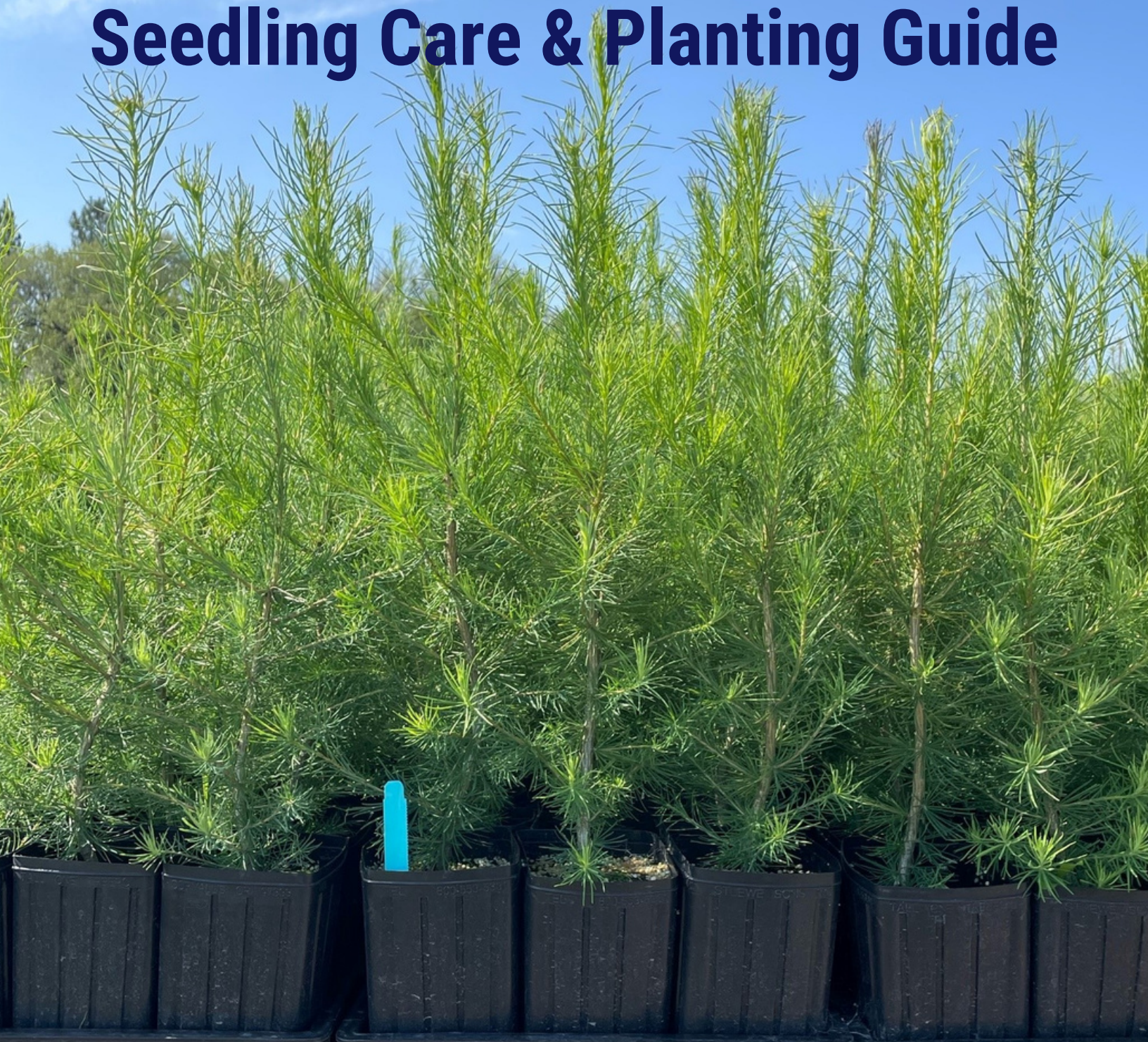




Seedling Care & Planting Guide



Conservation plantings are successful when healthy, site-adapted seedlings are used. Transplanting can significantly shock live plants which is why extra care must be taken to protect them. Improperly planted seedlings have little chance of survival. The following guide will help you care for your seedlings for optimal survival rates.

