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ESTABLISHMENT WATERING OF NEW PLANTINGS

With the current drought in the northern Plains, there's a lot of thought being given to water conservation practices. A popular misconception, however, is that drought-tolerant species and Xeriscape™ designs do not require supplemental water at planting time. Establishment watering, supplemental water applied at planting and then for the following 1-2 growing seasons, is critically important in arid regions of the country, especially during a drought. Watering technique, the quantity applied, the intensity and frequency of watering, and water quality all influence the success of a new planting. Site preparation, weed control practices, species selection, stock size and quality, geographic location, type of conservation planting, and a host of other factors will influence the watering regime. Here are a few tips on how to use your water efficiently to establish a new planting. For clarity, the term "planting" refers to the transplanting of plants, not the sowing of seeds.

Watering at planting time – Conservation plantings for reforestation, wildlife enhancement, riparian restoration, native range renovation (woody draws), and windbreak and shelterbelt establishment can be successfully installed without supplemental water at planting time – given ideal conditions. Ideal conditions include soil moisture near field capacity; cool temperatures; adequate and timely precipitation; friable (loose) soil; hardy, adapted stock; and good planting technique. In recent years, it has become increasingly difficult to meet these criteria in much of Montana and Wyoming. Even with dependable natural precipitation, I recommend the application of some water at planting for dryland projects. An overlooked and important function of supplemental watering at planting time is the **elimination of air pockets**, and natural precipitation seldom provides enough moisture for this purpose. Roots exposed to air pockets desiccate and die, reducing the ability of the seedling to obtain adequate moisture and nutrition. Seedlings supported solely by natural precipitation often remain in a stressed condition for 2 to 3 years before regaining vigorous growth. Keep in mind that a landowner's expectation of a farmstead windbreak, shelterbelt, or landscape planting is often of immediate vigorous growth and 100 percent survival. Since the function of most conservation practices are directly related to plant height, canopy width, and root spread, reduced growth translates into delayed performance.

Bareroot plants – In the nursery, undercutting of bareroot stock (plants dug, stored, shipped, and planted without soil surrounding their roots) reduces root system size and decreases the short-term capacity of the seedling to uptake water and nutrients. Although the shoot:root imbalance is corrected by reduced top growth over the next few years, the plant remains in a stressed condition. Supplemental water during establishment supports root growth as the proper shoot:root ratio is re-established. Seedlings planted by hand or with a seedling planter typically require 1 to 3 gallons of water at planting time. If a hand-held or three point power auger is used, 3 to 10 gallons of water per seedling may be needed, depending on the width of the auger and depth of the hole. For windbreaks, shelterbelts, and Xeriscapes™, bareroot seedlings should be watered once per week the first growing season, and then once every 2 weeks the second and sometimes third growing seasons. For some conservation applications, this level of care is totally impractical. In such cases, the planner needs to consider the likelihood of the planting receiving adequate natural precipitation for survival and vigorous growth,

whether the project is better suited to a different location, or if it should be deferred until weather patterns are more favorable.

Efficient ways to deliver water include drip systems, hand-watering from tanks, soaker hoses, and underground drip tapes. Five-gallon buckets with a small hole drilled in the bottom, or retrofitted with a drip emitter, can be placed at each seedling for a slow, uniform delivery of water. These are especially effective on heavy-textured soils (high clay and silt) where water infiltration and percolation are slow. Flexible plastic containers designed especially for this purpose are commercially available.

Container plants – Container plants are watered in the same manner as either bareroot or b&b (balled and burlapped), depending on the size of the container and corresponding rootball. Small container plants, with their root systems intact, often adjust to their new planting site more quickly than comparably sized bareroot material. With textural differences between potting mix and the native soil often pronounced, care should be taken after planting to assure that water is moving between the rootball and the adjacent soil.

B&B (balled and burlapped) – Although large b&b materials are seldom used in traditional conservation plantings, they remain the plant materials of choice when large stock is needed for landscaping projects. With the strong interest in "backyard conservation" and "sustainable landscaping", b&b stock will probably be part of the plant materials mix.

