Abstract

Infection and Spread of Root Rot Caused by Heterobasidion Parviporum in Picea Abies Stands after Thinning: Case Studies on Former Pasture and Meadow Lands †

Darta Klavina 1,*, Lauma Bruna 1, Astra Zaluma 1, Natalija Burnevica 1, Kaspars Polmanis 1, Talis Gaitnieks 1 and Tuula Piri 2

1 Latvian State Forest Research Institute Silava, Rīgas 111, LV-2169 Salaspils, Latvia; lauma.bruna@silava.lv (L.B.); astra.zaluma@silava.lv (A.Z.); natalija.burnevica@silava.lv (N.B.); kaspars.polmanis@silava.lv (K.P.); talis.gaitnieks@silava.lv (T.G.)
2 Natural Resources Institute Finland (Luke), Management and Production of Renewable Resources Latokartanonkaari 9, FI-00790 Helsinki, Finland; tuula.piri@luke.fi
* Correspondence: darta.klavina@silava.lv
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Abstract: Afforestation of former agricultural lands is a well-established practice in several countries. It is beneficial for avoiding previous-generation forest diseases and expanding forest areas. However, several biotic and abiotic risks have been reported for such stands as well as a higher risk of Heterobasidion root rot after thinning. Therefore, this study investigates the spread patterns of Heterobasidion root rot in three Picea abies (L.) Karst. Plantations established on former pasture and meadow lands and subjected to forest management practices. First of all, to get an insight into the average infection rate we sampled all standing trees (157 in total) within a transect all along the sampling area. It showed slightly lower infection in pastures than in former meadows (16% vs. 29% and 33%, respectively). Based on those data and the observed dieback all over the stand, we established circle sample plots in disease centres where all trees and stumps were analysed, and the average infection rate there was 34–41%. All obtained Heterobasidion isolates belonging to Heterobasidion parviporum Niemelä & Korhonen. Isolates were paired to detect genotype size and infection origin. Of 141 genets examined, 99 were single-tree, indicating primary infection, and 42 formed territorial clones (160 trees and or stumps) indicating the spread of infection through root contacts. The following conclusions were reached: (i) on average, primary infection in such stands is essential, but in older stands secondary infection predominates; (ii) H. parviporum can form large (up to 137 m²) territorial clones in forests on former pasture and meadow lands causing extensive tree dieback and mortality. This study was financially supported by European Regional Development Fund’s Post-doctoral Research project No. 1.1.1.2/VIAA/2/18/298 “Determining the risk of Heterobasidion rootrot and fungal communities in roots of Norway spruce stands on former agricultural land”.

Keywords: Norway spruce; Heterobasidion root rot; primary infection; secondary infection; first rotation forest; afforestation