frost damage.

PROPAGATION

- Many deciduous species can be rooted from hardwood cuttings during winter. Take cuttings of shoots that grew early in the season and bury insert them by about half their length in a sandy soil. True hardy species can be rooted outdoors in open ground, but slightly tender trees will need to be rooted indoors.
- Many hard-coated seeds, such as hawthorn, hornbeam, pine and maples, actually need a period of cold before they can germinate. Some even need to be frozen for several weeks. This process of freezing and thawing is called stratification and is a natural mechanism designed to prevent early-shed seeds from germinating in autumn, only to be killed off during the following winter.
- Seeds of some species, especially hawthorn (*crataegus* spp.) and hornbeam (*carpinus betulus*) may take two years or more to germinate. The shells of these seeds are exceptionally hard and durable, and need this time to degrade sufficiently for the root and cotyledons to be able to burst through.
- Collect seeds of field maple (*Acer campestre*) or Japanese maples (*Acer palmatum*) in autumn and keep them in a paper bag until the middle of January. Then put them in a polythene bag with a handful of dry sand, seal the bag and pop it in the fridge. Within a few weeks most of the seeds will germinate and they can then be potted up and gradually hardened off ready to be put outside in spring. This way your seedlings will get off to a good start in their first crucial year.
- Sow acorns and other large fleshy seeds as soon as they are ripe. Such seeds are designed to be distributed by birds and animals who bury them in soil or leaf litter and then forget where they put them which explains how species with heavy seeds, such as oaks and chestnuts,



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appear spontaneously great distances from the parent trees. Allowing fleshy seeds to dry out before sowing will render them unviable.

Air layers

- If you're thinking of air layering, be patient. Wait until the first flush of spring foliage has begun to harden. The growing shoots produce auxins which, in turn, signal to the roots that they are there and require sustenance. Ring-barking cuts off the downward flow of these auxins and the roots believe that there is no foliage to feed, which may well result in the loss of the branch to be layered. In addition, the leaves produce sugars to nourish the emerging roots.
- Also, when you do get round to it, don't be faint-hearted. Remove an entire ring of bark at least one and a half times the diameter of the branch, scraping the wood clean of all traces of cambium. Leaving a bridge of bark as a 'safety precaution' will probably cause the layer to fail or at least delay the rooting. Having made these points, species do vary and there are exceptions to the rules, but why take the chance?

WIRING

- Before you wire - de-wire! Let your trees rest and stretch for a few months before re-wiring.
- In practical terms, this is an ideal time of year to wire any species because the branches are clean, the buds are small and not so easy to dislodge and you probably have more time on your hands. But wiring does cause stress to the tree, which it won't begin to recover from until spring - so concentrate on adjustments rather than drastic shaping.
- Finish wiring before winter and keep the wired trees frost-free.
- Cover any cracks or splits in the bark with cut paste or, in the case of many transverse cracks on the outside of a bend, with something like petroleum jelly.
- Deciduous trees are best wired during the dormant season. Begin in mid- to late August, well before the buds begin to swell. If you wait until the end of September the buds will have begun to swell and they become more fragile and very easy to dislodge. Elm and larch are the worst culprits.
- Wire when the soil is slightly on the dry side and water afterwards if necessary. If the plant is pumped full of water, the twigs and branches will be less flexible and will break more easily.
- Don't wire while the roots are frozen. The action of bending branches causes a certain amount of tissue damage compressing some cells and expanding or stretching others. If the soil is frozen the tree cannot adjust its water content to compensate for the changes in cell size and some branches might die from drought.
- Don't wire the whole tree at one sitting. Take your time by doing a little bit each evening. This way you can consider each move carefully and if you are making mistakes with either the application of the wire or the positioning of the branches, you will have plenty of opportunity to spot them before you have gone too far.
- Wire is less likely to cut into the bark at sharp bends if you can ensure that it is on the outside of the bend, not the inside. This also helps prevent branch cracking by compressing the tissues rather than stretching them. This is not always possible, of course, but it is a good rule to try to keep.
- Always cut wire away to avoid damaging fragile young branches or tender, swollen bark. The thicker the wire, the more important it is to do this. In the long run it is false economy to try to salvage the wire. It becomes progressively more brittle and difficult to re-apply accurately. You only have to break an important branch once to make the connection! If you must try to uncoil



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the wire, start with the thinner sizes first. from the tip of the branch towards the base, and hold each turn firmly as you work along the branch.