Pickup, Transportation & Storage

Seedlings will be delivered to your county's designated drop-off location via our refrigerated truck. Please pick up your seedlings on their scheduled drop-off day. For optimal care, transport your seedlings in an enclosed vehicle. If the back of a pickup truck or an exposed trailer is your only option, be sure to cover the seedlings with a tarp. This precautionary measure will shield the seedlings from direct sunlight and protect them from drying in the wind. Aim to plant your seedlings within one week of drop-off.



Our seedlings are grown to be planted in their intended destinations

There is no need to pot up or
transplant seedlings from one location to another

Bareroot

At the Nursery, bareroot seedlings are stored in a humidified, temperature controlled environment. While currently in a dormant state, they are gradually transitioning out of it. We advise you keep bareroot seedlings, within their original bundles, in a cool, dark, and humid location (preferably between 35 and 45 degrees). Root cellars, crawl spaces, basements, and unheated barns are suitable spaces for short time periods. Never allow seedlings to freeze or expose seedlings to temperatures above 55 degrees.

Plant bareroot seedlings as soon as possible. If all three types of seedlings are ordered, prioritize planting bareroot seedlings first.

During storage, bareroot seedlings should be checked every two to four days to ensure the roots and sphagnum moss packing material remain moist. If you do add water, be sure to drain any excess out the ends of the packaging. Do not leave bareroot seedlings in standing water.

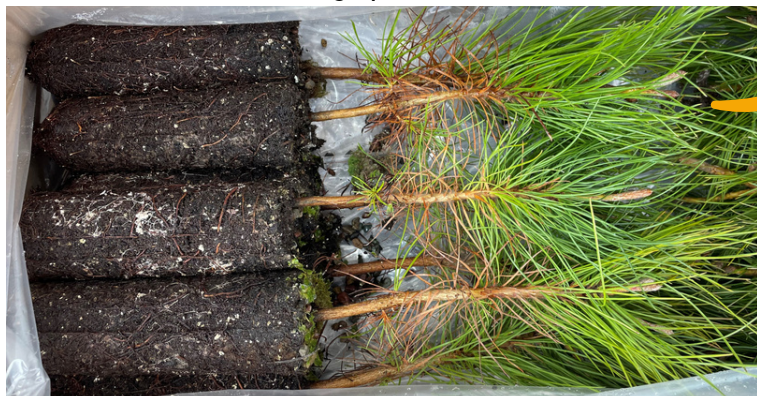
Packaging: Bareroot seedlings will be typically bundled in quantities of 400 to 500 and be 6 feet long. See photo on page 3.



Small Container Seedlings

Small Container seedlings (10 - 27 cu. in.) are stored in freezers at the Nursery set to 28 degrees to keep them in a dormant state. **YOUR SEEDLINGS WILL BE FROZEN WHEN YOU RECEIVE THEM.** To keep them in a dormant state, it's recommended to store them in a cool, dark place until planting. Do not store seedlings in a home freezer, home freezers are too cold for seedling storage and will kill your seedlings. **Do not break seedlings apart, if seedlings are still frozen and not easily separable, allow them a little more time to thaw.** To speed the thawing process, open the cardboard box and remove the plastic bag containing the seedlings. Do not try to force them apart as root plugs could be damaged. You may notice white mycelium on the small container plugs. This is a positive sign indicating healthy and viable roots. Only seedlings that can be planted quickly should be brought out to the planting site.

Packaging: Small container seedlings are packaged in cardboard boxes measuring 32x10x6 or 36x10x10 and will have 24 - 216 seedlings per box.



From left to right: Box of 48, 27 cu. in. A tray of 9 Ponderosa 175 cu. in. A bundle of 300 bareroot. A tray of 9 Poplar, 175 cu. in.

Large Container Seedlings

It's important to note that 100 and 175 cubic-inch seedlings have different care requirements than small container and bareroot seedlings. Larger seedlings are not stored in a cooler or freezer at the Nursery.

