ANIKA BARTHOLOMÄUS[1], SASCHA SCHULZE[1], STEFAN MITTLER[2], HEINZ-JOSEF KOCH[1], BERNWARD MÄRLÄNDER[1] and MARK VARRELMANN[1]*, [1]Institute of Sugar Beet Research, Holtenser Landstrasse 77, 37079 Goettingen, Germany and [2]Syngenta Agro GmbH, Am Technologiepark 1-5, 63477 Maintal. **Real-time PCR-based quantification of Rhizoctonia solani (AG 2-2 IIIB) in soil extracts and the effect of different factors like plant cultivar and fungicide treatment on pathogen concentration in field soils.**

Rhizoctonia solani (anastomosis group 2-2 IIIB) is the causal agent of Rhizoctonia root and crown rot in sugar beet cultivation world-wide. Here, a direct soil DNA extraction method was applied for detection of *R. solani* from samples of 250 g soil using a real-time PCR assay. The assay is specific to the AG 2-2 IIIB and standard curves originated from three different field soils spiked with sclerotia gave evidence of its valid quantification with a detection limit of 2 mg sclerotia per kg soil. Different independent field trials with artificial inoculation were conducted to study the effect of plant cultivar, crop rotation and fungicide treatment on the pathogen concentration in the soil. The results showed that the amount of quantified DNA in the soil at harvest correlated with the rated disease severity of Rhizoctonia root and crown rot. Additionally, a strong effect of the sugar beet genotype was observed. At harvest, the amount of *Rhizoctonia* DNA was significantly increased in plots cultivated with a susceptible sugar beet genotype compared to a resistant one. The results also indicate, that depending on the initial inoculum, the effect of the resistant genotype varies, keeping it on a steady level at a lower disease pressure, but tend to propagate the inoculum if the disease pressure was high. The application of fungicides significantly reduced the pathogen concentration in the soil, as well as the cultivation of the non-hosts winter rye. This fast and reliable quantification method represents an applicable tool to study the long-term development of the pathogen concentration in soils in the future.