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Oh, the toil of making soil

By *Andrew Smith*

When I was a kid my mama told me never to discuss sex, politics or religion at a party, because it might offend someone and start an argument. But you could discuss the weather, no problem, if you could find someone bored enough to listen to your opinion about it.

Today, of course, you can't discuss the weather either, because global warming might come up and there are plenty of people willing to go to fisticuffs over whether you are a believer or not, or whether you drive a pickup or a Prius.

This leaves maybe winter boots and dirt as the two remaining sure-fire non-inflammatory conversation starters you can use at any party. Unless, of course, it's a party of Eskimos, who, it turns out, have very strong opinions about winter boots; or a party of bonsai people, who, I'm finding, have very strong opinions about dirt—that is, bonsai soil.

And if you happen to find yourself at a party of bonsai-growing Eskimos don't even try to talk; just drink. Everyone will already be mad anyway because their bonsai are always frozen.

Up till now at least, I have never really been a connoisseur of fine soils. Things, all things, eventually break down and crumble to dust and that's what we call dirt. New things arise and grow out of this dirt, living for days, years or centuries, until they too crumble back into it, adding whatever materials their life has gathered back to the humble soil. And it goes on and on. There's nothing as common, or as magical, as plain old dirt. Just ask Adam.

My basic approach to bonsai soil has been based on the observation that in nature trees grow where seeds fall, rather than where conditions are perfect. Trees are capable of adapting to lots of varying conditions or they would need to go see tree psychiatrists. And since the job market for tree psychiatrists is pretty slim, I have always assumed that trees are pretty adaptable. Anyway, rather than trying to find a perfect soil, my goal has just been to find one that was easy to make and that would work, and let the tree do the rest.

This has worked alright for nearly 20 years. I've collected and potted thousands of trees and most of them have grown or I would have quit long ago. And during my trips around the country and my visits to various homes and bonsai collections one of my most frequent observations has been that people grow bonsai in all kinds of stuff. I stayed with one guy on the east coast who had several beautiful collected specimens, including Rocky Mt. juniper, ponderosa pine and Douglas fir, that he'd had in pots for over 20 years without ever clean-

ing any of the original soil from the roots. The trees were just potted 'as is' and bonsai soil was added around the edges of the root pad. Since one of the cardinal rules you always read about collecting is that you **MUST** remove the original mountain soil to prevent root rot, I asked him why he had not done so. He said, "Why would I want to do that? This is what they were growing in." Anyway, it worked for him.

Just last year I saw a ponderosa pine, originally collected by me, that had been growing for 10 years in what looked like leaf mold, in a plastic pot with no drainage holes. Again, that shouldn't work, but it appeared to be working fine.

And it's common knowledge that you have to screen your bonsai soil, but I've met many knowledgeable bonsai growers who don't. Since I transplant and pot several hundred new trees every year I found that approach appealing, and that's the example I have always followed. In all cases the common factor leading to success may be growers attentive enough to water appropriately, based on the soil they had.

But his winter, maybe because of all the righteous bonsai soil opinions I heard flying back and forth, I really started considering whether I ought to try finding a better soil mix. Although my soil worked alright, I began to wonder whether I could find something that would work better than just alright. Bonsai is hard work, and if I could increase survival by just 5% it would be worth a lot to me.

So, based on what I had been reading and hearing, this spring I radically changed my soil mixture. I ordered a pallet of pumice from Oregon, and a pallet of volcanic scoria from Colorado. To this I added pea gravel and a bit of bark and charcoal. And now for the radical part—I decided to screen everything, which I have never done before.

My standard mix for pines is now 3 parts pumice, 3 parts lava, 3 parts pea gravel (Pumice Helper my wife calls it, because it's cheap), ½ part horticultural charcoal and ½ part fine pine bark, all screened to sift out the dust. For junipers I use more pumice and for spruces and deciduous trees I add a little more bark.

This soil mix is kind of the gourmet version of the soil mix I had already been using. The components are of better quality and screening it is like marinating a tough cut of beef to tenderize it before cooking. Voila! I might become the Top Chef of dirt.

