Regional Bonsai Care

Elements for Successfully Growing Trees Outside their Traditional Zones

By Cheryl A Sykora

Figure 1: Above, Cheryl's set up in Phoenix, AZ. Front faces east, 30% aluminized shade cloth. It is left up all year long and an additonal side panel is put up on the south side during the summer. The benches are plastic wood (wood rots very fast in Phoenix). Water is overhead and surplus ponds on the paver base providing humidity to the area. Water once a day in the fall, winter, spring and twice a day during the summer. Water is hard 400ppm hardness. Some leaves get white but species I grow not so much – coastal oaks, pomegranates, California junipers, silverberries, olives.

North America is a large continent and presents diverse bonsai growing conditions. Climates vary from extremely cold in the winter to extremely hot in the summer. Growing seasons vary from spring through fall; spring growing, summer dormancy, fall growing; to an all year around growing season. Some areas struggle with no real cold dormancy periods. Others with overly long cold dormancy periods experience slow bonsai growth. Light conditions vary from intense sunlight to whole months of solid cloud cover with low light. Water conditions vary from acidic, low hardness water to basic, high hardness water. Length of growing season varies from less than 6 months to almost the entire year. Humidity levels vary from bone dry (less than 10% relative humidity) to evening conditions approaching 100% relative humidity.

Figure 2: Left, Cheryl's greenhouse in Wisconsin.

One can pick their location for optimum bonsai cultivation but even that may not be optimum for all species one has an interest in. This article explores how people adapt to the conditions of their location and grow a wider variety of trees in their respective climates. Your climate is what it is. How do you compensate for deficiencies in your climate through your approaches to growing bonsai?

Cheryl Sykora
Zone 4a (Wisconsin) and Zone 9b/10 (Arizona)
Moving Trees Between Different Climate Conditions

The effects of a change in climate on your trees is an important consideration when planning purchasing trees raised in a climate different from your own or moving your collection from one location to another location. Even moving a collection from one yard to another yard in the same city presents challenges with changes in light levels, winds, etc.

Planning is critically important to success. Is the tree thriving in its current location, in good soil, and has a good set of roots? A tree without these basics will be difficult to move unless the move is to a more optimum location.

Here is my guidance on moving trees. I have two houses in very different climates for bonsai. One in central western Wisconsin with long cold dormancy but good summer night temperatures and workable relative humidity. My house in Peoria, Arizona has very little winter dormancy, a spring and fall growing season separated by a hot dormancy, hard, alkaline water, and intense summer heat sometimes approaching 120°F.

Start by assessing the health of your trees. You can move trees still in nursery pots in potting soil but they need to be healthy. Also do not plan on doing anything with the tree for the first year until the tree has gone through an entire weather cycle. Water, fertilize, and watch.

What type of trees are you moving? What kind of dormancy do they need? What quality water? Are they considered difficult in your current climate but easy in the climate you are moving them to or vice versa? Remember you are not the single individual that can accomplish the impossible like keeping a ponderosa pine alive and thriving in Phoenix, AZ

Figure 3: Right top and Figure 4: Right bottom, pines in the green house. These are the exposed root seedlings that Jonas Dupuich did a workshop to show us how to make exposed root bonsai. I have had them for about 3 years. Boon Manakitivipart said to cut the bottom off the tall plastic container and plant them in a pot to help develop them. The greenhouse gives them about twice the growing season we have in WI.

or an olive thriving in the northland without a greenhouse and augmented lighting.

Move trees into hot conditions, in general, during late fall when temperatures are less than 90°F during the daytime and more than 50°F at night. These are areas that can get up to 120°F during the daytime, go into the 80s or 90s at night and have less rain than to more temperate climates. Make sure that the container is not too shallow. Intense heat conditions require slightly deeper containers than do cooler climate conditions.

Move trees into a climate with a cold winter in spring to let them get used to the new growing conditions before they need to be introduced to winter protection. This gives you, the grower, an opportunity to understand what winter protection means in your new climate. Never move trees in the winter into a cold climate without an understanding of what requires winter protection in that area. Even tree species that can handle cold down to – 20°F may not be able to be wintered outdoors the first year as they have not been acclimated to the cold conditions. It may not be realistic to ever winter these "transplants" outdoors. Winter storage in the north is very sophisticated and requires preparation. Don't move trees to a cold area during the winter. Winter storage is complex and you will fail even if you think you understand it. Two rules – extreme cold and extreme heat require experiencing to fully understand the ramifications to your bonsai.

