



PLANTING POLE CUTTINGS IN RIPARIAN ECOSYSTEMS

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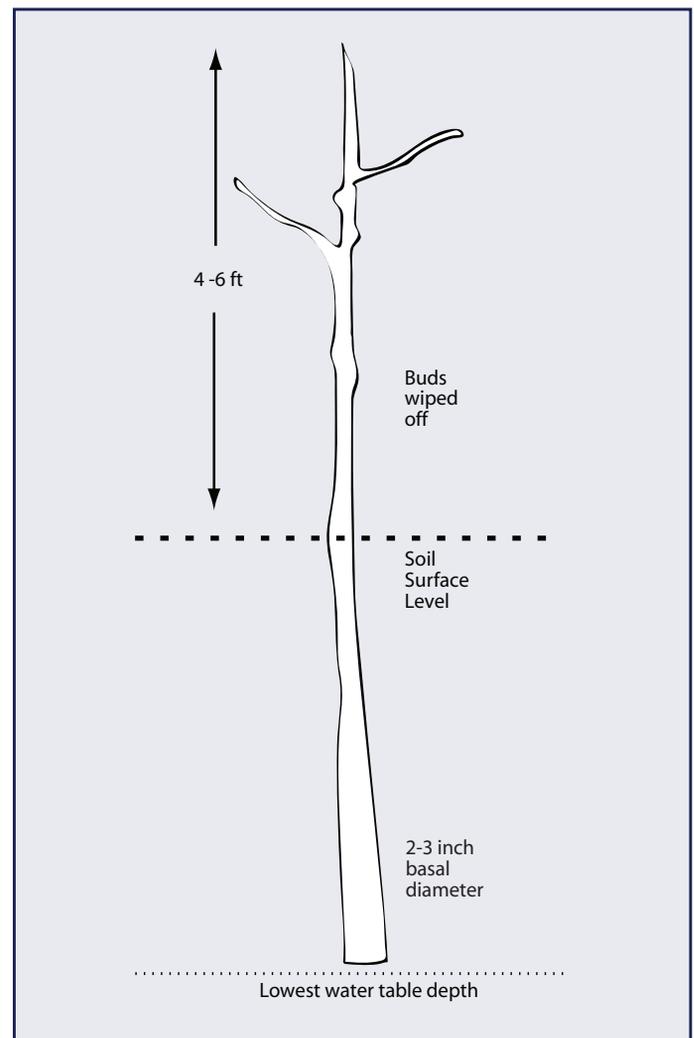
Riparian ecosystems are found in the transition between aquatic and adjacent terrestrial ecosystems where unique vegetative communities can occur due to free water at or near the soil surface. In water limited environments, such as those found in the arid southwest, riparian zones act as rich oases that provide food, shelter, and transportation corridors for a wide variety of life forms. In addition to providing habitat, riparian plants reduce the speed of water flowing from adjacent land areas allowing nutrients, sediments and debris to be deposited on land before they enter the water. This benefits the riparian plant community through increased nutrient cycling and soil building processes. Riparian plant communities also buffer water temperature extremes, increase ground water recharge, and keep mineral nutrients on-site by storing them in biomass. A healthy, functional riparian plant community provides a rich environment for insects, mollusks, amphibians, reptiles, fishes, birds, and animals.

In Arizona, many naturally occurring riparian ecosystems have been impacted, altered or removed by natural processes and land management activities. Most riparian tree species can be successfully reestablished using nursery grown seedlings and saplings. Some can be more easily reestablished by planting poles: a branch or trunk that does not have roots or extensive above ground growth. Fremont cottonwood (*Populus fremontii*) and Goodding willow (*Salix gooddingii*) poles are commonly used in riparian revegetation projects in Arizona. Poles will develop roots and grow to maturity when planted in suitable locations. The following information is to assist residents, landowners and agency personnel in successfully establishing pole plantings in riparian ecosystems of Arizona.

Site Selection

Usually there is evidence to indicate past site conditions and suitability for riparian vegetation. Proximity to water, tree stumps, water-loving plants such as cattails, rushes or sedges, and other features can help in finding suitable sites. Sandy and/or silty soils are best suited for pole planting sites. In marginal riparian areas, depth to ground water should be monitored on a monthly schedule for at least one year. Ground water level can be monitored at existing wells or wells can

be established by installing perforated PVC drainage pipe vertically in the soil. Readings can be taken with a metal tape or a string coated with chalk to determine depth to ground water. In some instances, depth to ground water is obvious from adjacent perennial water levels. The size of the project will determine the frequency and feasibility of monitoring. On smaller sites, such as home landscapes, monitoring may not be



warranted. Sites where the ground water depth is within one foot of the soil surface during the growing season are better suited for willow than cottonwood. For cottonwoods, depth to ground water should not be greater than 4-5 feet depending on the suitability of the soil for digging holes.

Harvesting Poles

Ideally, poles should be harvested from young, vigorous trees from several individuals on nearby sites or from sites with environmental characteristics similar to the planting site. This will help ensure some genetic diversity and adaptation to the planting site. Straight poles having a diameter of two to three inches are most desirable. Poles should be cut while in their deepest dormancy, during January and February. The total length of the poles depends on the lowest depth to ground water. Ideally, the poles will be long enough to be in contact with the lowest anticipated ground water depth and still have four to six feet above ground after planting. Two small branches at the uppermost tip should be left on the pole. All other branches should be cut off and dormant buds should be removed by wiping them with gloves. After harvesting, the poles must be soaked in water for ten to fourteen days prior to planting. It can be challenging to find a body of water large enough to soak the longest poles. Soaking simulates a flood event and will stimulate new root growth after planting.

Planting Poles

Dig holes to a depth of the lowest anticipated ground water. In some cases, digging can be difficult due to rocks and cobbles. Larger plantings may justify the use of a mechanical auger. Poles should be planted the same day they are removed from the soak treatment. On some sites, it is a good idea to dig some holes prior to planting day if adverse soil conditions are expected. To plant, place the bottom end of the pole (the end that was nearest the ground on the tree when harvested) in the hole and backfill with soil material. Avoid air pockets and use dry surface soil to backfill. If surface soil is scarce, then minimize the number of rocks in contact with the pole when backfilling. In some areas, it may be necessary to protect the planted poles from rodents and rabbits with tree guards or hardware cloth.

Culture

In April or May the buds should begin to swell. At this point, it is best to remove the buds to reduce transpirational water loss and stimulate root growth. Poles should be protected from livestock for two to three growing seasons. If beaver are

present, hardware cloth (heavy screen) should be wrapped around the base of each pole after planting. Irrigation systems can improve short-term survival but may not result in longterm establishment. In order to be successful, irrigation water should promote root growth to a depth at which the tree will eventually have access to capillary ground water.

Additional Information

Under ideal circumstances, all of these protective measures can be employed. In practice, time and resources can be limited and some compromises are usually made. Keep in mind that these species are very well adapted to Arizona's riparian ecosystems and can survive under less than optimum conditions.



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