



## **Pull-out resistance investigations as a criteria for the selection of plants for soil bioengineering measures in South Brazil**

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The interaction of root systems and soil plays a key role for the stabilization of shallow seated planar slides. Therefore, soil bioengineering plants are selected for criteria amongst others such as dense and fast root development. These processes can be investigated under different approaches. This contribution focuses on the determination of the pull-out resistance. This resistance is the force required to pull out a plant of the soil. The pull out resistance value measured under controlled experimental conditions provides indirect information about the below ground biomass development and density of the root system and consequently leads to the geotechnical performance of the soil bioengineering system.

The field measurements have been conducted in South Brazil within the frame of the research cooperation between the University of Natural Resources and Applied Life Sciences, Austria, and the Federal University of Santa Maria, Rio Grande do Sul – Brazil. The general objective was to identify potential plant species for local soil bioengineering measures. In a first step several native plant species were tested for their vegetative reproduction potential and in a following step pull out resistance field measurements were conducted. Four local species of plants (*Phyllanthus sellowianus*,

*Sebastiania schottiana*, *Salix humboldtiana* und *Salix x rubens*) were selected for drag measurements. All measurements took place under the same controlled test conditions to permit a comparison of results within the tests of measurements.

The two species of Salicaceae showed a higher pull-out resistance after during the whole period of measurements (3, 6 and 9 months) with the pull out resistance of 2.6 kN for *Salix x rubens* and 1.9 kN for *Salix humboldtiana* in comparison with the other two plant species (1.5 kN). Other plant parameters such as above ground dry mass and basal area of the shoots performed a good relation with the pull out resistance.