



Resprout and survival of willows (*Salix purpurea* and *S. incana*), Poplars (*Populus nigra*) and Tamaris (*Tamarix gallica*) cuttings in marly gullies with Southern aspect in a mountainous and Mediterranean climate (Southern Alps, France)

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In the Southern French Alps under a mountainous and Mediterranean climate, a current strategy of bioengineering is developed for trapping sediment in marly gullies with surface area less than 1 ha. It is based on the use of structures in the form of brush layers and brush mats of cuttings on deadwood microdams. Purple and white Willows (*Salix purpurea* and *S. incana*) are recommended here as they proved their efficiency to resprout and survive in such environment. However, these species installed in Southern gullies did not survive in previous experiments, due to the too harsh conditions of solar radiation and drought. We thus decided to test other species, namely black Poplar (*Populus nigra*) and Tamaris (*Tamarix gallica*), which proved their resistance to drought conditions in other experiments. To this view, bioengineering structures have been built in 2010 in eroded marly gullies in the Roubines and Fontaugier catchments (Southern Alps, France). We tested two installation modalities: one in spring and a second in autumn. Seventy-eight bioengineering structures (50 in spring and 28 in autumn), among which 32 made with Poplar cuttings and 28 with Tamaris cuttings, as well as 11 structures with purple Willow and 7 with white Willow as controls, were built in 6 experimental gullies. After 3 observation years for each modality (2010 to 2012, and 2011 to 2013, respectively), results first revealed that Willow species succeeded in surviving in gullies in Southern aspect (76 % for the cuttings installed in spring and 52 % for those installed in autumn), which is in contradiction with previous results. Second, Poplar showed a good ability to survive (62 % for the cuttings installed in spring and 33 % for those installed in autumn). Tamaris obtained the worst score with 26 % and 38 % of survival for the cuttings installed in spring and autumn, respectively. Globally, excepted for Tamaris, survival rates were better for the cuttings installed in spring. The bioengineering strategy has therefore been improved by incorporating cuttings of poplar species on the bioengineering structures, whatever the aspect of the gully but specifically on the Southern ones. Tamaris is not recommended as for it. Final recommendation is to preferably install cuttings in spring instead of autumn.