

# Woodland Park's Tree's for Conservation Program

## 44 Tips for Improved Tree Planting Survival

### PLANNING

#### 1. *Know your objectives -*

What is it you're trying to accomplish? Is your planting project a windbreak, shelterbelt, or living snow fence? Are you trying to create wildlife habitat, re-forest a burn, or plant trees where none exist. Will you control erosion, improve a stream bank, provide a visual or noise abatement screen, plant Christmas trees, or are you just creating species diversity?

#### 2. *Select the correct species for the job -*

Some plants need lots of water, some don't. Some plants need lots of sunshine, some don't. Still others need sandy soil, others don't. As with all living things, plants have specific requirements necessary for their survival. Be sure to consider these plant characteristics before you buy:

a) deciduous or coniferous, b) mature size, c) growth rate, d) flower color (if any), e) fall color, f) edible fruit, g) suckering ability, h) proliferation and type of seeds, i) insect and disease susceptibility, j) structural strength, k) palatability to livestock or wildlife, l) water needs, m) sun or shade tolerance, n) soil requirements, o) cold, heat and drought tolerance, p) elevational range, q) protective attributes such as thorns, a strong smell or poisonous parts, r) life span, and finally, s) physical aesthetics.

#### 3. *Know the conditions of your planting site -*

Every tree or shrub that you plant MUST exist in that spot, 365 days a year no matter what the conditions. Keep in mind that your plants must be able to tolerate some of the following conditions, if not all of them:

a) high elevation and solar radiation, b) poor soils, c) high winds, d) low annual precipitation, e) high probability of predation, f) rapid changes in temperature, g) extreme cold and heat, h) insects and diseases, i) invasive grass, weed and native competition, j) heavy snows.

#### 4. *Know what it takes to do the job –*

If you only have the weekend to install your planting then stick to a project size that is manageable. Two adults can hand plant 200-300 trees in a couple of days but only if they're hustling and working hard. (A chainsaw-driven auger is much faster than a shovel). If you're also scarifying and hand-tilling the ground (site prep), installing weed-barrier, shingles and tree guards then the project can be very time consuming and hard work!

Tools you may need are: shovels, augers, hoe, pulaski or hoedad (scraping tools) to scarify the soil, 5 gallon buckets, gloves, hammers to pound shingles and weed-barrier pins, razor knife, tape measure, flagging, and your site/planting plan.

### SITE PREPARATION

## *5. Plant in a competition free environment -*

Your project will fare much better if you plant in freshly tilled soil that is completely free from invasive vegetation. You should till the soil as deep as you physically can AND as wide an area around each plant as you can. Tillage allows for rapid root growth, soil aeration, elimination of plant competition, easy movement of moisture and easier digging.

Site preparation can be accomplished by several means depending on the nature of your project whether it's in long straight rows or if it's a random hand planting.

Straight rows are the easiest to till. Simply attach a two-bottom, 12-inch plow to a 40 horsepower tractor and plow the entire length of the row. If you are installing weed barrier make each tilled row at least 7 feet wide. Then roto-till with the PTO drive on the tractor.

For hand planting either in rows or randomly spaced the methodology is the same however more laborious. For a 4-5 foot diameter around each tree/shrub scarify the soil with a hoe, pulaski or hoedad. This means scrape the competing vegetation off the top layer of the soil. Next, with a shovel, as deep as the shovel will go (about 6-8 inches), break the soil up by hand inside the scarified area. Roto-till by machine or break the clods up with the shovel.

While you're working just remember that this is the most important aspect of the project. If you don't have adequate site prep you won't have acceptable plant survival.

## **TRANSPORT AND STORAGE OF SEEDLINGS**

### Bare Root Stock

#### *6. Transport bare root stock out of direct sunlight -*

If you have a pickup throw them in the back and cover with a tarp. If you have a car then the trunk works fine, but only for a short time.

Store bare root stock inside the garage, root cellar, basement, your refrigerator or wherever it's dark and less than 50 F. It's possible to leave them that way up to three weeks but ill advised. Superior long-term storage is called "heeling-in".

Separate the seedlings, place them in a trench, cover the roots with loose soil, and keep moist until ready to plant.

