



**MODELLING THE POTENTIAL DISTRIBUTION OF *PHYTOPHTHORA ALNI* ROOT AND COLLAR ROT OF ALDERS IN BAVARIA AND PRELIMINARY APPLICATION OF THE MODEL TO ESTIMATE THE US SUSCEPTIBILITY TO *P. ALNI***

Thomas Jung<sup>1</sup>, Marla Downing<sup>2</sup>, Vernon Thomas<sup>3</sup>, Markus Blaschke<sup>4</sup>,  
Michael F. Tuffly<sup>5</sup>, Robin Reich<sup>6</sup>

<sup>1</sup>Independent scientist and consultant for tree diseases, Thomastrasse 75, D-83098 Brannenburg, Germany

<sup>2</sup>Forest Health Technology Enterprise Team, Forest Health Protection, USDA Forest Service, Suite 331, 2150 Centre Avenue, Building A, Fort Collins, CO 80526-1891, USA.

<sup>3</sup>Information Technology Experts, Inc. 2120 S. College Ave., Fort Collins, CO, 80525, USA.

<sup>4</sup>Bavarian State Institute of Forestry (LWF), Section Forest Ecology and Forest Protection, Am Hochanger 11, D-85354 Freising, Germany.

<sup>5</sup>ERIA Consultants, LLC, 165 South 32nd Street, Boulder, CO, 80305, USA.

<sup>6</sup>Department of Forest, Rangeland and Watershed Stewardship, Colorado State University, Fort Collins, CO, 80525, USA.

*Phytophthora alni* formerly known as the “alder *Phytophthora*” is a recently evolved soil- and waterborne hybrid pathogen causing root and collar rot of *Alnus* species. *P. alni* has quickly spread across Europe via planting of infested nursery stock and has yet not been recorded from other continents. A model was developed to predict the potential distribution of *P. alni* in Bavaria, Southern Germany in order to have a tool for assessing the potential hazard posed by *P. alni* to forests in other regions of the globe. Bavaria was chosen because of (i) being a hot spot of the disease, and (ii) the existence of both a large disease data base and expert knowledge. A binary classification tree analysis was conducted using field sample data from 434 alder stands as dependent variables, and GIS datasets on soil texture components, aspect, slope and landform, and a Normalized Difference Vegetation Index (NDVI) as independent variables. The model selected 5 of the 13 independent variables. The independent variables important in predicting the presence or absence of *P. alni* were minimum silt fraction values less than 20 %, mean sand fraction values less than 5 %, slope less than 2.97 degrees, aspects that were Southeast, South, Southwest, and West, and a landform index less than 6.6 (<0=concave, 0=flat, >0=convex). A ten-fold cross validation had an error rate of 0.1751 (78.34 % model accuracy). The 307 *P. alni* infested sample points were predicted with 86 % accuracy, and the 127 non-infested sample points with 63 % accuracy.

Preliminary results of an application of the Bavarian rules along with additional datasets on drainage, streams, climate, distribution of alder species, distribution of wholesale and retail nurseries, and urban settlements in a Multi-Criteria model to the US indicate that there are regions with a considerable susceptibility of alder forests to *P. alni*.