USING DORMANT POLE CUTTINGS TO REVEGETATE RIPARIAN AREAS[1]

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Abstract. Dormant unrooted pole cuttings from woody plants of Salix, Populus, or Cornus genera can be planted deep enough to reach low water tables or into streambanks so flood waters won't erode them away. Large cuttings from 8 to 20 cm in diameter have much better survival than whips. The cuttings must be long enough to be reach 15 cm into the water table and tall enough to be above the competing vegetation. First year's establishment success exceeds 90%. Third year's establishment success exceeds 70% during extreme drought period.

INTRODUCTION

Many riparian areas in the West need rehabilitation. Abuses in the past have caused the destruction of vegetation and accelerated bank and bottom erosion. Recent emphasis on water quality, aesthetics, wildlife, and fisheries has prompted new interest in methods for revegetating eroding stream channels (Carlson et al. 1991). The Interagency Riparian/Wetland Plant Development Project, USDA Natural Resources Conservation Service (NRCS) Plant Materials Center (PMC), is developing planting techniques for riparian woody vegetation to improve establishment success, in addition to performance tested native varieties of willows and cottonwoods for eventual release, to better meet the needs of riparian rehabilitation. One technique for revegetating riparian areas is dormant pole plantings. Large poles, 8-20 cm (3-8 in) in diameter, are harvested while they are dormant and planted 0.6-2.1 m (2-7 ft) or deeper in the ground. Extensive rooting occurs from root primordia the entire length of the stem. This creates an extensive root system that acts as vegetative armor to protect streambanks, improve water quality, or enhance fish and wildlife habitat.

Reestablishing woody riparian vegetation in an arid or semi-arid climate can be very difficult especially in areas that are drought prone, have low water tables, have been overgrazed, and areas that have excessive streambank erosion. Dormant unrooted pole cuttings from different species of *Salix*, *Populus*, and *Cornus* can be planted deep enough to reach low water tables or deep enough into streambanks that are exposed to high velocity runoff without being washed away.

PROCEDURE

When harvesting the cuttings from native stands, it is important to select healthy, vigorously growing stock that has no obvious insect or disease problems. Prepare the cuttings by trimming off the top 0.6 cm (2 ft) to get rid of the apical bud and most of the flowering parts. This allows a majority of the energy in the stem to be sent to the auxiliary buds for rooting and sprouting rather than upward growth and flowering. All side branches are also removed so excessive energy is not expended trying to support the side branches, but rather equally distributed to the primordia up and down the stem.

Unrooted pole cuttings can be harvested anytime during the dormant season after the leaves have been shed and before the buds start to swell (late fall to early spring). Generally, the cuttings are large limbs or even whole trees that are found in areas that have natural stands. Diameter ranges from 7.6-20 cm (3-8 in.) depending upon species. Lengths have been tested from 0.9-3.7 cm (3-12 ft) (Carlson et al. 1991; Hoag et al. 1992).

The exact diameter and length of the cuttings is dependent upon the species selected. The general rule of thumb is the larger the diameter of the cutting the better. This ensures a large supply of stored energy in the stem to improve establishment success. The large diameter cuttings can also incur less damage from rodents and grazing animals if livestock or big game animals happen to get into the planting area. The length of the cuttings is based on species and the depth to the lowest water table where the planting is taking place. The cutting needs to be long enough to reach about 15 cm (6 in.) into the water table and tall enough above ground to not be shaded by the surrounding herbaceous vegetation (Hoag 1991; Hoag et al. 1991; Hoag et al. 1992).

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They can successfully be stored for up to 4 months in a cool, dark place without significant reduction in establishment success. Generally, a walk-in cooler set at 32-35 F is the most successful. By storing the cuttings until spring or summer, the planting window can be extended past the flood season and into the low water period. This ensures that the bottom of the cutting is planted into the lowest water level. It is also recommended that the cuttings be soaked for 5 to 7 days before planting to allow the root primordia to start swelling before the cuttings are planted.

For high volume plantings, the planting method should be selected based on the following criteria: 1) accessibility to the planting site, 2) depth to the low water table, 3) soil structure (i.e. pan layers, cobbles, boulders, etc.), 4) diameter of the cuttings. Possible planting methods include but are not limited to power post-hole augers, wheel mounted augers, and "The Stinger," a tool that replaces the bucket on a backhoe for planting into rock riprap or steep vertical cutbanks. The general rule of thumb is to select the method that gives the best soil to stem contact, and can get deep enough to reach into the low water table (Hoag 1991; Hoag et al. 1991; Hoag et al. 1992). The part of the cutting that is in the water will act as a wick to ensure the cutting has a constant water source for sprouting.

RESULTS

Large diameter dormant unrooted cuttings that had between 85 and 99% establishment success the first year sometimes dropped down to 70% or 80% in the second and third year. Larger diameter cuttings have had significantly higher establishment success than whips or small diameter cuttings. Even after extreme drought, rarely will plantings have dropped lower than 65%. Establishment success appears to be directly related to contact with the low water table. Small diameter cuttings generally had lower success rates because 1) they were not in contact with the low water table or 2) they had a limited amount energy in the stem.

Dormant, unrooted, large diameter, tall pole plantings of *Salix*, *Populus*, and *Cornus* species provide a highly successful alternative to high cost, shallow rooted potted or bareroot stock. They are easier to plant, inexpensive, and do not require nearly as much site preparation. They can be used in most bioengineering situations to help naturally armor the streambanks to reduce erosion. Appropriate placement of the cuttings based on stream dynamics is necessary to prevent exacerbating the original problem. This method is especially useful to the land owner or manager trying to revegetate riparian areas in an arid or semi-arid climate.

Detailed methods on selecting, harvesting, treating, and planting dormant pole plantings can be obtained by contacting the author.

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