They are instead stored indoors during the winter to protect the roots from harsh temperatures. These seedlings are then transitioned out of indoor storage as soon as possible (usually within the first week of March). Consequently, they are not dormant during shipping. The Nursery will water all of these seedlings before shipping them out. Upon receipt of these seedlings, it is best to take them home immediately and place them outside. During transportation seedlings can be laid down and covered with a tarp to prevent wind damage. When storing keep the seedlings upright in these trays until the planting. Water as needed. **Protect the tips of your pine seedlings, if the tip (also known as a "candle") is damaged the tree will fork.**

Packaging- The large container conifers and hardwoods (100 and 175 cu. in.) will be arranged in plastic trays of 9 seedlings. 175 pots are 4"x4" and 14" deep Seedling height varies by species as depicted in photo above.

Empty trays and pots can be dropped off at the nursery in Missoula, 2705 Spurgin Rd., building G. 2

Planting Site Tips

Favorable seedling sites have high soil moisture levels, little competing vegetation, and some protection from direct sun and wind. Soils rich in organic matter, proper pH, good aeration, and the ability to retain moisture are ideal. On most planting sites in Montana, water is the greatest limiting factor to survival. Reducing or eliminating weeds and grasses in your planting area is extremely important. Soil moisture levels can be greatly enhanced by plowing and disc-harrowing the site a year in advance. It is imperative to maintain a weed-free environment throughout the entire growing season.



Seedling Care at the Planting Site

During all seedling handling, ensure that the roots are shielded from heat, drying, and prolonged exposure to sun and air. Only transport the seedlings that can be planted in one day to the site.

For bareroot seedlings, consider a root dip slurry of soil and water, resembling thick paint like consistency, or wrap roots in wet burlap. However, avoid leaving seedlings in the slurry mix for over an hour to prevent root damage.

Small container seedlings can remain in their bags during planting, however do not allow direct sunlight to heat up the roots within the bags. If necessary, wet the plugs, but do not leave them in standing water.

Ensure that large containers are watered before being transported to the planting site. Once at the planting site, place them in an open area, avoiding closed spaces. If it is hot, place them in the shade.

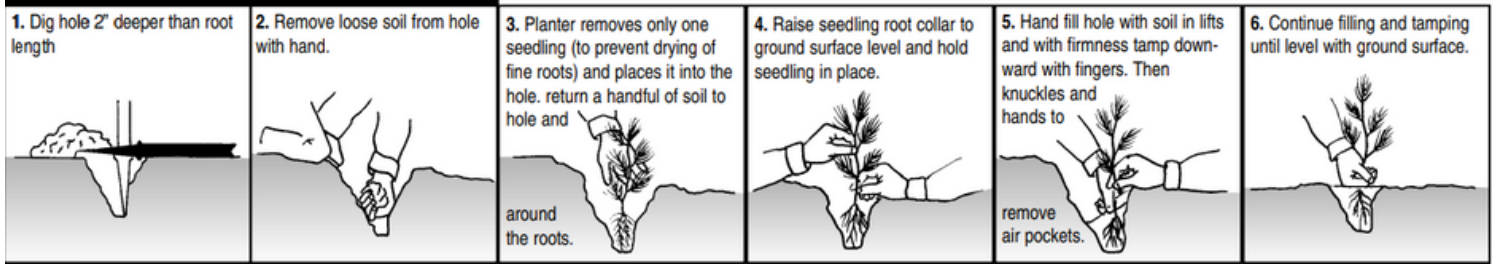
Planting

In Montana, early spring is the best time to plant due to high soil moisture levels and cool temperatures. The ideal temperature range for planting is 33 to 55 degrees Fahrenheit. If temperatures exceed 60 degrees or become windy, it's advisable to stop planting until conditions improve.

A variety of planting tools are accessible, including a sharpshooter-type shovel for digging narrow, deep holes. Each planting hole must be large enough to accommodate the root system in a natural form. Place bareroot seedlings in the hole spreading the roots downward. Do not bunch roots at the bottom of the hole or fold them so that the roots ends are directed toward the surface.



