Deep Planting Long-Stem Nursery Stock: An Innovative Method to Restore Riparian Vegetation in the Arid Southwest

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Technical Note

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By David R. Dreesen and Gregory A. Fenchel

On the Ground

- The successful establishment of riparian shrubs in the arid Southwest has been accomplished by using "deep planting" methods in riparian areas that lack overbank flooding.
- This methodology involves the immediate exploitation of capillary fringe moisture by the existing root system of long-stem nursery stock and the deep burial of native shrub root crowns.
- The methodology precludes or drastically reduces the need to apply irrigation water in arid and semi-arid environments in order to establish riparian shrubs and trees by deep planting long-stem native nursery stock.

Keywords: capillary fringe, phreatophyte, root crown, watering tube, water table.

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How does a restoration specialist in the Southwest establish native riparian vegetation when often confronted with two critical site limitations: meager and unpredictable precipitation and the lack of overbank flooding? Revegetation of disturbed riparian sites has been accomplished using novel planting methods and nursery stock where natural regeneration can no longer be expected.

Many riparian plant communities in the Southwest have been altered by human activities. These disturbances include reduction of flood events on major rivers by impounding high flows, levees restricting channel width, straightening and deepening channels to improve water conveyance, installation of drain channels to develop arable land by lowering water tables, and introduction of noxious woody species that have invaded vast areas of riparian habitat.

Properly functioning riparian areas provide many ecological services including recreation, fish and wildlife habitat, dissipation of flood flows, and water quality protection. The rehabilitation of disturbed riparian areas has been deemed a high priority societal goal as evidenced by the amount of funding spent on both private and public lands to restore native riparian plant communities in the past several decades.

Restoring Riparian Vegetation in the Southwest

Many common overstory trees and understory shrubs in riparian areas are phreatophytes. Phreatophytes have been described as plants whose "roots are in the water table or its capillary fringe during all or most of the growing season."[1] The capillary fringe has been described as "the zone immediately above the water table" where the water is held "by interfacial forces (surface tension)" and "is typically saturated to some distance above its base at the water table."[2] Thus, the capillary fringe serves as a constant water supply with sufficient aeration for roots of phreatophytic species to flourish. In dry climates, the natural regeneration of riparian species is dependent on overbank flooding, but the persistence of this vegetation is dependent on the appropriate ground water level[3] and associated capillary fringe.

On lower elevation floodplain sites in the Southwest, cottonwoods, Rio Grande (*Populus deltoides* Bartram ex Marsh. subsp. *wislizeni* [S. Watson] Eckenwalder), plains (*Populus deltoides* Bartram ex Marsh. subsp. *monilifera* [Aiton]