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Renaud Jaunatre, A. Evette, Marie-Françoise Buisson

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Transplantation experiment of an endangered pioneer species: the dwarf bulrush (Typha minima Hoppe)

Renaud JAUNATRE\textsuperscript{a}, André EVETTE\textsuperscript{a}, Morgane BUISSON\textsuperscript{b}

Introduction
The dwarf bulrush (Typha minima Hoppe) is a pioneer, light demanding species colonizing riparian flood plains of temperate mountain streams. Its number declined by more 80% over the Alps and its larger remaining populations are located in French alpine rivers: Arve River, Durance River and Isère River. Due to rising river anthropisation, T. minima population are regularly impacted and may need restoration.

Our objective is to determine the best method to restore viable populations in the context of the Isère river development work (mainly embankment).

Methods
- \( T. \) minima clones collected in wild populations.
- \( T. \) minima clones grew in nursery.
- Clones transplanted either bare roots, small containers or large containers.
- \( T. \) minima and other plants shoot frequency (+1 & +10 months) and \( T. \) minima rhizome growth (+10 months) monitored (pinpoint lines).

Results
- Large containers, have the highest frequency, bare roots the smallest after 1 mth (\( F_{2.13} = 130.4 ; p<0.001 \)) and 10 mth (\( F_{2.26} = 46.38 ; p<0.001 \)).
- Large and small containers have the highest root growth (\( F_{2.81} = 13.29 ; p<0.001 \)).
- \( T. \) minima and other species frequencies are positively correlated (\( p<0.001, R^2=0.49 \)).

Conclusion
- The 3 methods allow transplantation of viable \( T. \) minima clones.
- The more initial biomass is transplanted, the better are frequency and growth.
- Competition does not seem to be a limiting factor of \( T. \) minima growth.
- Attention should be paid to transplantation location, substantial loss are due to river bank erosion.