

ABSTRACT

Leptosphaeria maculans is the causal agent of blackleg disease in *Brassica napus*. In this thesis the ability of *L. maculans* to produce certain phytohormones was established. The thesis focused on auxins and brassinosteroids. Most commonly occurring natural auxin, IAA, and its inactive oxidation product, OxIAA, were found in highest concentration. In plants infected with *L. maculans* the concentration of OxIAA was higher when compared to control water-treated plants. A surprising difference in IAA production between two sister isolates of *L. maculans* was discovered. In chemically defined cultivation medium Gamborg JN2 isolate did not produce any IAA. JN3 on the other hand produced IAA in concentration around 1000 pmol/g FW. This difference was used for studying *L. maculans* putative auxin synthesizing genes. The candidate genes were identified as orthologs of *Arabidopsis thaliana* genes (*YUCCA1.1*, *NIT1.2*) and *Ustilago maydis* (*IAD1.2*, *TAM1-2.1*). An increased transcription level of the auxin biosynthesis candidate genes was observed in JN2 treated *in vitro* with auxin precursors (tryptophan, tryptamine). Increased IAA concentration was observed as well. No such effect was observed in JN3. Surprisingly, an increased candidate gene transcription and IAA concentration was observed also in JN2 treated with GABA, which was used as control nitrogen containing compound not supposed to be an auxin precursor.

The ability of *L. maculans* to produce brassinosteroids was studied in the second part of the thesis. Teasteron was identified as the most commonly occurring brassinosteroid in *L. maculans*. Concentration of teasteron in mycelium was sevenfold higher than in plant vegetative tissue. Other brassinosteroids in the mycelium were found in low concentration equal to concentration in vegetative plant tissues. Putative *L. maculans* brassinosteroid biosynthesis genes were identified as orthologs of *Arabidopsis thaliana* *CYP90A1*, *CYP90A2*, *DET2a* and *DET2b* genes. For establishing the role of brassinosteroid in *L. maculans* – *B. napus* infection process gene silencing vectors of these candidate genes were prepared.

A long term purpose of this thesis is to establish whether *L. maculans* may be using hormonal molecules as effectors during the infection process. In Czech.