Geophysical Research Abstracts
Vol. 19, EGU2017-545-3, 2017
EGU General Assembly 2017

Study of root tensile strength of softwood and hardwood tree species: Implications for slope stability

Marzieh Esmaiili (1), Ehsan Abdi (1), Mohammad Jafary (2), and Baris Majnounian (1)

(1) Department of Forestry and Forest Economics, University of Tehran, Tehran, Iran, Islamic Republic Of (m_esmaiili@ut.ac.ir), (2) Department of Range and Watershed Management, University of Tehran, Tehran, Iran, Islamic Republic Of

Landslides are known as one of the major natural hazards and often incurring economics and human life losses. The role of tree roots in slope stability is very important, especially when human lives and infrastructure are at risk. The anchorage of roots and improvement of slope stability mainly depend on specific properties of root network systems, such as tensile strength. These properties of the roots which govern the degree of reinforcement are different among tree species. Although, many studies have been conducted about plant biotechnical properties of species, yet there is lack of knowledge on comparing root systems of softwood and hardwood tree species for similar site conditions. Therefore this study was conducted to assess the tensile strength of the root system of Picea abies (softwood species) and Fraxinus excelsior (hardwood species) planted on two forested hillslopes. To this aim, single root specimens were sampled for each species and their tensile strength were then measured in laboratory using a computer controlled Instron Universal Testing Machine. According to the results root tensile strength tends to decrease with diameter according to a power law for both species. Based on analysis of covariance (ANCOVA), a significant difference has been observed in the tensile strength between the two studied species. Also the results showed that the value of mean root tensile strength for Picea abies (19.31 $\pm$ 2.64 MPa) was much more than that of Fraxinus excelsior (16.98 $\pm$ 1.01 MPa) within all root diameter classes. The data presented in this study may expand the knowledge of biotechnical properties of Picea abies and Fraxinus excelsior, as biomaterial for soil bioengineering.