More on bare root stock...

Our bare root stock is just that, it has no soil what-so-ever around the roots. What it does have is damp sphagnum moss or sawdust with a clear plastic wrapper. If you leave the stock in that damp moss too long then fungal growth can occur that might kill the plants. On the other hand if you take the plastic wrapper loose or if the sphagnum moss dries out then the roots will dry out too. The root system **MUST** stay covered and protected throughout the transport and planting process.

### Regular Potted Stock

#### *7. Protect your trees from damaging winds during transport -*

If possible use a covered van or trailer. If you have a pick-up cover the trees with a tarp or shove to the front of the bed, close to the cab. If you only have a couple of boxes put them inside your vehicle (for a very short time only!).

Store potted stock in a protected, cool location such as the garage, on the north side of the house, under the porch or in the shade of mature trees. Keep the soil moist until ready to plant. Potted stock can be stored this way for many weeks. However, the sooner you plant the better their survival will be.

More on potted stock...

Lodgepole pine and Rocky Mountain Juniper are commonly shipped in tarpaper containers. You must completely remove the paper from the root ball just before planting otherwise your tree will become root-bound.

You may experience difficulty removing pinion, bristlecone and Douglas-fir from the styro-block containers. Use a knife to cut away the styrofoam or gently push up through the slot in the bottom of the block.

You may observe slightly better survival with regular potted stock evergreen trees than with bare root stock. Our experience has been that conifers don't tolerate a bare root condition as well as deciduous trees and shrubs.

#### *8. Properly store your seedlings if you can't plant right away -*

Do not store your trees and shrubs inside a heated building or where they may be exposed to too much sun, wind or warm air. For that matter don't leave your plants inside a hot automobile after you pick them up on distribution day. Keep them cool and dark until you're ready to plant.

#### *9. Plant as soon as possible -*

The correct planting period in the Woodland Park district is between the first of April and the first of June. Our distribution is traditionally the third Thursday and Friday in April. If you plant after they break dormancy your seedling survival may drop dramatically.

### **PLANTING DAY OPERATIONS**

#### *10. Start early -*

It's cooler in the mornings and you'll have less wind, both of which are easier on you and the seedlings.

#### *11. Hydrate the polymer -*

Mix up your polymer a couple of hours before you plant. It takes about a 1/4 lb. of polymer crystals to hydrate into 5 gallons of slurry. Five gallons will usually stretch into 1 handful of hydrated poly for about 100 trees.

#### *12. Do not soak your trees! –*

There's an old saying that plant roots should be soaked in a bucket of water a day or two before planting. Unfortunately that's simply not true and doing so may even kill your trees. Plant root systems must exchange free oxygen and nitrogen with the atmosphere to live. Those gases are not freely available in simple water therefore your seedlings would drown if you did this.

### *13. Follow the correct spacing -*

All plants have spatial requirements in order to thrive. Make sure that you know their mature size and proper spacing regimes. (See ["Trees for Conservation Species List and Descriptions"](#) for proper spacing)

## **THE PROCESS**

### Bare root stock

#### *14. Use the polymer as a slurry -*

The fine root hairs that actually feed and water plants are near- microscopic in size. That means it doesn't take much to kill them. Use the poly as a slurry that coats the roots to protect them from dehydrating wind, sun or soil. Remove the plastic wrapping from the bundle (50 seedlings), remove the sphagnum moss, cut the twine, and insert the entire bundle in the 5 gal. bucket of hydrated polymer. Begin to plant.

#### *15. Plant one at a time and green side up! -*

Dig a round hole at least one foot in diameter. Make a small mound of soil in the bottom of the hole. Spread one handful of poly around the hole to be back-filled with the soil. Take the seedling from the bucket of slurry and spread the roots out in all directions using the mound as a root support. Pull loose soil and poly back over the roots, filling the hole half way. Lightly tamp soil down or fill with water. Then, back fill the rest of the hole, tamp soil again or re-water. Remember, soil compaction eliminates air space and the oxygen therein that roots need to survive.

Work quickly. It doesn't take long for the roots to die on hot windy days. Don't lay the trees out ahead of yourself. Rather plant one at a time with minimal exposure.