Bending branches

- If you intend to make severe bends in conifer branches, it is best to do that while the tree is resting. The main danger to the tree during severe bending is the separation of the bark from the wood as it stretches on the outside of the curve and compresses on the inside. It follows, therefore, that there is less danger of this happening when the bark is stuck fast. Having said that, there's no point in carrying out such operations if the tree has to wait three or four months before it can begin to recover with new growth. Late winter to early spring is best.
- Bind the branch very tightly with several layers of wet raffia. (Raffia becomes more supple and less likely to snap when wet.) It's easiest to use six or eight strands in a bunch, overlapping at each turn. Try to get the wire to cross the trunk on the outside of the curve. This helps to reduce the stretching effect on the bark as the branch is bent. If the wire crosses the trunk on the inside of the bend, it has the opposite effect - forcing the bark on the outside to stretch and fracture.

Sharp bends

- Really sharp angles can be introduced into a branch in early September in the following way. Using a sharp, fine bonsai saw, cut a narrow wedge out of the branch at the point where you want the bend. If you're very careful you can use angled side cutters for the job, but they're not so easy to control as a saw. Make the cut on the inside of the bend, and about half-way through the branch. Then, having applied the wire making sure that it crosses the branch behind the wedge-cut make the bend until the two cut surfaces meet and are pressed tightly together. Within a couple of months the surfaces will graft together and by the end of the season the union will be strong enough to hold the bend in place.

REPOTTING

When to repot?

- Autumn is okay for deciduous trees but remember that the roots will not start to grow until spring, so if they are exposed to continual freezing and thawing, further damage is likely. Always keep trees that have been repotted in autumn frost-free all winter, but not so warm that they begin premature growth.
- Spring is best for all trees. Start with deciduous species and work through needle conifers, finishing with Chinese junipers, which are the last to start growing.

Order of Repotting

- All species are best repotted in late winter/early spring, but some can be repotted now in relative safety. However, there will always be an increased risk of damage of one sort or another because the roots won't begin to heal and regenerate until spring. Frost protection until spring is mandatory.
- Some species are safer than others for autumn repotting. Azaleas, needle junipers and larch are the most vulnerable to damage, followed by Chinese junipers and cypresses, then pines. Spruce and broadleaved deciduous trees are the safest.
- Heavy roots contain food stored for spring. Bear this in mind when pruning the roots.

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Repotting junipers

- The fact that most Chinese junipers begin growth in earnest much later than other trees, combined with the waxy leaves, enables you to repot them with confidence up until the end of October. If you can provide semi-shade and regular spraying, say three or four times a day, you can even repot throughout November. Late February through to the end of March are times to be avoided. Chinese junipers continue growing through autumn and don't like being disturbed while they are building winter reserves of energy. Try chopping up some fresh sphagnum moss (not peat) in your potting mix - up to twenty percent. The growth will be strong and dense and the foliage colour will become richer. Next time you repot, you will be amazed at the fine and healthy root system, which will explain why.

Mixing your own soil

- If you mix your own soil remember that it is essential to remove all fine particles especially of organic matter. Organic matter will continue to decompose in the pot and fine particles will wash to the bottom rapidly forming a dense, water-retentive mat that will seriously impede drainage.
- If you use, say, equal parts by volume of grit and organic matter, remember that grit, being heavy, settles in the scoop. Organic matter, being loose and fluffy, does not. This means that in order to ensure that you are using equal parts by true volume, you need to use two scoops of organic matter to every one scoop of grit.
- Adding a soil conditioner such as Biosorb (Terragreen, Turface, Seramis etc) to the mix will encourage healthier root growth. This keeps the soil open and retaining moisture without impeding drainage. However, limit its use to 15% at the most. Any more than this may retain too much moisture and cause the organic ingredients to become sour.
- Although some organic matter contains some trace elements, all bonsai soils are pretty poor in this regard. Add some trace element Frit to the mix, topping up with another dose later in the year.
- Always use dry soil. This is far easier to work into all the spaces between and around the roots than moist, sticky soil. Peat is difficult to re-wet once it has become completely dry, so it is recommended to use peat-free organic matter in home-made soils.
- If your ingredients are moist when you mix your soil, add some Biosorb (Terragreen, Turface, Seramis etc) and allow the mix to stand for a day or so. The Biosorb will absorb all the moisture from the other ingredients, creating a perfect consistency for use.

