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SHORT COMMUNICATION

Higher resistance of the offspring of Scots pine trees resulting from natural regeneration in old foci of *Heterobasidion annosum* root rot

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Abstract

Heterobasidion annosum (Fr.) Bref. is a fungal pathogen causing annosum root rot – one of the most economically important diseases in coniferous stands. The major aim of this study was to compare the resistance of the offspring of Scots pine trees (*Pinus sylvestris* L.) from seed orchards and the offspring of trees that were naturally reproduced in old foci of the disease. In experiments conducted in vitro, we used 960 seedlings which were grown from seeds collected from 60 trees in 6 old foci of the disease and 640 seedlings grown from seeds collected in 4 seed orchards. The offspring of trees from seed orchards after inoculation with *H. annosum* had nearly twofold higher mortality rate than the seedlings developed from the seeds collected in old foci of the disease. This suggests that the offspring of self-sown trees in old foci of the disease has a greater, genetically conditioned resistance to annosum root rot.

Keywords: Heterobasidion annosum, *natural selection* Pinus sylvestris, *resistance.*

1. Introduction

Heterobasidion annosum (Fr.) Bref. *sensu lato* is a fungal pathogen causing annosum root rot. Besides *Armillaria* root rot, it is one of the most economically important diseases of forest trees in Poland. This disease is well known all over Europe but also in Asia and North America. The pathogen has a wide range of host plant species. It is found in over 200 species of trees and shrubs. The greatest damage, of economic importance, is caused by *H. annosum* in coniferous stands (e.g. Bendel & Rigling, 2008; Korhonen & Stenlid, 1998; Möykkynen & Pukkala, 2009, 2010; Werner & Lakomy, 2002).

The *H. annosum* s.l. species complex consists of several different species. In Europe, three species with partly overlapping distributions and host specificities have been identified: *H. annosum* sensu stricto, *H. parviporum* Niemelä and Korhonen and *H. abietinum* Niemelä & Korhonen, with a preference for pine, spruce and fir, respectively (Karlsson et al., 2007). Root rot is a more severe problem in Norway spruce [*Picea abies* (L.) Karst.] in Fennoscandia (Korhonen & Stenlid, 1998; Möykkynen & Pukkala, 2009, 2010). In Poland, the greatest damage is caused by *H. annosum* s.s. (formerly the P intersterility group) in Scots pine forests.

It seems that the damage caused by annosum root rot in young forest plantations and later in young forest stands could be reduced if forest management practice involved planting of more resistant seedlings, particularly on former arable fields. Earlier research, conducted in vitro (Napierala-Filipiak, 2000; Werner, 1991), suggested that a higher resistance is observed, for example in the offspring of pine trees (*Pinus sylvestris* L.) that remained in forest areas where root rot killed many other trees.

In our new experiment, we wanted to see if a similar phenomenon can be observed also in the next generation, that is the offspring of young pines that are naturally regenerated in old foci of the disease. Thus, we compared the resistance of the offspring of trees from seed orchards and the offspring of self-sown trees in old foci of the disease. It should be noted that the mechanisms of the increased resistance to the attack by *H. annosum* in subsequent generations of forest are rather poorly understood.

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