



THE FOREST TREASURE CHEST

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Cairns, Australia 4-8 June 2023



Division 5

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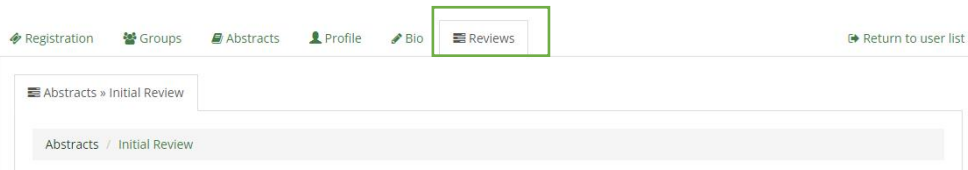
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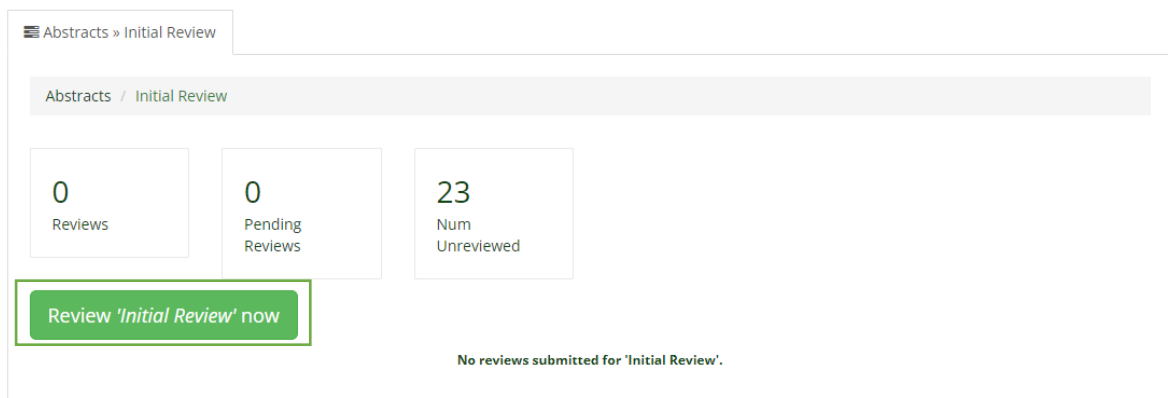
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Society: Abstracts

Category: S01 - In-Forest Wood Quality Assessments: New Advances in Nondestructive Testing Technologies and Wood Property Modelling

Keywords: **Dark brown forest soil; Clay content; ground penetrating radar; Coarse roots; Nondestructive root detection**

Presentation preference: **Digital Poster**

Study on the coarse root distribution of standing trees in Northeast China based on ground penetrating radar (GPR) (10189)

[Guangqiang Xie](#)¹

1. College of Engineering and Technology, Northeast Forestry University, Harbin, Heilongjiang, 中国

This study is to quantify the root distribution and root accuracy of GPR detection of live standing trees under clay condition, and to determine the specific factors that affect the accuracy of the GPR detection. It was conducted in Xinganling forest region. GPR was used to scan the coarse root distribution of 3 *Piceas* and 3 *Pinus koraiensis*. The actual roots of a *Picea* sample were excavated for further analysis and the point cloud of the coarse roots were subsequently obtained with a three-dimensional laser scanner. GPR test shows that all samples' root scope is wider horizontally than that vertically, the accuracy of GPR detection of *Picea*'s is 58.52%. The accuracy is positively correlated with the diameter of coarse roots, and negatively correlated with the depth of soil and the density of coarse roots. The health status of coarse roots has a great influence on the accuracy of GPR detection. All samples' coarse roots morphology is horizontal in study site. GPR performs well in detecting the underground distribution of coarse roots in clay condition. The detection accuracy was mainly affected by the diameter, density and the health status of coarse roots, and the depth and clay content of soil.

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