Don't try to grow trees requiring a cold dormancy in a climate with no dormancy. They will live a few years giving you a false sense that somehow you have defied Mother Nature but will die without the dormancy. This includes ponderosa pine, rocky mountain juniper, and anything else that survives at -20°F in the outdoors during the winter. Many of the fruiting and flowering require extended cold down below 40°F to thrive and flower.

Don't try to grow trees requiring lots of light in the colder north lands without light augmentation. This includes the Mediterranean and tropical species. Coastal live oak and olives are nice bonsai but don't thrive in lower light, colder areas, without a greenhouse, extra lighting, and possibly heating pads during the winter.

This is the basics of moving trees. There are fine points to this but some of that is too unique to locations. This is the basics. Contact the local bonsai enthusiasts for more detail. Leave your tree alone for a year is probably the toughest for most people. Even cutting off dead parts might not be a good idea during this year. Possibly a little light thinning but nothing more.

Figure 5: Right, one of Tim's trident maples growing in an Anderson flat.

Cheryl Sykora

Extending the Growing Season in the North

It is human nature to want to grow what is difficult in the climate you live in. Fortunately, with the introduction of LED growing lights and the use of greenhouses, areas where trees would cease growing around October or have insufficient light and heat to grow can have extended growing seasons. This needs some individual experimentation. Some species like Itoigawa and Kishu juniper and Japanese maples do not do well wintered inside a greenhouse at 70 °F and weaken from my experience. Others like Japanese black pine don't seem to need a dormancy and achieve better growth when wintered inside a greenhouse. Map out your greenhouse with a series of cheap min/max temperature and humidity gauges to identify colder areas of the greenhouse. Usually along outside walls or outside corners. The addition of some timed indirect LED lighting is also advantageous. Just in the last 5 years, LED lighting has advanced and is more economical. Put your black pines in the colder areas of the greenhouse and let the greenhouse go down into the 50s at night in these areas. It is too expensive to keep it at 70°F 24 hours a day anyway. The candles will be showing needles in late April or early May. Trident maples will start to bud as soon as the days get longer – early to mid January. This is advantageous. Leaves in a greenhouse tend not to be the weak, soft growth that occurs in cold storage even with light augmentation. These practices accelerate tree development in climates with short growing seasons.

Gay Wakeman and Tim Mathwig
St Cloud, MN, Zone 3b

Developing Non-Winter Hardy Species in the Ground in Minnesota

Gay and Tim are long time bonsai growers that live in a climate with winters that may dip to -20°F for extended periods, have months with no visible sun, and summers that count their days in the 90s sometimes on one hand.

These conditions can be challenging to developing trunks on trees. "Put it in the ground" doesn't work when the tree is not winter hardy in the area. Gay says there are many trees that they cannot grow in the ground year around in zone 3b. One way they speed up trunk growth without planting in the ground is to plant seedlings into Anderson flats (Figure 5) and let the roots run out the bottom and into the wood mulch of the growing bed. (Figure 6) In the fall, Tim and Gay, collect them from the growing bed and put them in a cold frame for the winter. It sometimes takes a sawzall (reciprocating saw) to cut through the roots as the roots of Japanese and trident maples can become very large in one season. (Figure 7)Gay says that she did try to create a fat trident by building a wire frame and wiring dozens of seedlings to it as shown in magazines.(Figure 8) This worked, but slowly in Minnesota, as the tree could not be planted in the ground. This system overcomes the limitations of Minnesota weather.

Overcoming extreme cold period in the winter is always a challenge writes Gay. Trees such as ponderosa pine, rocky mountain juniper, and larch spend the winters outdoors. An area is fenced high enough to keep the deer out and hopefully tight enough with chicken wire to keep the rabbits out. There is shade and windbreak from the surrounding forest

Figure 6: Right, root growth over the season before cut.

Figure 7: Far right,using a sawzall to remove roots growing through the bottom of the Anderson flat.

Figure 8: Bottom right, fused maple seedlings as an alternative for developing a large nebari.

trees. The boxes/containers are covered with pine needles or oak leaves for protection. Some sort of insulation is needed to keep the frozen trees frozen and not go through intermittent freeze thaw with changes in temperature during the winter.

