

MELANIE HAUER¹, HEINZ-JOSEF KOCH¹, STEFAN MITTLER², ANDREAS WINDT³

¹ Institute of Sugar Beet Research, Holtenser Landstr. 77, D – 37079 Göttingen

² Syngenta Agro GmbH, Am Technologiepark 1-5, D – 63477 Maintal

³ Nordzucker AG, Küchenstr. 9, D – 31174 Braunschweig

WATER USE EFFICIENCY OF SUGAR BEET VARIETIES SUSCEPTIBLE, TOLERANT AND RESISTANT TO BEET CYST NEMATODES

ABSTRACT

Heterodera schachtii is an important pest in many sugar beet growing regions. At field scale, sugar beet yield response to *H. schachtii* can be highly variable depending on the infestation level and further site-specific conditions, but also on the variety. Beet cyst nematodes cause root damages which might limit root water uptake and thus reduce biomass production, especially in susceptible varieties. Tolerant varieties should show more stable yields across a wide infestation range. A better developed rooting system of tolerant varieties presumably enables them to take up more water and nutrients, which might be the reason for their yield advantage compared to susceptible varieties under nematode infestation. Field experiments were carried out in the years 2013 and 2014 at sites with varying initial nematode infestations to evaluate the effect of nematode infestation on sugar and dry matter yield, evapotranspiration (ET_c) and water use efficiency (WUE, defined as yield per water consumed).

Total ET_c was estimated using the FAO-56 dual crop coefficient approach. Crop coefficients were calculated for each variety and environment and were adjusted to nematode induced variation in crop canopy and soil cover.

There was no significant correlation between nematode infestation and ET_c valid for all environments. Higher biomass production of the tolerant and the resistant variety under nematode infestation compared to the susceptible variety was not associated with higher water consumption. Differences in WUE between varieties were primarily associated with differences in yield. We concluded that differences in ET_c between varieties were negligibly small and did not affect yield formation in the studied environments.