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More than root reinforcement needed to be considered when choosing tree species for slope stability

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Root reinforcement is recognized as an important vegetation factor which can reduce shallow landslides. The aim of the present study is identity a tree species better for slope stability through measuring species-specific root properties (strength and failure displacement of single roots, density of roots with diameter ≧ 1 mm). The study site is located in the Lienhuachih experimental forest (23˚54'49"N,120˚52'43"E), central Taiwan. Trees with similar diameters at breast height (DBHs)(ranging from 31cm to 42cm) of two dominant species, *Schefflera octophylla* and *Cryptocarya chinensis* were sampled. Soil profiles (0.8m wide and 0.4m deep) were dug 0.9m to 1.5m away from trees sampled. Using the single root pull-out tests, the maximum tensile force and displacement of roots with different diameters were measured. Root reinforcement on soil profiles were modelled with the Root Bundle Model Weibull. The preliminary results showed that, for the maximum tensile force of roots with diameter $<$ 15mm, *Schefflera* is higher than *Cryptocarya*, but the relationship is reversed if root diameter $>$ 15mm. For root area ratio of soil profiles, *Cryptocarya* is higher than *Schefflera*. For the root displacement when reaching the maximum tensile force, *Cryptocarya* (0.0900m) is much higher than *Schefflera* (0.0003m). In other words, tensile cracks, which can promote infiltration and reduce slope stability, are more likely to occur around *Cryptocarya* because of its longer failure displacement. In a given DBH, the root reinforcement provided by *Cryptocarya* on soil profiles is higher than that of *Schefflera*. Although *Cryptocarya* is a better species to increase slope stability, extra efforts for monitoring tensile cracks are needed.