For trees that cannot take the outdoor temperatures, or are more refined, and snow load might cause damage, Gay and Tim store trees that cannot handle prolonged freezing temperatures or are further along in refinement in insulated rooms inside an old dairy barn. (Figure 9)There are three levels of shelves with fluorescent lights for each level in one of the rooms. Azaleas, boxwood, and smaller junipers are stored in that room. In the other room, they have three levels of shelves and they store the larger trees. In past years there were no lights in that room. Trees seemed to go through winter fine but this year LED grow lights were added. Gay and Tim are curious as to the effects of the lighting on the trees.

Both rooms have an oil filled radiator heater thermostatically controlled to keep the room between 36° and 40°F. Gay says that one room has too high of humidity so must be a little tight. They use an exhaust fan to control humidity but that can freeze up if the temperatures are too cold outdoors. This is also where the chipmunks girdled her trident made from whips. (Figure 10) One early spring weekend, chipmunks got into their storage area through a floor crack and girdled 26 trees. Gay and Tim quickly covered the areas with duct seal putty and almost all survived but have lumpy textured bark. Critters can be an issue during winter storage in the north both inside and outside!

Figure 9: Far left, winter storage

Figure 10: Left, the results of chipmunks girdling the trunk of a trident maple over the winter.

Jonas Dupich
Alameda, CA, Zone 10a
Adjusting the pH of the Water

For the few that don't do social media, Jonas Dupich is the Owner of Bonsai Tonight (https://bonsaitonight.com) - a store to buy soil and supplies, a blog to learn valuable information, and a virtual educator during covid. Also he is the author of a "Little Book of Bonsai", a resource for the beginners to bonsai.

Jonas writes "Most of the bonsai in my garden (pines, oaks, azalea, hornbeams, among others) grow well in my zone 10a. As a result, I don't need to do much to accommodate the plants' needs. The exceptions are a few ficus that I keep in a nearby greenhouse and some mountain species (like ponderosa pines) that I occasionally overwinter at a friend's garden in the foothills.

That said, I do make one accommodation for all of my trees – I acidify the water.

The municipal water in my area is above pH 9.0 for much of the year. To lower the pH, I add vinegar to the water with a chemical injector called a Dosatron®. (Figure 11)

The Dosatron® is a pump powered by water pressure. It draws a measured amount of a vinegar concentrate and injects it into the water line. By controlling the strength and amount of the concentrate used, you can get the pH right where you want it.

I aim to keep the water pH between 5.5 and 6.5 as this makes it easier for plants to absorb essential nutrients including nitrogen and iron.

When a batch of concentrate runs out, I refill it and test the water that comes out of the hose with a pH meter and make adjustments until the pH falls between 5.5 and 6.5. (Figure 11)

Does the approach work? I hope so! I have yet to set up side-by-side experiments in which I water some trees with treated water and others with untreated water, but I have found I can keep trees greener while using less fertilizer.

Speaking of fertilizer, I can also use the Dosatron® to fertilize the garden, a process known as fertigation. This is a very convenient way to apply liquid fertilizers like fish emulsion or Dyna-Gro."

Author comments:
I did a little research on the Dosatron®. There are various models of this device and other manufacturers, but they basically work in the same manner. They are a siphon system to add a solution of your creation directly to the water stream. Water pressure impacts most of these but, like everything

Figure 12: Below left, electronic pH meter

Figure 11: Below right, a chemical injector Dosatron® attached to the watering system.

else, if you buy a more expensive model, you can get one operating independent of water pressure/flow.

California, in general, seems to have water with very few dissolved minerals. Other areas are quite different – the midwest well water tends to come from limestone and has relatively high calcium hardness. The water systems in the Phoenix, AZ area tend to have high concentrations of dissolved silica and high hardness values up to 1000 ppm. A hardness of 200 ppm is low for the Phoenix area. Most essential minerals are in the form of metallic salts and are generally more soluble in the pH range Jonas is achieving with his system. One needs to be careful not to introduce too much of any one metallic nutrient to your trees. If you are on a city water system, the water supplier is required to have the water tested periodically to verify it meets drinking water quality parameters. This is public information and should be available from your local water supplier without your needing to pay for your own testing. If you have your own well, testing the water is an option. There are many chemical laboratories that are certified by the State you live in to test drinking water and can provide the information for a nominal fee. It is probably wise to test your water before you embark on pH changes as lower pH will effect the solubility of the natural salts in your water.

Carol Novak
St Paul, MN, Zone 4b
Adjusts the pH of her Municipal Water and has a Variety of Other Ideas

Carol Novak has studied bonsai for eight years. The last four years she has been retired. Her main teacher has been Michael Hagedorn. She lives in Saint Paul on a city lot in the 4b agricultural zone. When the weather doesn't allow working on bonsai, she makes ceramic bonsai containers and stained-glass windows.