The first and most obvious thing I discovered when I made this switch is that I really hate screening soil. I had hypothesized that this might be the case, but I was finally able to prove it beyond a reasonable doubt. So don't bring it up to me at any parties, unless you want to find yourself in an argument about it. And I have nowhere to put all the piles of soil dust that screening creates, so it gets tracked all over the house. Don't bring that up to my wife unless you want to get in an argument with her. And it takes a lot longer to pot trees because the soil is much slower to make. Every single project I'm involved in is

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behind schedule because of this. Don't bring that up to anyone I know or they'll probably call me and ask what's taking so long. And that's sure to start an argument.

On the up side, I think I've gotten the best transplant survival this year of any year so far. That could be because of the new soil. After all this trouble, I would hope so. But it could also be because we're in our second very wet year in a row after many, many years of drought. So the trees themselves are strong and eager to grow. And it's been a cool year so far too, so the temperatures haven't been stressful. Those things are probably helping too.

Time will tell, but so far I'm optimistic about this new soil recipe. It's definitely more expensive and more trouble to make than my old soil was, but if it really helps the trees then it helps me too and I'm willing to do it. No argument about that.



The Next Step—

Advanced Tips & Techniques

By Bjorn Bjorholm

Juniper Bonsai Culture

Perhaps one of the most well-known and popular plants used for bonsai is the Juniper. There are many cultivars and varieties of junipers that readily lend themselves to bonsai culture. In this article, we'll be taking a look at Shimpaku Juniper, Needle Juniper, and Procumbens Juniper, covering the basic maintenance and care techniques for each, as well as providing some insight into advanced techniques for creating world-

class Juniper bonsai.

One of the biggest aesthetic draws of Juniper bonsai is the characteristic twisted, gnarly deadwood that often features prominently in their design. Yamadori, or collected trees, often have heavily contorted trunks with deeply fissured deadwood that naturally interplays with the live vein, which ultimately keeps the foliage alive. Shimpaku, Needle, and Procumbens Junipers all possess their own unique deadwood characteristics, making each species aesthetically interesting and enjoyable in their own right as bonsai. In certain instances, it may be necessary to create shari, or deadwood on the trunk, to add to the visual appeal of a Juniper bonsai. In this case, first outline the desired shape of the shari with chalk and use a sharp knife to remove a section of the live wood along the natural line of the trunk. Typically, only 20 -30% of the total live tissue should be removed at one time for the safety of the tree. This technique can be performed year round.

The deadwood can then be peeled back with a variety of tools to give a more natural, feathered appearance to the final design. A chisel and hammer can also be utilized to add to the desired effect. Wood should be peeled and chiseled along the length of the deadwood to create a more natural look. In areas where bark or wood is difficult to remove with hand tools, an electric dremel tool can be used to clean those trouble areas. Be aware, though, that electric tools will often create an unnatural final appearance to the shari, so our recommendation is to use them sparingly if possible. Jin, or deadwood branches, can also be created by hand to add to the aged appearance of Juniper bonsai. Foliage should be removed first on the branch to be jinned, and the remaining live tissue can be crushed and removed with pliers. Branch tips should be broken and feathered back for natural effect. And again, electric tools can be used to clean up trouble areas.

Long-term maintenance of jin and shari is a major priority with Juniper bonsai. Both natural and man-made deadwood will rot over time through exposure to the elements and must therefore be cared for proactively. At Kouka-en, we typically wash the deadwood on Junipers twice per year using water and a basic toothbrush or nylon brush to first clean up the fungus and grime that naturally builds up during the year. Extra attention is paid to the shari at the trunk base, as this area tends to rot the fastest. The scrubbed grime is then rinsed off and the process is repeated as needed until the wood is as clean as possible. Next, a mixture of lime sulphur and water is then applied to the jin and shari. In most cases, we use a 1 to 1 ratio and add multiple coats as needed. Care should be taken to avoid getting the liquid on the live vein and tissue, as this looks unsightly and is potentially harmful if heavily applied. The yellowish color will fade within a couple of days, leaving the deadwood a nice, whitish hue.

