



## **Living part on soil bioengineering structures in Appennino Tosco-emiliano**

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From analysis headed up in soil bioengineered areas in different parts of Tuscany, the steepest root systems in slope stabilization turn out to be those spreading from seed-born plants, while adventitious roots from cuttings are often absent in the part more distant from the neck, and in some cases are insufficient to grant life support just in case of minor stress conditions.

Genus *Alnus* shows its adaptation capability to restore initial restoration steps and to create renovation prerequisites for other species through amending litter production and symbiosis for nitrogen fixation with *Frankia* genus bacteria; other similar symbiosis (with *Rhizobium* and fungi) are carried out by *Robinia pseudacacia*.

Soil fecundity increase is confirmed by the following entrance of more demanding species, as *Ostrya carpinifolia* and *Acer pseudoplatanus* at the tree level, *Urtica dioica* and *Rubus ulmifolius* (nitrophilous) at grass level.

In the project phase it ought to imagine a well-structured implant, including rooted plants, cuttings and possibly a seed mix of colonising species aiming to form a germplasm on the structure itself in order to sprout whenever the local conditions allow it. Verifying that many after developed species came from ornithocore dissemination (*Ficus carica*, *Pinus* spp., *Rosa canina*, *Sambucus nigra*), lead to thoughts about bedding out bird-attracting species on structures in order to realise a faster (and maybe more complex) succession development.

This higher velocity could grant in a shorter period the production of a root mass spread in a more disomogeneous and complex pattern than that deriving from cuttings disposed in the traditional way; such a variability could allow a better interaction with other biological factors in the soil (bacteria, fungi, nematodes, ...) that are important for the plant nutrient cycle (Ohsowski et al., 2012) and then the constitution of an articulate, long-term system.