

Virulence analysis of Polish isolates of the fungus *Zymoseptoria tritici* causing *Septoria tritici* blotch

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Septoria tritici blotch (STB) is one of the most significant leaf diseases of wheat and may cause up to 50% yield loss under favorable conditions. It is considered a high-risk pathogen due to its high potential for adaptation and substantial effective population size. It is estimated that over 70% of the fungicides applied annually to cereal crops in Europe target STB. This high selection pressure can be devastating, as STB has been reported to develop resistance to various classes of fungicides within a single growing season. Similarly, resistance in the host plant can also be overcome in a short period of time. Therefore, continuous monitoring of the pathogen population structure and its virulence against host resistance genes is crucial for developing resistant wheat varieties and promoting sustainable agricultural practices.

The presented study used single-pycnidial isolates of the fungus *Zymoseptoria tritici*, derived from leaves with STB symptoms, collected in various locations in Poland between 2020 and 2023. The virulence profile was determined based on the reaction of the differential set to infection with the fungal isolate. The differential set was composed of 23 wheat varieties/lines containing known *Stb* resistance genes. The experiments were conducted under controlled environment on seedlings. Tests were evaluated 21 days after inoculation. Plants were assessed in terms of the percentage of second leaf area covered with necrosis (NEC) and pycnidia (PYC). Precise determination of disease parameters was made using computer image analysis of infected leaves.

The tested *Z. tritici* isolates exhibited high diversity in terms of both disease parameters. Among the varieties/lines of the differential set, the M3 Synthetic (W-7976) line (containing genes *Stb16q* and *Stb17*) exhibited the highest levels of resistance throughout the years, with a maximum NEC value of 8% and no pycnidia formation observed for any of the tested isolates. Most of the tested isolates were virulent against varieties/lines containing genes *Stb1*, *Stb4*, *Stb5*, *Stb6*, *Stb7* and *Stb9*.