United States Department of Agriculture

Natural Resources Conservation Service
Plant Materials Program

Five Common Tree-Planting Mistakes - Follow these key steps to give your new trees the best chance of survival

The U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) Plant Materials program uses plants to solve conservation problems. One practice is using trees and shrubs in windbreaks and shelterbelts to provide protection from desiccating and freezing winds, manage snow deposition, create wildlife and pollinator habitat, produce fruit and lumber, and even help minimize global climate change by sequestering carbon. But early in my career, a colleague made an insightful observation regarding tree and shrub establishment in the northern Great Plains and Intermountain West. Gazing over a wide expanse of eastern Montana grassland he said in folksy vernacular, "Ain't no mistake trees don't grow out here." Despite Mother Nature's efficiency in plant distribution and establishment, there are places where additional trees and shrubs would provide important conservation benefits. With a small amount of TLC, we can help enhance growing conditions so they are favorable for tree and shrub growth in many areas of the West.

Well-maintained Rocky Mountain juniper planting.

The primary causes of planting failures, whether you are planting a shelterbelt, windbreak, or a single tree in the home landscape, remain much the same today as they did over 20 years ago when I started my career. Failures are often rooted in poor planning and preparation, not addressing timing-critical issues, or allowing maintenance to decline over time. Additionally, landowners often focus too much on mere plant survival, as opposed to ideal plant performance. Trees and shrubs used in conservation plantings can only provide meaningful conservation benefits if they *thrive*, not merely survive. In order for them to grow well in places that do not readily support trees, we need to create or enhance certain favorable site conditions, and do so in a timely manner. My favorite metaphor for tree and shrub plantings is an engine. If one small component of a car engine malfunctions, the entire vehicle may not work. Similarly, a single failure in the planting process can result in plant mortality or poor growth.

Listed below are five common planting mistakes that, individually or collectively, guarantee the failure of even the hardiest planting stock, and ensure your planting provides no conservation benefits whatsoever! Although we do not have enough space here to address every possible mishap, you can use these cues as a foundation for developing your own custom and successful planting strategy.

Planning a conservation planting.

MISTAKE 1: A NON-EXISTENT OR POORLY DEVELOPED PLANTING PLAN

A friend and colleague in North Dakota always stresses, “design to meet a goal.” Unfortunately, planting plans (if developed) are often perceived like owner’s manuals and instructions—referenced only in an emergency or when all else fails. The foundation of every successful and functional tree planting is a well-conceived plan. If you don’t believe within- and between-row spacing or proximity to buildings and roads is critical, just wait until your child is snowboarding on the 4-foot drift your living snow fence deposited in the middle of your driveway. In order to circumvent this botanical faux paus, I suggest the excellent guide, *Windbreaks for Montana—a landowner’s guide* (Montana State University Bulletin 366, http://www.msuextension.org/gallatin/documents/naturalresourcesdocuments/MSUWindbreak.pdf) and *Windbreaks and Living Snow Fences Resources* (Colorado State University, http://www.ext.colostate.edu/sam/windbreaks.html).

Become educated on proper planting design well before ordering plants or breaking ground, and allow enough lead time for addressing all subsequent planting steps, especially site preparation. Additional planning guidance is readily available at your local NRCS or county Extension field office. Trained staff can help recommend the best plant species, in the optimum configuration, for your local site conditions and planting goals.


Left: Quaking aspen planted in a poor spot.
Right: Bur oak thriving in a proper planting spot.

MISTAKE 2: BUYING NURSERY STOCK BASED ON PRICE AND CONVENIENCE, INSTEAD OF KNOWN ADAPTATION AND PERFORMANCE

Although it may seem cost effective to buy inexpensive stock and replant if it dies, the time and labor to replant, resultant delays in plant establishment and function, and potentially reduced performance will greatly offset any short-term savings. If you pencil out the cost of a large project such as surrounding your home and immediate yard, plants are a small percentage of the total expense. Matching plant species to planting site conditions (soil type, average minimum winter temperatures, annual rainfall, and other climatic factors) is imperative. Not only does the species have to grow well in the site, it also has to perform the intended function (the right plant for the right spot).

