



## **Resistance and efficiency of bioengineering works made of willow species for sedimentation and erosion control in eroded marly gullies (Francon catchment, Draix, France)**

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To better understand the role of vegetation and bioengineering works on erosion and sedimentation control is a key issue today for the scientific community working both in geosciences and restoration ecology. To this view, the marly catchment of Francon (73 ha) is an experimental catchment belonging to the complex of Draix, labelled as Observatoire de Recherche en Environnement (ORE). An ecological operation of rehabilitation of this basin was carried out in April 2008 in 30 gullies (on 20 ha). It consisted in the construction of 672 bioengineering works, namely of "brush layers and brush mats of cuttings on deadwood microdams", implementing the use of 25.000 cuttings of willows (*Salix purpurea* and *S. incana*). Measurements were made on 363 works in 26 gullies. The objectives were here to validate former results and to improve the knowledge on the efficiency of bioengineering works for the sustainable retention of sediment, by checking their resistance (damage on the works) and their performance (resprout and survival of the cuttings, sediment trapping) during extreme climatic disturbances. After 3 years (2008 to 2010), the results especially reveal: 1/ a good resistance of the works: only a few works are partially damaged on less than 1/3 of their surface area; 2/ a total rate of cutting resprout of 49% after 3 years (52% for *S. purpurea* and 47% for *S. incana*); previous researches showed that a rate of about 40% of living cuttings is required for an efficient and sustainable sediment trapping; 3/ an average trapping of 0,2 m<sup>3</sup> of sediment per work; these results show less quantities of sediment trapped than it has been highlighted in previous studies. However the works are still little filled due to the absence of heavy rainfall events, this absence generating low erosion rates and sediment yields. Measurements are continued in the forthcoming years to improve data and results. In 2012 in particular they should validate our results on the cutting resprout, as 3 years of observations are required for this.