FPInnovations®

# EvaluTree®

APPLICATION NOTE #2

# Quantifying Blue Stain Using Vis-NIR Spectroscopy

Blue stain in lodgepole pine has become a major problem for both pulp and paper mills and lumber manufacturers. In the pulp and paper industry, increased volume of blue-stained chips dramatically impacts mechanical pulp bleaching costs, while for solid wood manufacturers, the presence of blue stain can seriously degrade appearance products. Historically, the only way to measure blue stain in the field is by visual inspection of core samples or fallen trees. EvaluTree® has addressed this problem by developing a technique that allows for fast and accurate determination of blue stain in standing trees and on log ends.

## Challenge

To determine the location and intensity of blue stain in Mountain Pine Beetle-killed stands.

## Method

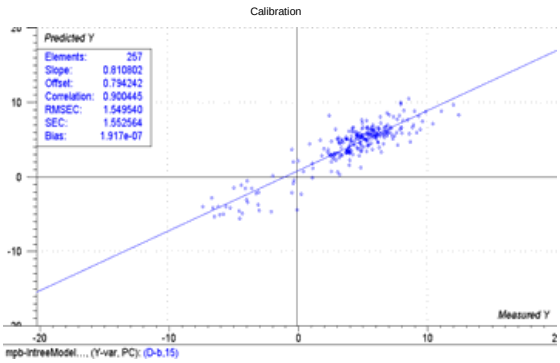
A Vis-NIR probe is introduced into a 12-mm hole created with an incremental corer or by scanning a log end. The Vis-NIR spectrum is collected and the intensity of blue stain in that location is calculated from a partial least squares model. This model quantifies blue stain intensity using the CIEL*a*b coordinate system (an industry standard measure). By incrementally moving the probe into the tree or across the log end, the depth of penetration of blue stain and its intensity can be quantified.

Collecting Vis-NIR spectrum in-field.

## Results

Calibration models were built for beetle-killed lodgepole pine that showed strong correlations between the NIR spectrum and the blue stain intensity ($R^2$ = 0.8).

These models now allow for screening of a stand of lodgepole pine trees to determine the impact of blue stain on the final product.




Intensity of blue stain using Vis-NIR spectroscopy.

Our spectroscopy specialists at EvaluTree® will help you analyze either standing timber, core or cookie samples collected from forests, allowing you to rapidly screen your samples for blue stain intensity and penetration.

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