Carol writes: "My collection is primarily deciduous trees, which remind me of the trees where I grew up in New England. Because deciduous trees thicken and scar so quickly, I stake all my trees that are wired with day-glo flags so that I can easily check for wire biting in, and to prevent losing track of trees' wiring hidden by leaves. (Figure 13) We have squirrels, chipmunks and birds in the yard which pull off moss and fertilizer, and dig into the soil during acorn season. To prevent this, I wrap the pot and soil of most of my trees with inexpensive hair nets, under which I tuck any fertilizer, and pellets or bags. (Figure 13) I do a lot of approach and thread grafting to create branches and root grafts on deciduous trees; they are virtually all done with the trees' own branches or cuttings, but I did some root grafts on

Figure 13: Left, the use of day-glo flags as a reminder to check trees.

Figure 14: Below, pot wrapped with a hair net to protect the removal of moss and fertilizer by unwelcome critters.

trident maple with purchased seedlings that I hope don't develop a noticeably different bark. We do not have enough space in our city lot to field-grow hardy trees let alone in my cold frame, so I don't try to grow big trunks. I buy them, and grow branches.

I take cuttings for the propagation of chojubai, and of trident maple to make root grafts. The media I have used varies from bonsai soil fines, perlite seed-starter and/or a light potting soil, often mixed together. The most difficult thing is to keep them moist but not soggy. For bigger cuttings, such as from a trident maple, I plant them in a pot of pumice fines. For smaller, more tender cuttings, I have used a clear plastic cup with holes in the bottom planted low enough in the cup to have wind blocked which helps prevent desiccation. Rooting hormone may increase the success rate, as well as moisture, and I am currently using a heating pad once nights go to 60°F or lower and will continue this in the cold frame for the winter. They are currently kept in a pop-up mini-greenhouse and misted every day rather than watered."

Author comment:
Carol wrote this at the end of September so this is for summer conditions. Putting anything in a pop-up mini-greenhouse in the winter in Minnesota won't help.

Carol writes further: "I live in Saint Paul, Minnesota and use municipal water which primarily comes from the Mississippi River via a chain of lakes. It is quite soft with minerals at low ppm. At times of the year, it is supplemented by an aquifier from wells in Wisconsin about 200 miles southwest of the City. Depending on the Mississippi River water level, the pH can vary, but is generally 8 to 9. Lately it has been over 9. Before retiring I used an automated watering system straight from the pipes which limited the health of some of my trees—presumably because of the balance of nutrients that could be absorbed. Currently I water by hand via a hose and watering wand. I bring the pH down to about 6.5 with the use of either 30% vinegar (acetic acid) or muriatic (hydrochloric) acid which is more stable, diluted and stored in a 7 gallon water container. This is attached to my watering hose with a Hozon® siphon and a water pressure regulator. Watering with fertilizer, especially fish emulsion, can bring the pH as low as 4.5, and so I use straight tap water to mix the fertilizer, add powdered seaweed to raise the pH, and water by can.

For the first several years I grew bonsai, our yard was all in part or full shade. With the removal of two large trees there

Figure 15: Right, one of Araxi's junipers putting on a lot of growth in Mesa, AZ.

Figure 16: Top far left, Figure 17: Top left, and Figure 18: Bottom left, all indicate the beneficial growing environment of Araxi's collection in Arizona.

is enough sun to put up a 30% shade cloth for trees coming out of winter storage or recently defoliated. On the other hand, I struggle to get flowering trees to flower which I attribute to the short periods of full sun. I also use shade cloth for very high temperatures. With humid summers, the trees don't tend to get inordinately thirsty from heat even into the 90s. The hot, dry breeze is the biggest factor for frequency of watering, and one of our club members fittingly described it as the "death wind". Fortunately, I am retired and can water 2 – 3 times a day if needed. This also serves to cool the slate that makes up my display and growing bench tops. I have a tree that was recently put into soil that was too fine, half of which is akadama, and into an overly large pot. The tree was not flourishing, most likely due to lack of oxygen as the roots are not taking up a lot of water. Despite having sphagnum moss on the top, the top of the soil feels dry before the soil is adequately dry. Rather than risk more stress to the tree by re-potting into a smaller pot, I use a moisture meter that reaches the depth of the roots.

