



Hydrological, mechanical and spatial characterisation of root reinforcement in Mediterranean shrub vegetated slopes

A. Dani (1), F. Giadrossich(1), F. Preti (1), M. Schwarz (2,3)

(1) Dipartimento di Ingegneria Agraria e Forestale, Università degli studi di Firenze, Italy , (2)
WSL, Swiss Federal Institute for Forest, Snow and Landscape Research, Switzerland, (3)
EPFL, Ecole Polytechnique Federale de Lausanne, LASEP, Laboratory of Soil and
Environmental Physics, Switzerland

Soil erosion and shallow landslide are extended process in Mediterranean slopes and they cause hazard hazards. The use of bioengineering techniques for hazard mitigation is nowadays of strong interest and has an increasing application. Detailed knowledge about the characteristics of local plant species are the key point for their application and management within bioengineering measurements. Furthermore these knowledge are important for the stability assessment of “naturally” vegetated slopes. In this study we present the results of different lab and field tests for the spatial and mechanical characterisation of root reinforcement due to the presence of *Spartium Junceum* L.; the interest on this species is caused by usability in Mediterranean climate environments even if it is not completely suitable for bioengineering purposes. In particularly we carried out strenght tests on single roots, laboratory shear tests with bare soil and rooted soil, and root distribution mapping in field. The strength and shear tests have been used to quantify the rooted soil mechanical behaviours and to couple them with the root distribution characteristics. These results are used also to compare different theoretical quantification models. With the aim to estimate the root distribution without destructive methods the results of two quantification approaches (under-over ground biomass relationships and climate based root distribution model) have been compared to the field data of root distribution. Further research of this study regard the analysis of water stable soil aggregates properties, the utilisation of direct in-situ

shear tests, the use of vegetative propagation techniques and the characterization of the morphological evolution for seed propagation.