After the lime sulphur dries, the live vein is then carefully rubbed with fine grain sandpaper to expose its natural, underlying reddish color. This technique is not a necessary one, but the contrast between the whitish deadwood and the reddish live vein is often aesthetically pleasing and adds to the character of the design. And of course, care should be taken to avoid damaging the live tissue. This technique can be applied to all Juniper species, however, extra care should be taken with Needle Junipers as their bark is rather thin and tears easily. Lastly, avoid rubbing the live vein with oil, as this can also be detrimental to the tree's health.

Shimpaku Junipers

Shimpaku can be repotted at anytime throughout the year, even in the hottest part of the summer months. However, the best and safest time to repot



is in the spring. Old soil should be removed carefully with small root rakes, and if the remaining root ball is well developed and rather compacted, small leather punches or even screwdrivers can be used to aerate the soil. Shimpaku typically look best in unglazed containers, particularly pots that have a reddish hue, as this often accentuates the red color of the tree's live vein. The proper shape of the pot will be determined by the movement and design of each tree – for example bonsai with harsher lines often look best in pots with sharper edges, and vice versa for softer trees. At Kouka-en, we use a mix of one part akadama, one part pumice, one part large particle sand, and one part lava rock for Shimpaku bonsai.

Older Shimpaku Junipers will often produce seeds in mid to late spring. Seed production drains energy from the plants, so it's best to remove them as they appear during the growing season. Additionally, allow new shoots to elongate during the first part of the growing season. As they elongate, do not pinch, but rather use scissors to cut back to the semi-hardwood on the shoot.

Avoid cutting through the foliage and only cut the shoot itself. In this way, we can avoid damaging the delicate foliage and promote healthy, soft growth at the same time. Removing more than 50 to 60% of the total foliage mass on Shimpaku Junipers will often cause them to produce juvenile foliage that can take years to correct, so for safety's sake, it's better to err on the conservative side when trimming.



Needle Juniper

Another popular Juniper species used for bonsai is *Juniperus rigida*, or the needle juniper. Needle Junipers have characteristically sharp deadwood and needles, which can seem somewhat intimidating at first glance, but if maintained properly they can make incredibly powerful bonsai. In spring, shoots should be allowed to fully elongate. In Japan, this typically means allowing them to grow unencumbered through late May or early June. As they reach this appearance, shoots can be cut back. Shoots should then be trimmed with sharp scissors. The green area is the safe zone, so cutting anywhere along the green shoot will produce back budding and new shoots in those areas. Do not cut through the foliage, but rather weave the scissors between the needles and cut only the shoot itself.



Just after shoot cutting, this is an excellent time to detail wire and refine Needle Junipers. Wire is applied in much the same manner as Shimpaku Junipers, however, rather than layering pads, branches can be fanned out in a hand-shape, which will promote back budding and a rounded branch profile. Tweezers can be used to clean up and refine the bottom of the pads. Old needles and dangling new needles back within the branch itself can also be plucked to give a more refined look to the tree.

There are many theories and opinions about repotting Needle Junipers; however, at Kouka-en we typically repot about one week after the first round of shoot removal in early June, just as the second flush of buds begins to appear. Needle Junipers are rather fickle, so avoid cutting the roots too severely. The soil mixture for *Juniperus rigida* is the

same as for Shimpaku Junipers. Again, water thoroughly until water runs clearly from the drainage holes.

Procumbens Juniper

Another popular Juniper species used for bonsai in Japan is *Juniperus procumbens*. Procumbens are a naturally occurring Juniper species found in the Japanese mountains and many outstanding yamadori examples can be found throughout the country. Procumbens foliage is coarser than Shimpaku, but still much softer than Needle Juniper. Characteristically, Procumbens Junipers tend to have a relatively large amount of inner branch dieback. This can be offset to some degree by performing a bit of thinning in early spring each year. Shoots should not be pinched or sheared in this manner. Rather, they can be trimmed back in any area where already existing smaller buds exist. Again, do not cut through the needles, but rather only on the shoot itself. Just as with other juniper species, remove shoots that protrude from the crotches of branches. Wiring can be performed in the same manner as shimpaku and needle junipers, and repotting is best done in spring with the same mix as previously mentioned.

