

# Characterisation of microbial communities and detection of the putative causal agents in lesions of sugar beet with symptoms of girth scab

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To date the pathogen(s) causing girth scab of sugar beet is unknown. Symptoms of girth scab on sugar beet resemble common scab of potato thus in this study it was hypothesized that the same pathogens cause both diseases or at least are part of the disease development. Potato scab is induced by pathogenic *Streptomyces* spp. *A. cochlioides* is a long known pathogen of sugar beet causing root rot (black root) in older roots. Both girth scab and root rot show symptomatic lesions that appear on the surface of the beet, but beets show a different appearance above the ground.

While previous studies concentrated on the isolation of pathogens from sugar beet lesions with girth scab symptoms in the present study aimed to analyse the microbial communities and to detect the putative causal agents in total DNA from lesions of sugar beet derived from different geographic locations.

DGGE was used to analyse 16S rRNA gene fragments (bacteria, *Streptomycetaceae*) and ITS (fungi) fragments amplified from total community DNA (TC-DNA) to analyse the composition of dominant bacteria, *Streptomycetaceae* and fungi. In addition, the presence of pathogenic *Streptomyces* spp. in the microbial community was detected by PCR-

Southern blot hybridisation of *Streptomyces* ITS and the pathogenicity determinants *txtAB*, *nec1*, *tomA*. For the detection of *A. cochlioides* the specific primers *ef1α* and Southern blot hybridisation with a digoxigenin-labeled probe were used to detect the oomycete in TC-DNA in order to detect the putative causal agents of girth scab of sugar beet lesions. 16S and ITS fingerprints of samples originating from the same region clustered together but DNA extraction technique influenced the clustering. The PCR Southern blot hybridisation revealed the presence of *Streptomyces* spp. in microbial communities of all samples but not in all of them pathogenicity determinants were detected.

*A. cochlioides* could not be detected in the TC-DNA from lesions of sugar beets analysed here. These results eliminated *A. cochlioides* as the causal agent of girth scab.