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WATER USE EFFICIENCY OF THREE SUGAR BEET TYPES IN RELATION TO CYST NEMATODE INFESTATION

L'influence de l'infection de nématodes à kystes sur l'efficience d'utilisation de l'eau pour trois types de betteraves sucrières / Einfluß des Befalls mit Rübenzystennematoden auf die Wassernutzungseffizienz dreier Zuckerrübentypen

ABSTRACT

Identifying and quantifying differences in water use efficiency (WUE) of nematode resistant, tolerant and susceptible sugar beet types is essential to determine the maximal site-specific yield potential. Beet cyst nematodes cause root damages which can limit root water uptake and thus reduce biomass production, especially in susceptible types. When infested with nematodes, a higher water use is expected for nematode-tolerant types compared to susceptible types. Field experiments are carried out in the years 2013 and 2014 at 5 sites with different initial nematode infestations. The following hypothesis is to be tested: WUE of the sugar beet types susceptible, tolerant and resistant against *Heterodera schachtii* varies at nematode-free and nematode-infested sites. These differences are due to site-specific microclimate but also dependent on the degree of nematode infestation.

Air temperature, radiation, wind speed, relative humidity, precipitation and soil water content were recorded continuously at each site in order to determine the components of the water balance. Using these parameters, Evapotranspiration (ET) is calculated according to the dual crop coefficient approach after Allen *et al.* (1998) and the Penman-Monteith-equation. WUE is then calculated as the ratio of ET and crop yield of each variety.

At two of the five sites (one infested, one free of nematodes) an intermediate harvest was carried out in June 2013 and WUE was calculated for this growth stage. WUE at the infested site does not vary between the different sugar beet types, probably due to the early harvest time in the mid season before the susceptible type's roots might be severely damaged. After the final harvest in October 2013 we will be able to derive whether nematodes significantly affect WUE of different types of sugar beets or not.