

Summary: An Ascomycete belonging to the order *Ophiostomatales* are a diverse and economically significant group of fungi. Most of them cause blue-stain of sapwood, which is burdensome for the wood industry. Other fungi, such as *Ophiostoma novo-ulmi*, may cause severe forest tree diseases. Members of the *Ophiostomatales* are known for symbiotic relationships with bark beetles. However, little is known regarding the wound-associated *Ophiostomatales* in European hardwood ecosystems. The aim of this dissertation is to expand the knowledge on the diversity, taxonomy, ecology and pathogenicity of the wound-associated *Ophiostomatales* on hardwood trees.

The survey was conducted between 2015 and 2017 in 18 hardwood stands consisting of 23 native and 3 exotic tree species. At each site, hardwood trees with wounds on tree stems were assigned into one of five health categories, whereas wounds and necroses were divided into four types. The samples of callus tissues, inner periderm and stained sapwood were cut from each wound, and were placed directly onto Petri plates with 2% MEA medium with two antibiotics. Fungal isolation were also made from beetles belonging to the *Nitidulidae* family. Nitidulid beetles were collected from fresh bleeding wounds on oak. The fungal identifications were based on morphological characteristics and DNA sequence analyses. Artificial inoculations of two-year-old seedlings of six hardwood tree species were conducted to evaluate virulence of ten ophiostomatalean species isolated from wounds on mature hardwood trees.

A total of 1196 isolates of the *Ophiostomatales* were obtained from 652 wounds. Members of the *Ophiostomatales* were recovered from 38% of the wounds. Among them, 63,7% of the isolates represented species belonging to the *Ophiostoma s. l.*, whereas 22,5% of the isolates belonged to the *Sporothrix* genus. Two isolates belonged to the *Graphilbum* genus, and the remaining isolates resided in the *Leptographium s. l.* (13,6%). The DNA sequence analysis and the phylogenetic analysis have shown that the obtained isolates represent 32 taxa. Among them, 20 taxa represented well-known species, whereas 12 taxa were unknown to science. In the dissertation, five unknown species were formally described as new taxa. They included *Leptographium flavum*, *Leptographium vulnerum*, *Sporothrix cryptarchum*, *Sporothrix resoviensis* and *Sporothrix undulata*. Fungi, such as *Grosmannia cainii*, *Ophiostoma cf. ponderosa*, *Ophiostoma sparsiannulatum* and *Sporothrix aurorae* have been found on the European continent for the first time, whereas *Ophiostoma denticiliatum* has been noted in the area of Poland for the first time. The wounds of hardwoods trees were most often colonized by *Ophiostoma quercus*. Species such as *S. undulata* and *O. sparsiannulatum* were also relatively often isolated from the wounds.

Members of the *Ophiostomatales* commonly colonized necroses and wounds of hardwoods trees, forming diverse fungal assemblages in terms of species composition. In general, the wound type did not appear to have a significant impact on occurrence of members of the *Ophiostomatales*. The species composition and the frequency of ophiostomatalean fungi in the wounds were associated with tree species and the health status of the wounded trees.

During the study, 108 isolates of the *Ophiostomatales* were obtained from 130 adults of nitidulid beetles. Overall, 74% of nitidulids yielded isolates of ophiostomatalean fungi. Among the 13 identified ophiostomatalean species, *O. quercus*, *S. cryptarchum* and *S. undulata* were the most frequently isolated from the beetles. This study provides evidence that the nitidulid beetles are effective vectors of the *Ophiostomatales*.

In the conducted pathogenicity test, the mortality rate among the seedlings was low, since only 2.2% of the inoculated plants died. All fungal species caused dark-brown lesions on inoculated hardwood seedlings. Lesion lengths varied among fungal and tree species. The largest lesions were generated on stems of *Quercus robur* and *B. pendula* seedlings. The findings indicated that the wound-associated *Ophiostomatales* on hardwood trees are probably weak pathogens for hardwood trees and have a minor role in the healing process of wounds.

Keywords: forest trees, new species, *Leptographium*, *Ophiostoma*, ophiostomatalean fungi, *Sporothrix*, virulence