Hand planting with a planting bar.



A primary cause of poor seedling survival is incorrect planting depth. For bareroot seedlings (see above diagram), the root collar (natural soil surface line) must be located just below the soil surface when finished. Fill the holes with your hands, checking for correct root collar height. Tamp the soil slightly around the roots. Container seedlings should be planted so the surface of the plug's soil is a half-inch below final grade. Topping the plug with native soil will prevent rapid drying of the plug.

When planting container seedlings, it's important to leave the plug undisturbed. Despite a belief in disturbing roots for better growth, the Nursery does not recommend this practice, as container plugs were developed by the reforestation industry for successful tree planting without root disturbance. The general feedback indicates that survival improves without disturbing the plug.

Large seedlings need to be removed from their containers. To do so, gently tip the plant upside down and let the tree's weight aid in its removal. Press and massage the container's sides can help ease the seedling out, but avoid forcefully pulling on the seedling.

Other general planting tips:

- Don't put water in the planting holes immediately prior to planting. This can lead to excessive compaction when the soil is tamped around the roots.
- Do not pre-dig holes. Dig holes the same day you plant so the holes do not dry out or compress.
- If you use a mechanical tree planter, have someone follow behind the planter to adjust root-collar depth and tamp out air pockets.
- Select good microsites for the seedlings. Plant on the north and east side of downed logs or stumps to shade the seedling, especially on south-facing slopes. Avoid areas of dense sod.
- Remove all weeds and grass from an 18-inch area around each planting hole.
- Larch seedlings are very susceptible to competition. A good 3-foot square area should be cleared when planting larch, completely remove all vegetation around the tree for best survival.



A large seedling planted to the top of the plug and then watered 2 gallons

Post-Planting Seedling Care

WATERING: Ideally, provide one to two gallons of water per seedling immediately after planting, with additional watering in the first year being highly beneficial. In subsequent years periodic deep watering is preferable over frequent light watering. During the summer, irrigate each plant with one to two gallons of water every one to two weeks. Gradually reduce irrigation in late summer to allow the seedlings to harden off for winter. In areas subject to Chinook winds, a final irrigation right before the ground freezes can help winter survival.

FERTILIZATION: Fertilizer use on first-year seedlings is generally not recommended. After the first year, small applications of slow-release fertilizers with equal parts nitrogen, potassium, and phosphorus will aid plant growth. Follow recommended rates carefully and avoid mixing manure with the planting hole soil.

MULCH: Woven weed fabric is the best mulch for seedlings. It controls all weeds, reduces evaporation from the soil around the roots, and allows water and air to pass through. Other good mulch materials are wood chips, bark chips, straw, and composted sawdust. Mulch should be no deeper than three inches. Avoid using grass clippings to reduce attracting rodents.

WILDLIFE DAMAGE: To deter deer and elk browse, limit access to the seedlings or apply repellents. Rigid net-like tubes are available from many reforestation suppliers. These are effective at discouraging browse of the terminal bud but require annual maintenance. Repellents such as Plantskydd and TreeGuard have shown positive results. One application in the early spring appears to give decent protection for the season. To prevent rodent damage, control weeds around seedling bases with shallow, clean cultivation.

Be cautious of dog urine as it can burn seedlings, causing damage and killing seedlings over time.

Most Common Causes of Seedling Mortality During Handling and Planting

- Seedlings not picked up promptly
- Improper Storage of Seedlings
- Roots drying during planting
- Roots “j-rooted” in the planting hole
- Seedlings planted to the to the wrong depth
- Air pockets left in the planting hole
- Over-compacted soil in the planting process
- Planting too late in the Spring or Fall

Best Practices for Successful Plantings Include

- Selecting seedlings of appropriate size and species for the site
- Proper site preparation well in advance of planting
- Protecting the seedlings from heat and drying during handling
- Planting seedlings promptly after delivery
- Watering as needed, especially the first year after planting
- Pre-planning to account for any needed labor and supplies