

Success of Horsetails Against Tamarisk and Through Pulse Flooding

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Introduction

Horsetails (*Equisetum*) are a species of vegetation native to the Colorado River system. Prior to Glen Canyon Dam, they were not found on the main stem but restricted to stable tributaries. With the stabilization of the hydrograph, horsetails have been able to proliferate in the riparian community and colonize the new high water zone. Horsetails are successful in this novel habitat in several ways. First they are able to coexist with tamarisk where many species are unable to withstand saline soils. Second, horsetails are able to re-sprout through sediment deposited by pulse flooding.



Figure 1. Horsetails sprouting through sediment deposited by November 2004 pulse flood (E. Booth personal photograph of RM 139R)

Ecology of Horsetails

Horsetails are a fern ally typically found in wet environments. Many appear to grow in xeric conditions, but rhizomes (underground stems) are found to penetrate into the saturated soil of the ground water table. Horsetails are perennial and grow from creeping rhizomes. They have a hollow stem which ends in reproductive spore cone. There are several species and hybrids of these species found at the edge of the Colorado River; *E. X. ferrissii* Clute, *E. hiemale*, *E. arvense* L., and *E. laevigatum* A. Baum.

Successful coexistence of Horsetails with Tamarisk

As observed at RM 139R, horsetails were the only other vegetation found in the monotypic lateral band of mature tamarisk. They are also abundant along the waters edge in the more typical marsh region. There are several hypotheses for how horsetails are surviving in amongst established tamarisk where no other species is found. One way that tamarisk competes is by increasing soil salinity around the base, making it inhabitable by most native vegetation. Horsetails can tolerate saline conditions as seen by presence in salt marshes. Thus, horsetails may be able to share this habitat due to their tolerance of salts. This may not be an accurate explanation, because new sediment deposited from the November 2004 flood may not have had time to accumulate salts from tamarisk. Another reason that the sediment may have low saline content is the trout perturbation flows could be leaching salts from the sediment. The second hypothesis for how horsetails are able to share this habitat with tamarisk is that horsetails were well established prior to the flood can grow through sediment faster than other riparian species by virtue of their rhizomes.

Success of Horsetails through Pulse Flooding

Horsetails are one of the most successful riparian species at responded to the pulse flooding. Four months after the flood, adult horsetails were rapidly growing through sedimentation deposited from the flood. It was observed at RM 139R that horsetail stalks grew through over 3 feet of sediment to reach the surface. Horsetails are so well established, scouring flows do not remove the entire rhizome. Re-growth happens quickly on open sandbars without significant competition by other species.

Conclusion

Although horsetails were not found along the main stem of the Colorado River before Glen Canyon Dam, they are successful under current hydrograph conditions. They are able to coexist with tamarisk whereas other species are not. They are also successful through flooding disturbances. Horsetails were once novel to this riparian system, but now they are pervasive.