Minnesota has the reputation of being very cold (true) and so people I meet elsewhere in the country assume severe limitations in the type of trees we grow here. Cold, however, is not a problem for a small to medium bonsai collection. It is possible to keep any tree above freezing in the winter with a cold frame; it is not feasible for people living in hot regions to refrigerate trees to put them in dormancy. Author comment: Phoenix, AZ doesn't have sufficient cold period for dormancy to flower many of the fruiting and flowering trees. I have heard that some people have used refrigerated containers in the winter to store their bonsai. Have no direct experience with this or anyone who has done it and would suspect it creates desiccating conditions. So not true that refrigeration has not at least been attempted in hot climates.

Carol further says, "Our garage isn't huge, and so I built two cold frames using 2" insulation taped onto utility shelves. They have swinging doors with hinges made of tape. They each have a heater, thermostat, lights on a timer, and fans. The fans are essential to prevent mold and fungus which can occur even if you use a dormant spray. I first used fluorescent lights, however they heated up the cold frames too much. I now use inexpensive LED bulbs. There are trays in the bottom to catch run-off (the trays used under washing machines are perfect), and the humidity is always on the high side which is good to keep recently-worked branches from desiccating. I switched to Inkbird® thermostat so I can control the temperature anywhere there is a wi-fi, even from the tropics in the winter. Everything is plugged into GFCI outlets as it is easy to short out outlets near that much water and humidity. Accent plants sit on a humidity tray.

The short growing season is the greatest constraint in developing trees in Minnesota. My USDA zone is 4b, which means we have an average of about 6 months of growing time. Trees come out of winter storage in about late April. They go into storage in late October. Sometimes early November if lucky. Light in the cold frames is necessary for broadleaf evergreens and conifers. Given the smallness of the cold frames, even the deciduous receive light. Carol gets a 3 to 4 week early start on spring growth and the lights are bright enough to create short internodes and normal growth. Another advantage of lighting the cold frame is all the trees can be monitored carefully to check if buds are pushing or if there is a disease problem. The chojubai, which bloom the most profusely in April, can also be enjoyed. Ume also regularly bloom in cold frames and must be enjoyed in the same manner.

Araxi Hovhannessian – Mesa, AZ, Zone 9a

Araxi has been growing bonsai for more than 20 years, participated in Boon Manakitivipart's intensive training and Boon on-going workshops held at her house in Mesa, AZ.

Arizona has several different growing zones depending on elevation but the Phoenix area which includes Mesa is particularly challenging because of the intense summer heat – sometimes exceeding 120°F and extreme dryness with relative humidity less than 10%. The water quality is generally poor with high calcium hardness and dissolved silica. Water hardness of water supplies vary throughout the valley but are generally between a low of 200 ppm to a high of 1000 ppm. Infrequent rains in the desert make use of rainwater as an alternative difficult. Reverse Osmosis (RO) systems are common in the Phoenix area. The hottest temperatures are between June and August. Spring is around February 15th and a growing season extends into May. Growth stops during the summer and resumes in late September or October depending on the temperature.

Araxi identifies what she has done to grow trees in Mesa outside their more traditional zones:

Shade cloth – Araxi was using 65 to 70% shade cloth. The needles of the conifers were elongated with long internodes. She changed to 30% shade cloth and experienced vigorous growth on the conifers. For deciduous trees, she uses 50% shade cloth. She says that some of her conifers are in an intermediate zone between the 30% and 50% benches and are not doing as well.

Wooden boxes for growing trees - Conifers have done well in the Arizona heat when they are placed in wooden boxes. It promotes root growth but also protects against the thermal gain of the pot during periods of high heat. Wood may be a good insulator from heat? People in the Phoenix, AZ area have measured temperatures up to 140°F in pots during hot weather. This cannot be good for the roots and likely results in root death in the soil.

Cuttings and seedlings – Araxi experiences a 90% success rate with seedlings. When she gets cuttings she first puts them in a container with water and a few drops of B1 fertilizer. Next, she re-uses old "Boon" mix soil by first sifting it and then placing it in small pots. Next, she trims the end to 45 degrees and dips it in rooting hormone powder and inserts it in the pot with reused soil mix. She waters daily and can tell

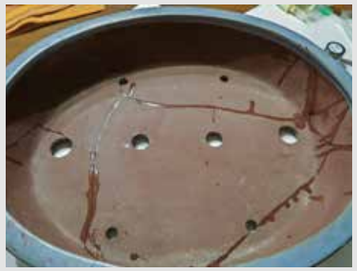

Figure 19: Above, Yamaki pot glued back together using a cyanoacrylate type glue.

