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EARLY LEAF DISEASE CONTROL AND DETECTION OF *RAMULARIA BETICOLA* IN SUGAR BEETS USING SPORE TRAPS AND qPCR

Contrôle précoce et identification de *Ramularia beticola* chez la betterave sucrière à l'aide de pièges à spores et qPCR / Frühe Kontrolle und Erkennung von *Ramularia beticola* in Zuckerrüben mittels Sporenfallen und qPCR

ABSTRACT

Field trials conducted in 2011 - 2013 have indicated a more efficient control of fungal diseases and higher sugar yield if sugar beets are treated with fungicides before visual symptoms occur. For a better determination of the optimized timing of disease control, more advanced methods are needed. In collaboration between the Universities of Copenhagen and Aarhus and NBR Nordic Beet Research a study was conducted with the goals a) to develop an early detection system based on spore trapping and b) to develop a qPCR based method to detect and to quantify *R. beticola* DNA in air samples obtained from Burkard® spore traps. Primers were designed based on the ITS region 2 and tested on *R. beticola* isolates. The specificity of the primers was tested on related fungi, including *Cercospora beticola* and other *Ramularia* fungi. The qPCR was used to measure the quantity of the DNA of *R. beticola* collected on tapes from the Burkard® spore traps. In 2012 and 2013 two spore traps were set up in sugar beet fields at two different sites on the Danish island of Lolland. Using qPCR, *R. beticola* DNA was detected in the air samples 14 - 16 days prior to first visible symptoms on untreated plants in 2012. This is in accordance with the reported latency of 2 weeks of the fungus. In 2013 fungal DNA was detected on several dates up to eight weeks before the appearance of first symptoms. However, the amount of DNA and symptoms varied depending on weather conditions. In order to investigate if spore trapping can be utilized to predict disease onset and used for recommendations for spraying, results from spore trapping are linked to fungicide treatments in field trials using different timings. It is expected that the results can lead to an IPM based recommendation where spraying only takes place when a real risk has been verified based on spore trapping or climate data. Further, results are expected to give a better understanding of the epidemiology of *R. beticola*.