Final Tips

In the winter months, junipers left outdoors in the cold will often become discolored – typically either purple or brownish foliage will appear. This is not a problem at all for the health of the trees; however, if you plan on displaying a tree during this period, it's best to keep it under slight cover leading up to the event. At Kouka-en, Junipers that will be displayed at the Kokufu-ten exhibition in February are kept in an unheated room leading up to the show to keep their foliage nice and green.

Regarding watering, Junipers are relatively drought tolerant, but they in fact thrive if watered more regularly. Each tree will have different needs and should be watered accordingly if possible. At Kouka-en, we water our Junipers thoroughly at least once per day during the growing season, spot-checking a second or third time during the day, watering again as needed. Fertilizer can be applied throughout the year. Organic cakes should be replaced every 4 to 5 weeks, or as needed.



Is your name
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One of the most common pests affecting Juniper bonsai is the mite. When a mite infestation occurs, Juniper foliage typically turns a sickly grey color and branches will begin to die. A variety of miticide sprays exist and if sprayed early enough after infestation or preemptively, mites can easily be eliminated.

The techniques featured in this article are universally applicable to Juniper bonsai. Consistent and long-term application of these techniques will aid in your journey to create beautiful, world-class juniper bonsai. As always, the road may be long and at times tedious, but in the end the journey will have been well worth the time and effort.



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How we view our trees is very important

When your trees are shown in a show, how should they be viewed? It's generally agreed that that they be slightly elevated in order that they so that they be viewed straight on or slightly down and we view them from a distance..

Now, let's consider how we view them when we work on them. I don't know about you but I set at a work bench and look straight at them or in the case of taller trees, I look up at them. These two different views have totally different perspectives. Now, I know it would be very uncomfortable to stand while we work on our trees but, we do need to occasionally back up and view the overall tree. This holds especially true when we are designing a tree the first time. We need to back up and occasionally view the entire tree. I do this when I'm working and typically wire while standing up but when first design and pruning, I set too close. A view point several feet away can also be very helpful when studying your tree whether it be for the first styling or later even after they have been wired. I like to have a small stand out in my bonsai area that I can set a tree where it is visible while I'm in the area. Actually, I have one stand that I use and it sets about 15 feet out my kitchen window. With this I can view my tree while drinking my morning coffee. Using this stand, I have taken finished trees or confusing trees and after a few days and turning them several times, I have seen a new front or totally new design than what I saw setting next to it.

Soil consistency. We discuss soil, its ingredients and its benefits all the time. No matter what soil you use, there's something to be said about soil consistency. It may take a while but ultimately you should switch all your trees to a similar type of soil. Now, some of the ingredients or particle size will vary with some trees but ultimately you will become more accustomed to each tree's needs, how the soil reacts during different seasons and your watering habits will become easier and more accurate per tree. If you have a tree with unknown soil, even if it came from a bonsai nursery or your friend, you will have problems understanding its moisture needs and you will constantly wonder if the existing soil is the proper mix. If I obtain a new tree, I always change its soil no matter how the soil looks as soon as the proper season arrives.

