

Riparian Notes

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Riparian Roots Reinforce Riverbanks

One of the primary attributes of good riparian vegetation is the extraordinary root systems of many riparian species. These root systems are what help reinforce banks and floodplains during flood events. Not only must roots help protect against the erosive effects of moving water, but it is also common to have large rocks and logs moving downstream during flooding. Vegetation must be well enough anchored to resist these powerful forces.

We don't have nearly enough good information on the rooting characteristics of most riparian species, but data from Arizona provides some helpful information that is applicable to Texas. The following information comes from: "Stream Stabilizing Traits in 6 Riparian Graminoids Common to Semi-Arid Alluvial Streams" by Caitlin Xenia Cornwall, Master of Science Thesis, Arizona State University, 1998.

Plant Species	Above Ground Biomass Lbs/Acre	Total Root Biomass Lbs/Acre	Total Root Length Miles per Cubic Foot
Spikerush	6,198	27,667	22.0
Knotgrass	6,198	24,527	18.8
Deergrass	23,302	65,033	7.2
Baltic rush	17,758	47,276	8.7
Rabbitsfoot grass	1,479	8,540	0.9

From this study, we find several important things about riparian-wetland plant species:

- Root biomass is typically 2.5 to 5 times greater than above ground leaf and stem biomass.
- For stabilizer species such as deergrass and Baltic rush, rootmass (root strength) and above ground biomass are the more critical features.
- For colonizer species such as spikerush and knotgrass, the primary feature is the phenomenal length of roots in a relatively small volume of soil.
- Annuals such as rabbitsfoot grass, do not provide comparable root mass or root length as the stronger perennials; however they can often provide quick cover and can start the restoration process.

Above ground biomass is also an important characteristic of riparian plants. Above ground growth is what helps to dissipate the energy and velocity of floodwaters which allows some sediment to drop. The plants then stabilize those newly deposited sediment and gravel helping to build bigger and more effective floodplains. The water storage capacity of these enlarged floodplains (the riparian sponge) is also enhanced, which in turn helps sustain baseflow.

Spikerush (*Elyocharis sp*) is found in most riparian systems across the state. Knotgrass (*Paspalum distichum*) is common in many areas and is noted for having fast growing stolons that root at the nodes for a quick mat-forming cover. Deergrass, (*Muhlenbergia rigens*) is a large riparian bunchgrass found in the Trans Pecos and may have a similar rooting characteristic as switchgrass. Baltic rush (*Juncus balticus*) is not common in the state, however there are many other species of *Juncus* that may have similar type roots.

Next time you walk across a riparian area, try to visualize the amazing root mass and the length of roots that lie below ground.