Optimization of soil bioengineering techniques for riverbank protection in changing world
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Soil bioengineering: a trade-off between functions

Sustainable protection of human stakes

 Restoration of ecological and recreational functions

Biodiversity support

Biodiversity assessment along a gradient of riverbank naturality or integrity

Main Results:
- Taxonomic and functional diversity tends to increase with naturality
- Invasive plant cover increases with minerality
- Macro-benthos is strongly impacted by all kind of works

Conservation: Sustaining endangered species
- Myricaria germanica and Typha minima

Main Results:
- Myricaria germanica shows good bioengineering capabilities
- Myricaria germanica can develop in riprap in highly disturbed zones
- Typha minima grows well on riprap, both on restoration sites and from natural colonization

Mechanical resistance

Experimental works on steep slope rivers (5-10%)

Empirical experience feedback on mechanical resistance of works

Main Results:
- Taxonomic and functional diversity tends to increase with naturality
- Invasive plant cover increases with minerality
- Macro-benthos is strongly impacted by all kind of works

Resistance to drought and invasive species

Asian Knotweeds, Coypu and willow cuttings

Main Results:
- Knotweeds inhibit willow cuttings with leachates
- A dense cover of willow significantly reduces knotweed growth
- Long cuttings are as efficient as long cuttings to face Coypu damages

Drought resistance of Tamarix and Salix

Summer drought is a major threat and should increase with climate change
Tamarix gallica and different Salix populations and species

Main Results:
- Some Salix species have higher drought resistance and plasticity than others
- Tamarix gallica shows very good bioengineering capabilities even under severe drought

International and overseas perspectives

Experimental works and biodiversity assessment in Québec

Monitoring vegetation and mechanical resistance of numerous bioengineering works in Calgary

Promoting and developing soil bioengineering along rivers of Guadeloupe

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