-Balance in the Forest-
Tree Planting

Adapted from the on-line Teachers Guide
http://mff.dsisd.net

MICHIGAN STATE
UNIVERSITY
EXTENSION

TREE PLANTING TIPS, FACTS, and COMMON MISTAKES

To obtain the best results from a tree planting project, consider the following:

- Select the right species for the site
- Properly prepare the site
- Select good nursery stock
- Handle the seedlings correctly
- Use a good planting & handling technique
- Watch for and provide follow-up care

Select the Right Species For the Site

Hardiness Zone	Soil Texture
Wind Exposure	Soil Fertility
Soil Moisture	Frost Pockets
Soil Drainage	Existing Vegetation

Different tree species prefer particular soil types and water conditions. Know your soils and lay of the land, and select appropriate tree species. Poor selections will result in trees that are more prone to slow growth, insect & disease problems, and mortality. Growth will always be better where water drainage is good and competition from grasses, brush, and weeds is minimized. Consider these soil and site factors.

Properly Prepare the Site

Site Prep Methods
Furrowing
Scalping
Plowing & Discing
Herbicides

Site preparation usually means exposing mineral soil for a planting spot and eliminating or reducing grass, weed, and shrub competition … BEFORE planting. Site "prep" is often done the season before planting. Competing vegetation is probably the most critical factor to control. This sometimes means the use of herbicides.

If you do not wish to use herbicides, consider more work intensive and expensive methods that may not work as well. Furrowing works for a shorter period of time and removes fertile topsoil from the immediate vicinity of the tree roots. Scalping removes a "patch" of sod and topsoil providing a place to plant the tree. Scalping will create a depression with less topsoil and will sometimes "collect" water. Plowing & discing, like a farm field, gives good soil texture for water infiltration and root growth. In lighter soils, wind erosion and excessive dryness might be a problem.

Select Good Nursery Stock

Seedlings are often described as "2-0 stock" or a "3-3 transplant". These numbers refer to the age of a seedling and the growing seasons since transplanting. The first number is the years the seedling grew in a nursery bed. The second is the number of growing seasons since transplanting. Total age is the combination of the two numbers. Transplanted stock are more expensive, but generally will experience a higher survival

rate. Spruce, fir, and Douglas-fir should be bought as transplanted stock for best results. Pines usually do well as 2-0 stock.

"**Bare root**" seedlings have been the normal type of seedling for many years. They are delivered without soil on the roots in bundles. Bare root stock is planted in the spring. "**Containerized**" seedlings are grown in styrofoam blocks. Each "cell" in a styro-block contains a seedling, complete with soil and nutrients. These seedlings, with their soil "plugs" are planted just about any time the soil is unfrozen. Spring and fall are generally the best times. Additionally, these seedlings have not experienced the root trauma of bare root stock.

Bare Root Seedling
or
Containerized Seedling?

Handle the Seedlings Correctly

Improper handling of seedlings is one of the major factors in planting mortality. When receiving your stock, make sure all the packaging is intact. Exposure from broken seals may cause root mortality. Bare root tops should have a healthy green color (if they're conifers), a fibrous root system, good stem caliper (diameter), and no multiple stems.

Signs of Poor Handling
Dry Roots
White Root Tips
Too Much Soil (bare-root)
Swollen or Burst Buds
Mold on Needles or Stems
Broken/Crushed Stems
Ripped or Crushed Bags/Boxes

Use a Good Planting & Handling Technique

Bare-root stock are particularly vulnerable to poor care. Keep bags/containers out of direct sunlight and in a cool place. Don't stack bags/containers and allow for air movement between bags/containers. Plant bare-root stock as soon as possible. Containerized stock can be more easily stored for periods of time. Water containerized stock if you don't plant them promptly.

Remove only enough bare-root seedlings from their bags to plant for that day. If there are left over seedlings, "heel" them in, which simply means to temporarily bury the root bundle in the soil. While planting, keep bare-root stock in a cool, shady spot and unexposed to air. As little as five minutes can kill critical root hairs and small roots! Keep those bags closed!
Plant trees at the proper depth, usually at the root collar (a slightly raised ring where the roots and stem meet). Roots must be oriented straight down in the hole. "J" rooting will kill the seedling. Don't wash or rinse the bare roots. Leave the few soil particles that remain.

Some Planting Rules
Don't plant in overly wet or sticky (clayey) soil
Keep seedlings moist and cool at all times
Plant in mineral soil, not the duff on the surface
Make the hole deep enough for the whole root system
Make the hole before removing the seedling
Remove trees one at time from planting pouch or container
Plant seedlings one inch deeper than they were in the nursery
Plant seedlings upright, not at an angle
Take care that roots are not curled or twisted
Pack soil firmly
Reduce competing vegetation

They are often around critical root hairs and small rootlets. Carefully carry seedlings so that they don't dry out or become excessively rubbed. Make sure there are no air spaces left in the hole.