Aftercare

- Newly repotted trees are vulnerable and should be protected from frost, heat, wind and too much water. Frost may cause further die back. Heat and wind can dry out the upper part of a tree rapidly, especially if the roots have not recovered from pruning and are thus not yet able to draw water efficiently. Excessive water will cause pruning wounds to rot with disastrous results.
- Never feed freshly repotted trees until after the buds have opened. Not only will this encourage growth that the roots cannot yet sustain but, because the roots are not functioning efficiently, there may be a build up of nutrients in the soil. If these nutrients achieve a higher concentration than those in the roots, reverse osmosis occurs, drawing moisture out of the roots and thus, ironically, causing drought symptoms.

ABOUT ROOTS



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Know your nodes

- Many species, especially those of the 'bean' family, such as wisteria and laburnum, and those adapted to permanently wet soil conditions, will produce knobby growths on their roots like these on alder. These nodes, as they are called, serve a very useful purpose. They help to extract nitrogen from compounds in the soil that would normally be inaccessible to plants. (Gardeners recommend leaving the roots of pea and bean plants in the ground so that the extracted nitrogen can be used by the next crop as the nodes decay.) So if you are dealing with leguminous or water-loving species, leave intact as many of these nodes as possible. If you find nodes on other species they have been known to occur on hawthorn, field maple and english elms they may be the result of too wet conditions, so cut them away and reconsider your soil mix and inspect the drainage of your pots. Abnormal, node-like growths may also be caused when a thick, newly-pruned root is in contact with the side of the pot, where it heats up rapidly in the summer sun. Overcrowding of heavy roots, causing spontaneous in-arch grafting, can also give rise to abnormal growths. Sub-terranean fungal infection or other pathological disorders are more likely to cause death and decay rather than abnormal growth.
- Die-back of branches, lack of vigour and early autumn foliage are common signs of an inefficient root system. One of the commonest causes of this is the presence of compacted old soil close to the trunk. Make a point of totally bare-rooting all new trees at the earliest opportunity - if not immediately on acquisition, then at the first subsequent repotting. Use a garden hose with a jet nozzle to remove the soil - but do it slowly. Little or no damage will be done to the roots. Stubborn areas of really hard soil will soften if you stand the rootball in a tub of water for a couple of hours. While you're at it - add some Superthrive or Rootsafe to the water. Using a really open, gritty soil from now on should make the occasional total bare-rooting a piece of cake in subsequent years.
- Root rot begins when the plants roots are deprived of oxygen and/or are attacked by a pathogenic fungus. Most healthy plant roots are impervious to fungal attacks, so the problem begins with too much water. Roots need oxygen to survive and when they begin spending too much time submerged in a saturated soil mix, they begin to die or become susceptible to fungal attack.
- Never repot any bonsai without making some improvement to its root structure in addition to normal root pruning. You only get one opportunity every few years, so grasp it while you can. The roots of a bonsai need to be properly structured, just as the branches. Crossing or poorly positioned surface roots can be adjusted at repotting time. Use wedges or similar to reposition surface roots.
- Never try to wire surface roots. Their cell structure is different to that of branches and they crush or split very easily. What's more, the bark on roots becomes damaged or detached from the wood at the slightest provocation!

Forest root pruning

- Forest plantings cannot be root pruned in the same way as single trees. After removing the old soil from the outer parts of the root ball, cut out wedges of roots from around the edge. Always inspect the roots carefully and make sure that each individual tree has a sufficient amount of roots removed - keeping this in proportion to the relative size of each tree.
- The central core of a forest planting roots becomes very compact and dense, eventually becoming impenetrable for water or air, and thus useless to the plant. Therefore, it will need to be refreshed from time to time. Do this by carefully removing soil from localised areas with a



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stick and/or a narrow, high-pressure water jet. The next time you repot, repeat the procedure in a different area.

Larch

- Many people panic when repotting larch. Over winter the roots contract and by spring become little more than flat, soft strands, like soggy shoelaces. To all intents and purposes they appear to be dead. But don't make the mistake of pruning away all these apparently dead roots. Inspect them closely and you will find a tiny, hard white thread in the centre of each 'shoelace'. This shows that the root is alive and in spring the thread expands and fat white growing tips appear as if by magic.