#### *16. Plant at the right level -*

The correct level at which to plant your seedling is called the root collar. That's the transition zone where the trunk turns into root system and where it grew in the nursery. Often there is a visible white ring with a slight swelling at this spot. That's the exact location that the soil level should be.

#### *17. Install the fertilizer tablet -*

If you have fertilizer tablets place one tablet per seedling, off to the side (NOT in the hole), about a hand's-breadth away, uphill, and shove into the soil with your thumb, just below the surface.

Don't over-fertilize! Your new seedlings came straight from the nursery and have been extremely well cared for. They usually don't require additional nutrients. Our tablets are a slow release, chelated formula. This special composition may take several years to dissolve which eliminates potential fertilizer burn.

### Potted Stock

#### *18. Keep root ball soil intact -*

Follow the same instructions for bare root stock, but do not disturb the roots (or insert into polymer slurry). Make sure the root ball does not become exposed after final planting. Insure that you have the

correct planting level at the root collar, not at the soil level of the root ball because it may have settled during shipment and drying.

### *19. Water right away if you can -*

Water about one gallon minimum per tree during planting for best results.

### More on planting techniques...

*Lot's of strange ideas abound about amending the planting hole with "good" soil or organic matter. Here are a couple of tips:*

### *20. Don't use green grass clippings -*

When soil microorganisms decompose organic material they require oxygen and nitrogen, among other things, to function properly. At times that chemical reaction may cause these elements to become unavailable to your plants. In addition decomposing materials give off heat as a by-product that may be enough to burn the root systems.

The same holds true for green manure. Also, livestock manure may have undigested weed and grass seeds that could later sprout and kill your seedlings.

### *21. It's not necessary to amend the soil with peat or potting soil -*

If you selected the correct species then your plants will do well at your site without soil amendments. Consider the conifer, a low nutrient-requirement plant. They grow in mountain soils that are typically shallow, decomposing granite containing low levels of organic matter. Despite this you can find literally millions of conifers thriving without any care at all.

If you've incorrectly selected a plant that cannot tolerate the existing soil and you back-fill the planting hole with "good" soil, what happens? In all likelihood the roots will stay in the amended soil and eventually become root-bound. Or they will remove all the organic material from the amendment and slowly decline.

## **MULCH**

### *22. Install mulch -*

Although mulch can be the most expensive feature of the project, it is extremely important to plant survival. Mulches reduce competition and maintenance work. Dark colored fabric mulches store solar heat and transfer that heat to the soil, which in turn encourages earlier and longer root growth. Mulches also store moisture by reducing soil evaporation. That translates into less watering resulting in time and money savings.

### More on mulch...

### *23. Don't pile wood chips or sawdust too deep -*

If you use wood fiber mulch keep these things in mind: a) pile no more than 3-4 inches deep, b) don't let it come in contact with the seedlings, (wet mulch can cause fungal growth), c) use dry material.

#### *24. Avoid hay, grass or weed mulches -*

Seeds left over from these mulches can cause problems later with unwanted competition. Also, field mice particularly like hay to nest in and they've been known to gnaw the bark off new plants.

#### *25. Avoid sheet plastic -*

Non-porous mulches don't allow roots/soil to breathe or gather moisture. They are not ultra-violet light resistant and break down easily in direct sunlight. Sheet plastic materials are easily punctured which allows weed and grass seed invasion.

#### *26. Use polypropylene woven weed barrier mulch whenever possible -*

The new materials manufactured today are tougher, lighter, woven (permeable), UV resistant, and very durable. Although initially expensive they more than pay for themselves over the long term by reducing watering and maintenance mowing/weeding.

### **ANIMAL PROTECTION**

#### *27. Install animal protection -*

Plants direct from any nursery are packed with fertilizers (i.e.: salts) and highly delectable to starving animals. They are also extremely palatable and easy to eat. Collectively this means that your plants may be favored over native vegetation especially during the first 2 winters.

#### More on tree protection from browsing animals...

#### *28. Protect the dominant bud on conifers -*

Conifers exhibit apical meristematic dominance that controls the growth of the entire tree. Naturally the dominant bud is the upper-most bud. If that bud is killed then another bud, usually from a lateral branch, must replace it before the tree can continue in good health and form.