Even before placing a b&b plant in the hole, water the hole so that the soil in the bottom is settled. This assures that the surface of the rootball (and more importantly the root collar) sits level with the existing soil grade at final planting. Once the b&b plant is sitting properly in the planting hole, start backfilling with native topsoil. Backfill the hole one-third full with soil and then start applying water. Continue adding soil and water until the hole is filled to the original soil grade. The backfilled soil should be a soupy consistency to assure that all air pockets have been removed. Once the hole is full of soil, very lightly firm the surface of the backfill with your foot. Never stomp or heel the backfill, it can cause serious root damage and loss of soil structure. After the backfilled soil drains for 10 to 30 minutes, place an open hose or sprinkler with a trickle of water as close to the trunk as possible and thoroughly saturate the rootball and adjacent soil. A 2- to 3-inch high berm constructed <u>just outside</u> of the planting hole helps keep supplemental water in this zone. With the limited lateral movement of water across the soil profile, it is best to remove the berm after the first growing season to encourage the lateral expansion of roots into the adjacent soil.

The frequency of watering varies with the local climatic conditions. In most cases, b&b stock should be given two thorough soakings per week over the first growing season. For maintenance plantings, the standard recommendation is to turn off the water in mid- to late August, allowing the plants to harden-off, and then resume watering after dormancy and until the ground freezes. Growing season water should not be held from <u>stressed</u> plants, and newly planted stock are often stressed. Watering should be reduced the second growing season to once per week, less frequently in high precipitation zones. By the end of the second growing season, water should be added on an "as needed" basis. Assuming proper species selection, supplemental watering at this point is a maintenance operation, and rates of growth are influenced more than establishment and survival.

For all types of stock, use watering techniques and conservation practices that provide adequate establishment moisture while minimizing waste.

1) If possible, use seedlings grown from hardy, adapted seed sources.

2) Select and plant drought-tolerant species to reduce maintenance watering.

3) Create landscape designs that take advantage of the natural topography to funnel or channel water to landscape plants. Channel roof runoff to your landscape plants.

4) Store soil moisture by controlling sod-forming grasses and weeds 1 to 2 years prior to dryland plantings.

5) On sandy soils, amend the native backfill with up to 50 percent organic matter such as peat moss to improve water retention.

6) Water in the cool, calm hours of the day to reduce evapo-transpirational losses.

7) Deliver water efficiently with drip systems or soaker hoses.

8) Construct shallow berms just outside of each planting hole to collect water and prevent surface run-off away from the plant.

9) On loam and clay soils, water less frequently, but for a longer duration to encourage deep root development.

10) Apply ample water slowly on heavy-textured (high clay and silt) soils to prevent surface runoff.

11) Apply moderate amounts of water more frequently on light (sandy) soils. Water tends to move downward through sandy soils quickly, below the root zone where it is unavailable to the plant.

12) Use 2-3 inches of coarse bark mulch over weed barrier to conserve soil moisture.

13) For small stock, use seedling protectors (screens or shades) the first 1 to 2 growing seasons to provide shade and wind protection.

14) For large stock, erect snowfence on the windward side of the plant to reduce wind desiccation.

15) Apply anti-transpirants or anti-desiccants to plants to reduce evapotranspirational losses.

16) After plants are fully dormant in the fall, thoroughly soak the soil profile. Repeat as the soil dries and continue watering as needed until the ground freezes. Even deciduous plants transpire moisture in the winter months!

17) Control weeds on a regular schedule. Do not over-cultivate on sandy soils that are susceptible to erosion. Plant a cover crop and/or leave some late season annual weeds to provide cover and trap snow for additional spring moisture.

In a nutshell, new transplants need water at planting time and then for an establishment period. The amount to apply and the frequency of application depend largely on stock type, soil type, local environment, and weed competition. Although the up-front investment of time and labor seems high, the work will prove well worth the effort as the project succeeds.

Other Information:

Drought Survival: Tips For Yards and Gardens. USDA/NRCS, Bozeman, MT. 2002.

Creating Native Landscapes in the Northern Great Plains and Rocky Mountains. Montana Association of Conservation Districts, Lower Musselshell Conservation District, and USDA/NRCS, Bozeman, MT 2001.

Water-Conserving Landscaping Involves More Than Plant Selection. Montana State University, Bozeman, MT. 2002, Http://www.montana.edu/wwwpb/home/xeris.html