Elms

- These are notorious for having roots that crush easily. They also have a very slippery texture beneath the bark which hinders pruning. Always use very sharp tools for cutting elm roots. Blunt tools will always lead to frustration and cause excessive and unnecessary damage. Roots with crushed fibres at the pruned end will die back and rot, possibly even causing the loss of valuable nebari.
- During summer and early autumn, especially when the soil is heavily mossed over right up to the trunk, new roots often emerge from the base of the trunk, between the older nebari. Young roots are many times more vigorous than old ones, and the growing conditions in the sub-layers of moss are ideal. It is an easy mistake to allow these roots to remain. They will soon become almost as thick as the nebari but their vigour will cause them to grow straight and eventually lift themselves above the soil

SUMMER STUFF

Pinching maples

- Most people tend to begin routine pinching far too early in a tree's development. Wait until the primary and secondary branch structure is established, with no long, straight branches, and has almost reached the ideal periphery for the tree. It is only the final few internodes that require the fine ramification that results from eager pinching.
- As soon as the first pair of leaves unfold, and you can see the embryonic bud beginning to protrude between them, pounce. If your fingers are nimble, use them. Otherwise, a eyebrow tweezers with flat tips are easier to use than the more pointed Japanese ones. Doing this will not only induce two new shoots from the remaining leaf axils, but it will also, and importantly, help to prevent the first internode from extending. If this process is repeated constantly throughout the year only on a healthy tree, which is being fed a moderate, balanced diet the results will be dramatic. Next year, allow some shoots from each branch tip to grow freely for a month or two, to act as a 'sap chimney', strengthening the previous year's growth. Cut them off at the base before the shade from the leaves begins to weaken the inner shoots.

Check your wiring



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- Trees are growing rapidly now and branches, especially young ones, are swelling. Inspect all wire very, very carefully each week. Check the wire at the top first, then on sharp bends on other parts of the tree. These are the places that swell the fastest and wire that is 'comfortable' one day can be digging into the bark a week later.

ODDS & ENDS

Bonsai mushrooms

- In spring and autumn you can frequently see tiny mushrooms growing close to the trunk of your bonsai. These are probably feeding on decaying organic matter in the soil, so are harmless and as often as not quite charming. They may even be the fruiting bodies of mycorrhizal fungi that actually benefit the tree by breaking down nutrients into a readily digestible form. But if you are the worrying type (or if there is honey fungus - armillaria in your area) here is a simple test. Gently pull the cap off one of the mushrooms and place it on a sheet of white paper for a few hours. When you lift it up it should have deposited a spore print on the paper. If this spore print is black, brown, purple - no problem. If it is pink - it may be armillaria. To reassure yourself, dig around in the soil to see if you can find black, shoelace-like strands of mycelium. If you do come across any - repot immediately, making whatever after-care provisions are appropriate and consult your nearest woodlands management agency for advice.
- In hot weather your trees' water consumption is likely to reduce as they 'shut down' - closing the stomata (pores in the leaves) to conserve moisture. But if your tree has actually wilted, when you water its uptake can be up to three times as much as usual. This is because it not only begins normal transpiration to enable it to take up the much needed water, but it also has to replace the water in the cells to expand them to their normal size.
- Watering your trees early in the morning means that as the sun reaches its hottest - mid-afternoon - the soil is reaching its driest. Watering at mid-day ensures that the trees have the maximum amount of available water exactly when they need it.

Lenticels

- Lenticels are tiny growths on the bark of young branches of most trees. Sometimes they are pale (cherry), sometimes dark, and sometimes almost indiscernible. In Chinese junipers they appear as small bumps, as if a grain of rice had been trapped under the bark. Their job is to exchange gases and release water vapour. In dry, windy winter weather, even in winter, deciduous tree can suffer damaging desiccation through "lenticular transpiration". Some roots also have lenticels which enable old roots to absorb moisture. It's not all good news, though: lenticels can also serve as convenient entry points for harmful fungi and bacteria.
- The traditional bonsai pot as we know it - rectangular, soft-cornered - is a fairly recent introduction to the art. Until the late nineteenth century bonsai pots had been much deeper and usually round, with ornate designs and narrative paintings incorporated in the final glaze. Specialised very shallow pots for forest plantings came along during the early 20th century, and crescent or half-moon pots have only really become acceptable during the past few decades. More recently still, the traditional Japanese potters have begun to put wire holes in their pots to make tying trees easier (an idea some say originated in the west).
- During the last few years the practice of joining two or more rocks or slabs to make a more abstract, free-standing container has made an appearance at some prestigious exhibitions in Japan, indicating that it, too, has gained acceptance there.



