

Field Trial of *Cornus amomum* and *Physocarpus opulifolius* for Riparian Buffer Restoration at Bent Creek, The North Carolina Arboretum, Asheville

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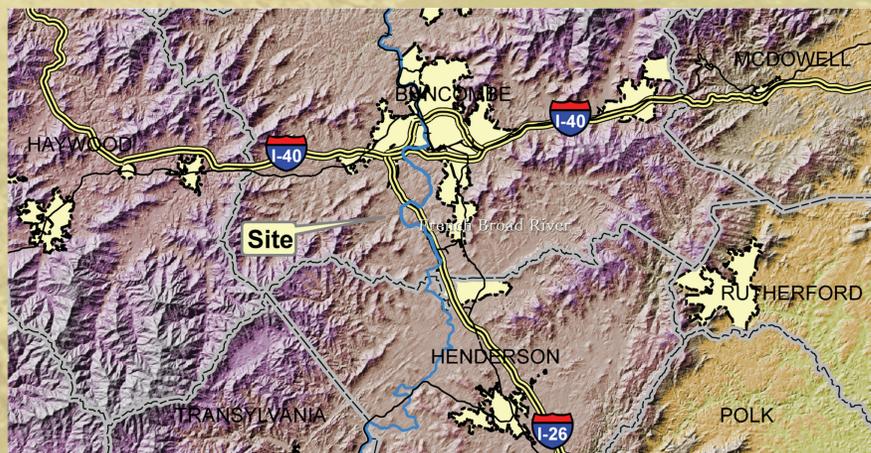
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Background

Several agencies and organizations are implementing natural stream channel design to restore stream function and habitat in Western North Carolina. While many agencies and designers suggest live staking as a method for riparian plant establishment, little relevant information exists on the survival rate of live staked species in western North Carolina. This study addresses survivability among Silky dogwood (*Cornus amomum*) and Ninebark (*Physocarpus opulifolius*) when live staked. The study site at Bent Creek in The North Carolina Arboretum experienced severe erosion and destabilization following Hurricanes Francis, Jean and Ivan in September 2004. Emergency stream stabilization, utilizing natural channel design techniques, was performed during December 2004 and January 2005. Silky dogwood and Ninebark live stakes were installed on the restored streambanks during February 2005.



Vicinity Map

Methods

In February 2005, live stakes were planted along the streambank of Bent Creek following construction.

- Local genotypes of both species (*C. amomum* and *P. opulifolius*) were harvested within a 50 mile radius of the project site.
- Each stake had at least 5 nodes present at the time of harvest.
- Stakes were partially submerged in water and stored in a dark room until installation. A steel rod was used to create a pilot hole before installation.



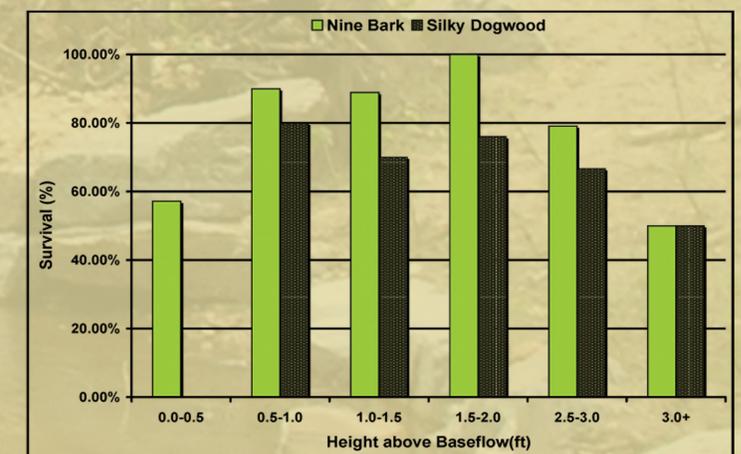
- 95 individuals of each species were planted so that two nodes were underground.



- Median diameter of each stake was measured below the top node using hand calipers. Measurements were made after planting and before the growing season.
- A total station survey unit was used to determine elevation above baseflow. Plantings were grouped into six elevation classes starting at baseflow and increasing in half foot intervals.
- Significant differences ($P \leq 0.05$) were noted using the GLM Procedure in SAS (SAS, Cary, NC).

Results

As of November 2005, mean survival of both species was 74.2%. Survivability was affected by species ($P = 0.01$) and height above channel baseflow ($P = 0.01$), but not by diameter, or any interactions. Ninebark (*P. opulifolius*) had greater survivability than Silky dogwood (*C. amomum*) at every height above baseflow except the highest class.



Discussion

Based on the results of this study, installing Ninebark live stakes in similar settings in western North Carolina at any height above baseflow could potentially result in at least 50% survivability. For additional species diversity, one option is to plant Ninebark at varied elevations above baseflow, and stake Silky dogwood in higher numbers between 1 and 2.5 feet above baseflow.

Potential Future Research

- Similar field trials including additional species of live stakes (e.g., Black willow, River birch, and Elderberry)
- Survivability of live stakes in different streamside soil composition and moisture conditions (e.g. compacted clay soil vs. looser, organic material and the effect of erosion control matting on soil moisture).

Acknowledgments

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