The great pine debate. Most become very confused when working on pines. Especially when it comes to trimming, pinching or cutting candles and the desired results. Most experts are adamant in their techniques and are driven to obtain the shortest possible needles. I fully agree with the techniques required to create ramification and adding foliage. Now, when it comes to forcing a tree to have shorter needles, I sometimes vary my techniques. This happens especially with white pines. Since they only bud once a year, it is very hard to obtain shorter needles unless you almost starve the tree during certain periods. In the case of regular white pines, and if the tree is medium size or larger, I do not drive myself crazy and I do not starve my trees. I would much rather have a healthy pine with medium length needles than a weak one that may not bud or survive. In most cases, the normal needle length is not all that bad. Given time as a bonsai, they will eventually have shorter needles naturally due to the finer root system and bonsai culture. I have actually seen pines with very short needles (1/2") that due to their lack of strength, failed to bud the following year. If you must have a short needle pine, find a short needle cultivar. With White's the Zuishio or Kokonoe have wonderfully shorter needles naturally. So, is this technique good for our trees and is it really worth pushing a tree to the brink of decline? You must make up your own mind as to how far you will push a tree. I'm not saying to slack off on the design of your tree, I'm just saying weigh the outcome and the results. As I have always said, a great bonsai takes time and it must remain healthy to thrive and become a great tree.

All bonsai techniques and how you treat your bonsai will very depending on **your local weather and conditions**. No matter what you read or hear, always consider your location and your areas specific weather conditions. The rain and cooler weather in the pacific north west in much different that that in S. California or Texas. In my area of the Midwest, luckily we get all four seasons and rarely have weather extremes. You may read how a specific species does well in Oregon and wonder why it will not thrive in Texas. Additionally, your conditions also make a huge impact on the soil type used and just as importantly the size container you use. In the perfect world, you can grow most all species in very small and shallow container—if you have perfect weather conditions to support this. We see trees shown in Bonsai shows and we admire those in the perfectly sized pot but, do we really know that tree grows all the time in that size container or was it prepared this year for the show? Bonsai is art, but it must also conform to your local conditions since we are dealing with live plants. No two areas of the country are exactly the same.

How do you fertilize? With most plants and trees, it is generally accepted to place your fertilizer around the outer edges of a tree where the majority of feeder roots are growing. In the case of bonsai especially during the first few years, I place my fertilizer cakes towards the inner area and closer to the trunk. Remember, this is the hardest area to achieve or encourage feeder roots so early on lets try to increase their density in the inner area. Once a tree is mature you will feed less and concentrate the feed all over.

Remember to **occasionally rotate your trees**. Especially those setting close to a fence or wall. Trees setting close to a wall, especially brick or concrete, will receive additional heat from the walls which makes it even more important to rotate them regularly. . Even though many trees are now semi-dormant you still should rotate them to give the foliage full advantage of the sun light

Keeping in mind that we rotate our trees, it is of even more importance that you make sure to **water the back sides of a tree** and around the trunk. I must admit there have been times when I wasn't watching or was in a hurry, I didn't notice or try to specifically water the back side of my trees. This can have a impact on their general health and root growth especially this time of year when our trees need additional watering due to extreme sun and heat.

Sometimes during very hot weather, our **smaller trees and accent plants** dry out even quicker than our regular or larger trees. Don't guess with these, insure they are watered properly every time you water. A good test as to their moisture is to pick them up. When dry, most are much lighter and you can quickly tell if they need water or that you have watered correctly. Small trees also love an occasional soak in a container of water.

A good experiment this time of year is to occasionally check the **soil temperature** of your trees. I check mine with an old meat thermometer. Check the center area and then again by the pots edge. You will probably be shocked how hot the soil is during the midday sun. Additionally you will usually see a couple degree increase next to the pot. If you are reading temperature close to or above 100 you need to add protection. When it is extremely hot, I use white towels loosely laid over the soil and pot. Leave a dead air space, don't lay the towel directly on the soil. Go back later and again check the temperature. Typically this will lower the temperatures reading by 3—5 degrees. Not a lot but enough to eliminate harm to your root systems. A damp towel of course works best but even a dry towel helps.

Keep a very close eye out for **insect problems during the summer**. Spider mites thrive in hot humid weather. Watch for a slight loss of color in the foliage. Junipers are especially susceptible to mite invasions. When watering, take time to always wash the foliage. A pressurized spray will keep insects at bay or at minimum reduce their numbers until you can properly spray them. A good strong water spray also helps keep the foliage clean.

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