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Cure for rooting headaches?

- An old trick used by floral arrangers is to put a couple of aspirin in the water to prolong the life of cut flowers. The active ingredient in aspirin - salicylic acid - is found in the bark of young willow stems. Researchers have found that immersing cuttings in an infusion of willow bark greatly enhances rooting in many species. Salicylic acid also helps prevent disease entering through wounds by actually killing off cells around them, thus making the area inhospitable to parasitic organisms. Although no research has yet been reported on the effect of salicylic acid on yamadori, it's well worth a try! Here's the recipe: Fill a glass container with twigs of current year's growth cut into two inch pieces and top up with water. Let this steep for a couple of days, then strain and use - simple! If you can't find a willow - try aspirin!

Jins and sharis

- Autumn and winter aren't the best times of year to make new jins and sharis because the bark is very difficult to remove when the sap isn't flowing, But it is a good time to treat existing deadwood areas with lime sulphur.
- If the wood is bone dry, spray with clean water before applying the lime sulphur - this helps it penetrate.
- To darken the usually snow-white lime sulphur you can add wood ash, charcoal or soot. Works just as well as inks but is cheaper!

Sifting

- Do you get smothered in dust when you sift your soil ingredients? Try this: cut the bottom off a bin liner to make a tube and tie one end around the base of the sieve. Drape the other end in a bucket or whatever and sift away. All the fine dust and debris goes straight into the bucket and not in your trouser turn-ups!

If you are thinking about using treated water of some kind, bear the following points in mind:

- Softened water is treated with sodium which replaces the calcium. Sodium is not good for plants in the amounts present in softened water and, when combined with the chlorine present in all tapwater, produces a lethal cocktail. Do not use softened water to water any of your plants. If you have "hard" water the only reason to avoid its use is the build-up of mineral salts on the exposed roots and the rim and feet of the pot. Adding a soil acidifier such as Miracid should make hard water safe for calcifuges such as azaleas and stewartia.
- Distilled water has been evaporated and condensed to remove some (though not all) of the impurities. It's fine if you only have one or two indoor trees to care for but prohibitively expensive otherwise.
- De-ionized water has been filtered in various ways to remove ions of sodium, calcium, iron, etc, many of which are beneficial to plants. Forget it.

Species notes

- Chinese junipers seem to live in a different time scale than the rest of us. They are late to start growing in spring often not beginning until the end of May. On the other hand, they can continue growing quite vigorously right up to the end of November in good years. The bonus is



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that Chinese junipers can be re-potted and root-pruned as late as early June with no ill effects, provided you can keep them shaded and misted for a few weeks. This can be a great help in busy bonsai back yards, where any spring task that can be put off 'til later is very welcome indeed!

- Chinese elms are not true deciduous trees. Like common garden privet, it will lose its leaves in cold weather but remains more or less in full leaf all year in mild climates or if kept indoors. Chinese elms are an ideal compromise between indoor and outdoor bonsai, giving you the best of both worlds.
- If your trident maples break dormancy early after being kept under protection all winter, don't worry everyone else's do the same. Just shift the tree outside during the day and replace it under shelter at night. Keep a weather eye open and shelter the tree from severe east winds during daytime exposure.
- Japanese maples that come into leaf under protection are extremely vulnerable to frost, wind and sun damage when placed outside. If they are placed outside before bud burst, the new shoots and leaves are much sturdier and far less susceptible to such damage.

Warnings!

- If you use a hose to water your trees, remember that the water in the hose will be of ambient temperature and not necessarily ideal for the tree. In cold weather it may be colder than the water in the underground water supply in hot weather the sun can heat water in a hose to a temperature that is almost too hot to touch. Always allow the water to run for a few minutes before using it on your trees.

Vine weevil larvae

- These murdering little beasts are active in the soil more or less all year round now, but more so in summer. In spite of what you may have read in other, less well-informed publications, there is no insecticide available to amateur growers that will even give them a hangover, let alone kill them. Predatory nematodes are usually quite effective but can only be applied at certain times of the year - like now! The best weapon, however, is the wit of man. Adult vine weevils are wingless, therefore can't fly. So, simply stand the legs of your display benches in containers of water and those evil weevils will never be able to lay their eggs in your pots again.

**I walked away
And left the bright moon
With my bonsai and their shadows**