Shrubs are multi-stemmed by nature and don't possess a dominant bud. Therefore some browsing is not harmful and in fact may even stimulate growth.

#### *29. Any physical barrier will work -*

At this stage aesthetics aren't important, survival is. Use chicken wire, slatted snow fence, commercially available tree guards or tubes, wildlife fencing (usually electric), or anything else to keep browsing to a minimum.

#### *30. If you don't use a guard then consider a spray repellent -*

There are lots of sprays on the market. Some are bitter or spicy- hot to taste. Others smell bad. The better sprays have a surfactant in them that helps the spray stick to the plant. This is important during the rainy season where frequent wetting may wash sprays off. A second application of repellent may be required.

The final word on sprays: if the wildlife is hungry enough they'll eat it despite what it tastes or smells like.

## **WIND AND SHADE PROTECTION**

### *31. Install wind protection on conifers -*

Northwesterly winds during the winter can severely damage recently transplanted evergreens. Moisture loss through evapotranspiration cannot be replaced until spring because the ground is frozen. Installing any of several windbreak barriers then can reduce this dehydration.

### More on wind protection...

The most natural way to protect a row of evergreens is to plant a temporary row of fast growing trees or shrubs. These plants should also have a short life span, between 10 to 30 years. Examples are sand cherry, nanking cherry, willow, cottonwood, lombardy poplar, Siberian elm and black locust. As these plants mature they should protect the property as well as the young conifers. If possible plant the temporary rows several years before installing the permanent and slower growing rows.

Remove the temporary rows as they begin to decline in vigor and health.

Other solutions: commercially available tree tubes, roofing shingles, wooden pallets, snow fencing, piled slash or shade cloth.

### *32. Install shade protection -*

Despite the fact that Colorado blue spruce matures into an awesome windbreak tree it prefers protected mountain slopes as it's natural habitat. The cool, dark, shady conditions are the antithesis of what we find on the eastern plains. So that means you must protect this species and many like it from the damaging sun until it acclimates itself to the new environment. You may accomplish this at the same time and manner as the wind protection.

## **WATERING REGIMES**

### *33. Water immediately after planting -*

Water each seedling, regardless of specie, with one to two gallons immediately after planting.

Water is the limiting factor for any plant growth and is particularly true of young seedlings with limited root capability.

### *34. For best results install a drip system -*

If you install a drip system use a one gallon/hour emitter. Then turn on your system when you leave for work and turn it off when you get home. A correctly installed irrigation system can water as many as 500 plants simultaneously or a medium sized windbreak.

### *35. Water periodically throughout the first two years*

Check the soil moisture to determine when next to water. Soil types, recent precipitation levels, presence or absence of mulch, vegetative competition, species composition, wind, day temperature and relative humidity will determine watering intervals. If all things are considered, and if polypropylene weed barrier fabric is used, then a reasonable watering interval should be 8-10 gallons every 20 days. Remember, it's better to apply infrequent heavy doses than light doses on a constant basis.

## **ANNUAL MAINTENANCE**

### ***36. Begin watering mid April to early May -***

After the long, cold winter your trees and shrubs should begin to break dormancy at this time. However weather conditions may not be conducive to proper maintenance until May. If so you should allow the soil to thaw before you begin to water.

Apply one final heavy dose to deciduous trees or shrubs late August or early September.

Apply once-monthly heavy doses to conifers as late as November/December, weather permitting.

### ***37. Replace dead trees -***

As with any planting you should expect some mortality. If you implemented your planting with all the above information then you should expect about an 80-90% survival rate.

Even a survival rate as low as 50% is discouraging but not alarming. Simply emulate nature and keep planting until your project has the success you require.

### ***38. Prune as necessary -***

You should expect some stem and branch damage as a normal occurrence. Snow breakage, insect and disease kill, and die back are common phenomenon. Simply follow good pruning techniques to reshape damaged plants. Prune just before bud break. In El Paso County bud break occurs mid April to the first of June.

### ***39. Inspect weed barrier -***

Re-cover loose edges as needed throughout the year.