Ponderosa pine windbreak showing different seedling form and density resulting from different seed sources (origin)

Know the origin of the planting stock, not the nursery where it was grown, but rather the geographic origin of the seeds used to grow windbreak plants. Rocky Mountain juniper (*Juniperus scopulorum*), for instance, grows from Mexico to Canada, but you can be assured southern U.S. seed sources will not perform well in the northern Great Plains. Conservation-grade planting stock is relatively inexpensive, and when grown by a reputable conservation seedling nursery, is of known performance and adaptation, and of high quality. The USDA-NRCS Plant Materials Program makes seeds of our tested conservation selections available to a variety of state and commercial nurseries.

MISTAKE 3: INADEQUATE PREPARATION OF THE PLANTING SITE

This is a huge and common mistake. Control of sod-forming grasses and weeds is often the single most beneficial action a landowner can take to improve tree establishment. Control may be required one to two years in advance of planting, and may be provided by chemical sprays, mechanical cultivation, bark mulch, the use of weed fabric, hand weeding, or combinations of these techniques. A research project at the Bridger Plant Materials Center in Bridger, Montana, quantified the differences in survival and growth between trees grown on fallow versus vegetated sites. After only four growing seasons, green ash trees maintained under clean cultivation were 12–15 feet tall, whereas the same species, provided the same amount of water, but grown in a cover of thick spike wheatgrass, averaged only 18–30 inches tall!

Green ash tree in **fallow test plot** after four growing seasons.

Green ash tree in **vegetated test plot** after four growing seasons.

But be cautious of too much bare soil between shelterbelt trees rows that can lead to soil erosion and poor water infiltration. Use woven weed fabric to maintain tree rows and help minimize the bare ground between rows.

MISTAKE 4: IMPROPER STORAGE, HANDLING, AND PLANTING OF NURSERY STOCK

There are a series of potential missteps from the time a homeowner receives planting stock until it is planted. Dormant planting stock needs to be stored under cool, humid conditions until planted. Minimize storage and plant as soon as possible after the first frost-free date in your area. Avoid planting on warm, windy days when roots can desiccate in seconds. Keep roots packed in a moist substrate such as burlap, shredded newspaper, or fine organic mulch while transporting and before planting.

In NRCS studies, Scots pine (*Pinus sylvestris*) measured 80% mortality after only two minutes of root exposure on a clear, 73˚F day! After planting, elimination of air pockets around roots is essential, and adding water until reaching soil saturation is the most effective method of removing air pockets from around roots. *Do not physically pack the soil around the roots*, simply add water until the soil is soupy and settles completely. On certain soils, it may be necessary to apply a second dose of water after planting to wash fine soil particles into soil cracks.

Rocky Mountain juniper seedling shortly after planting and irrigation showing developing soil cracks.

A handy publication on nursery stock handling can be found on the Montana NRCS and Plant Materials websites titled, *Temporary Storage and Handling of Container, Bareroot, and Cutting Stock* (Plant Materials Technical Note MT-51).

MISTAKE 5: INADEQUATE PROTECTION FROM LIVESTOCK AND WILDLIFE

Many well-planned and properly installed windbreaks have succumbed to livestock or wildlife predation if left unprotected. Never install a woody planting without providing protection from animals. Physical (fencing) and/or electrical exclusion works the best, but can be expensive. Spray-on products have also been used successfully but tend to lose their efficacy over time. Several types of individual tree protectors are also commercially available. Each type of product has its benefits and limitations, but all enhance plant survival and growth to some degree if properly installed and maintained.

Deer damage to unprotected bur oak tree.

Multi-wire electric fence.

Welded wire screen used to protect Colorado Blue spruce seedling.


Fence posts and fishing line used to protect trees from deer.

LONG-TERM PLANTING MAINTENANCE

Aside from the five critical considerations already described is the issue of long-term planting maintenance. Although proper species selection and installation helps minimize maintenance, additional care such as supplemental watering, fertilizing, insect and disease control, weed management, and thinning and pruning will inevitably be needed over the life of the planting. There are many useful products that help support tree establishment and health such as windscreens, anti-desiccants, bud caps, bark wrap, and more.

The list of potential planting mistakes may seem daunting, but a little up-front education and effort will surely reduce frustration and minimize planting failure. The real beauty of a successful tree and shrub planting is found in the years of conservation benefits and enjoyment they provide. Need more information? Visit USDA Plant Materials, Montana NRCS, or university Extension Service websites.

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