LONG-TERM IMPACTS OF GROUND SKIDDING ON STANDING TREES-ASSESSMENT OF DECAY USING STRESS WAVES

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Abstract

Timber harvesting and log extraction with conventional ground-based skidding systems in steep, mountainous terrain often results in severe damage to residual stands and forest sites. In this study, the impact of rubber-tired skidders on standing trees along sides of the trails was investigated 5 to 20 years post-harvest in terms of frequency and development of decay at the point of wounding. The study was located in the Hyrcanian mountainous forests of Iran. All standing beech trees (healthy or wounded) were evaluated on both sides of skid trails; four age classes (determined in relation to time since logging) were selected in chronosequence over 20 years (four 5-year classes) in forests under management. Stress wave velocity was tested in three directions (on wound, perpendicular to wound and longitudinal directions on trunk) of each standing tree located along sides of trails to characterize the trunk decay. To compare the results with reference to the wave velocity of healthy beech, 20 trees were selected in a non-harvested area. Totally 205 standing beech trees were investigated using stress wave in this study. Results showed that more than 75% of the standing trees located up to 1.5 m from both sides of the skid trails had been injured by skidding operations. Among these, about 24.8% had been decayed as a result of wounding. Most of the decayed trees were observed down slope along the trails and also on both sides of curves in the trail. The percentage of decayed trees and decay intensity in each skid trail increased with the increasing age of skid trails from 10 to 20 years. However, traffic intensity had no effect on tree decay. This study indicated durable injuries were produced on standing beech trees in areas affected by skidder movements; however, most of injuries are easily preventable.

Key words: beech tree, decay, harvesting impacts, Hyrcanian forests, skid trail

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