### ***40. Inspect animal protection -***

Maintain and replace tree guards or re-spray as needed. This includes fences and other exclusions.

### ***41. Inspect for insect, disease and wildlife damage –***

Pay particular attention for insect activity just after bud break and spray accordingly. A good generic insecticide is permethrin and is effective on most of the insects that feed on woody vegetation.

Most of the local plant diseases are weak pathogens that rarely kill healthy trees and shrubs. Fungi that enter infection courts on damaged plants cause most branch dieback. These infection courts may be caused by insects, hail damage, machinery, animals, ice or whatever. Hence the best method for control of fungal diseases is obviously prevention. Even if the disease is properly diagnosed most often it is difficult if not impossible to control, much less cure.

### ***42. Inspect and replace sun screens or shingles as needed -***

It doesn't do any good if the screens are lying on the ground.

### *43. Control unwanted competition -*

Eliminate competing vegetation by mowing, physical removal, herbicidal spray or installation of additional weed barrier fabric. Be careful not to damage the residual trees.

### *44. Control rodents -*

Pay special attention to soil disturbances that may signal gopher and rodent activity. Learn the signs that they make and become proficient at trapping or poisoning them. Gophers are probably the most difficult pests to control.

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## **A SHORT LIST OF “THINGS” THAT MAY KILL YOUR TREES AND SHRUBS:**

### **ANIMALS**

Cows, horses, antelope, rabbits, deer, elk, porcupine, dogs, insects, (of which there are thousands), llamas, gophers, field mice, picapin, voles, moles, prairie dogs, sheep, goats, people...

### **DISEASES**

Most of which are vascular system or leaf problems...

### **TOO MUCH:**

Fertilizer, wind, water, sun, heat, cold, herbicide, insecticide, soil-compaction, air space, weed and grass competition, mulch, soil piled up around the trunk, trees in a restricted space, polymer...

### **NOT ENOUGH:**

Water, sun, heat, cold, space, insecticide, soil compaction, air space, mulch, soil, time given for proper planting techniques...

### **ABIOTIC**

Soil grade changes, construction damage, excessive pruning, trunk girdling, floods, avalanche, fire...

### **IMPROPER PLANTING TECHNIQUES**

Planted too deep, not planted deep enough, poor spacing, dehydration of bare root stock, poor specie selection, no site prep, no mulching, no watering, no animal protection, planted too early, planted too late, planted in buckets and then moved and planted again, amending the soil, tangled roots, air pockets, not removing the tar paper containers or burlap, planted over rock, poor storage (including storage in the sun, in a car trunk, allowing the roots to freeze or dehydrate, soaking in a bucket of water for more than an hour, too hot, exposed to the wind) digging the hole too soon which allows it to dehydrate, no weed control...

## Suggested Nominal Spacing Regimes for Windbreak, Snowfence and Random Plantings

4 - 6 feet	5 - 8 feet	6 - 10 feet	8 - 12 feet	12 - 16 feet	16 feet +
Antelope bitterbrush	Snowberry	Lombardy poplar	Siberian elm	Green ash	Engelmann spruce
Sumac	Cotoneaster	Pinon	Lodgepole pine	Cottonless cottonwood	Narrowleaf cottonwood
Sandcherry	Honeysuckle	Chokecherry	Limber pine	Golden willow	Bur oak
Woods rose	Nanking cherry	Lilac	Rocky Mtn. juniper	Colorado blue spruce	White fir
Mtn. mahogany	Serviceberry	Native Willow Mix	Scotch pine	Honeylocust	Douglas-fir
Wax currant	Coyote willow	Silver buffaloberry	Ponderosa pine	Black locust	
	Native plum	Red-osier dogwood	Aspen	Hackberry	
	Caragana	Bristlecone pine	Austrian pine		
	Golden currant		Eastern red cedar		

### To calculate spacing between the rows:

Minimum distance - Add together the nominal distance requirement for the specific plants in adjacent rows,

**For example:** if adjacent rows are Rocky Mountain juniper and ponderosa, add 8 feet for the RMJ and 8 feet for the ponderosa for a total of at least 16 feet between these rows.