Figure 20: Above, Apoxie-Sculpt® epoxy to fill the cracks on the outside of the pot.

Figure 21: Above, location of crack to which the epoxy will be applied.

when it was successful when the needles or the leaves don't look like they are dying. Early spring or late fall has worked best for her.

Kirk Hedberg – Afton, MN, Zone 4b

Makes his Own Bio-Char out of a Weed Tree/Bush

Kirk has been doing bonsai for more than 20 years and regularly volunteers at the Como Conservatory assisting in the maintenance of the Como bonsai collection.

I asked Kirk to explain his Buckthorn charcoal potting mix component. For those of you not familiar with buckthorn a little history. Common or European buckthorn and glossy buckthorn (*Rhamnus cathartica* and *Frangula alnus* respectively) are the two non-native, invasive buckthorn species found in Minnesota and Wisconsin. They were first brought here as hedge material and became a nuisance plant, forming dense thickets in forests, yards, parks and roadsides. There are many reasons a person doesn't want buckthorn. The "thorn" and the way it spreads underground and pops up like raspberry canes is enough of a reason. Kirk has an old onion farm that has been invaded by buckthorn. Kirk cuts it and burns it in 3 by 4 foot across piles. He just keeps the fire going until he is done for the day and douses it with water rather than letting it go to ash. This gives him a good pile of charcoal which he puts in a metal garbage can. He made a box with ½ inch hardware cloth that he screens it through smashing up the chunks with a block of wood. Before he uses it he screens it again through a ⅛ inch screen using what stays on top of the screen. Basically, eliminating the fines. He says buckthorn works but any hardwood would work. Soft woods like cedar don't work as the charcoal is too soft and crumbly. He puts the charcoal in a soil mix of #2 chick grit (basically granite), lava, pumice or perlite). The mix is a bit coarse but it seems to work well according to Kirk. When he repots a tree, he finds the roots often go into the charcoal chunks which he views as a good sign. Kirk has been using his bio-char 8 or 9 years and the charcoal is still apparent in the soil mix. It doesn't decompose like fir bark does. He was concerned that it might be too basic when he used it with azaleas but he didn't see any problems. He thinks it holds water and some nutrients but hasn't done anything to verify this. Author comment: Kirk is creating biochar from an otherwise useless plant material. Basically, creating his own bonsai soil component. Biochar is being investigated as a method of sequestering carbon to mitigate global warming and climate change. Biochar is high in potassium and identified as a replacement for lime in acid soils. According to literature, biochar is effective at both retaining water and water-soluble nutrients. There is evidence that biochar also provides a habitat for beneficial soil microorganisms. One would not necessarily need a buckthorn infestation to duplicate this recipe for creating biochar nor use exactly Kirk's soil mix to try this soil additive.

Figure 22: Top left, the result of epoxy and gold leaf application.

Figure 23: Bottom left, other side of repaired pot - ready to use.

Figure 24: Left, quince repotted in the repaired Yamaki pot.

Cheryl Sykora

Using a High-Grade Epoxy Sculpting Product with Bonsai

I have seen cheap, uncolored 2-part epoxy products used by professionals with remarks on the odor encountered during application. There are better products on the market, people! They come in a variety of colors that can be blended to match the tree, the pot, or whatever else you are using them for. I use Aves Brand Apoxie-Sculpt® which comes in small packages in a variety of colors that can be blended to create the color you want. Epoxies are a 2-part system. The colorant is in one part and the catalyst to make it hard is the other part. "Pea-sized" pieces can be blended to produce the color you want. Dries a little less wet looking. For the blue Yamaki pot that was broke, I used a strong glue (Figure 19) and applied blue colored apoxie sculpt mixed with white to tone down the blue, (Figure 20) filled the fine cracks, (Figure 21) and followed by applying gold powder to uncured epoxy surface to give that fine gold line effect (Figure 22).

Farewell to writing the Regional Series Articles

This is my last regional series article for ABS. I have been writing regional series articles for many years, since around 2015 and it is time for someone else to take up the pen with some fresh ideas. I sincerely thank all those that have taken time to contribute to the articles in the past and hope they will be willing to assist those that follow me. As bonsai evolves in both style and species, more topics will become important to share with those that practice the art of bonsai. The goal for all bonsai practitioners is creating and maintaining refined bonsai suitable for high level exhibitions expressing the uniqueness of the individual creating them.