Planting Around Homes, Schools, Parks, and Other Human Habitats

For the most part, it is better to plant larger trees because they are more visible and less prone to accidents, such as getting run over with a lawn mower. Balled and burlaped trees are more expensive than bare-root trees, but have more intact root systems and usually a better chance of survival. Make sure the hole is deep enough and wide enough to accept the entire ball / root system without crowding the roots. The best tree in a bad hole will die. Money is better spent on good planting than on super stock. Plenty of water for the first summer or two is recommended. One inch per week is enough, from either rainfall or a bucket.

Select tree species that live better in human environments (salt, air pollution, soil compaction, etc.). Stake a tree properly. Three lines should be used, with bark protection where lines attach to the tree. In areas of high deer density, cages should be placed around the tree. Cages should be 3-5 feet in diameter. Chicken wire can be wrapped around the cage to keep out rabbits. Tree wraps can be attached to the tree stem to reduce problems from mice and voles. Cages might also reduce the threat of vandalism.

Consider the species mix in the area or in your town. Try to avoid planting only one or two species. These "monocultures" could prove to be disaster if an insect or disease agent attacks a particular tree species. Entire neighborhoods could lose their trees, and all the advantages of trees, if monocultures come under attack. This has happened in the past to many communities due to Dutch elm disease, chestnut blight, and emerald ash borer.

Watch For and Provide Follow-up Care

Planting is hard work! You will want to protect seedlings from grass and weed competition until the seedlings are well above the height of grass and weeds. Intensive root competition from sod may impede tree growth for years, even after tree crowns have grown taller than the grass.

Many plantations experience damage from deer, grazing, and fire. These are preventable. Fence construction can be expensive. If you live an area of high deer populations, consider the cost of a fence BEFORE you order seedlings.

Inspect the seedlings several times each summer for signs of insect and disease problems. Discover the reasons for broken leaders, off-color foliage, unusual growths, and defoliation. Consult a forester for diagnoses.

Common Mistakes That Kill Tree Seedlings

Care Errors
Wind exposed roots
Overheated seedlings from direct sun
Temporary storage covers blow away exposing seedlings
Roots dry out from not planting soon enough

Planting Errors
Soil packed too loosely
Planting too deep or shallow
J-rooting
More than one tree per hole
Second hole not closed (planting bar problem)
Planting in duff rather than mineral soil
Failure to allow good root spread in hole

Other Errors
Improper spacing (many potential long-term problems)
Failure to control competing vegetation, especially grasses
Planting in low spots and frost pockets
Incorrect match of species and site
Planting at the wrong time of the year
Failure to provide full sunlight (at least with most species)

Where can your school obtain tree seedlings?

There are a number of sources, sometimes the trees are free. The best source for current information would be one the places listed below. Occasionally, grants fund tree planting projects at schools, on school forests, or in other places.

1. County Conservation District
2. County MSU Extension Office
3. DNR Office (private forest management specialist)
4. Commercial seedling nurseries.

A WORD ABOUT PLANTATIONS

Plantations for timber production go back to the ***CCC days*** in the 1930s. At that time, society was concerned about the future supply of the domestic timber resource and unemployment levels were high. Not much was known about proper relationships

between tree species and site suitability, but the sense of urgency was strong and millions of trees were planted. Many of these older plantations have now been thinned several times. Some have been harvested and replanted, or converted to other uses, such as housing or a parking lot.

Today, the timber need for plantations remains strong, especially ***softwood*** plantations, particularly pines. About 30 million trees are planted in Michigan each year. The most commonly planted species are red pine, jack pine, white spruce, and European larch. Plantations require intensive forestry and efficient ways to produce wood fiber. They can be likened to agriculture, except the planting occurs only once every 60-100+ years and harvesting from thinnings may occur every 10 years or so. Plantations, of course, are also much "lighter on the land" than farming because they are more like a forest system than a corn field. However, some people are concerned about the lower levels of species diversity and other ecological concerns that are sometimes associated with plantations.

*SOFTWOOD: A "softwood" can also be called an "**evergreen**" or "**conifer**" tree. However, it is inaccurate to call all conifers "pines"! There are only three native pine tree species in the U.P. (white, red & jack) and seven species of non-pine conifers (balsam fir, hemlock, cedar, black & spruce, tamarack, and yew). True pines (genus Pinus) make up only 15% of the number of conifers in the U.P.*

Planting trees is often one of the first activities associated with "forestry". A simple concept, but it's actually quite easy to kill seedlings or set the stage for future growth problems. Exposing the roots to warm, dry air for even a few minutes can kill the fine root hairs, dooming the seedling.

Plantation establishment involves MUCH more than just planting trees. In most cases, the site needs to be properly prepared, which involves the removal of competing vegetation. This is usually done with herbicides, which can sometimes be controversial (more perception than science, however). After the amount of competing vegetation is reduced, then trees are planted in mineral soil. Additional treatment may be necessary to expose mineral soil, either by digging furrows or "scalping" small patches at regular intervals. After the seedlings are in the ground, the job isn't over. In most cases, an additional herbicide treatment or two is needed to control competing vegetation until the trees become tall enough to compete on their own. Most people seem to know that planted trees need full sunlight, but fewer people understand that underground competition for water and nutrients is also very important. That's one of the reasons why converting old fields to plantations is difficult. The root systems of grasses present serious challenges to seedling survival!