

Field measured and simulated soil-plant water relations in maize

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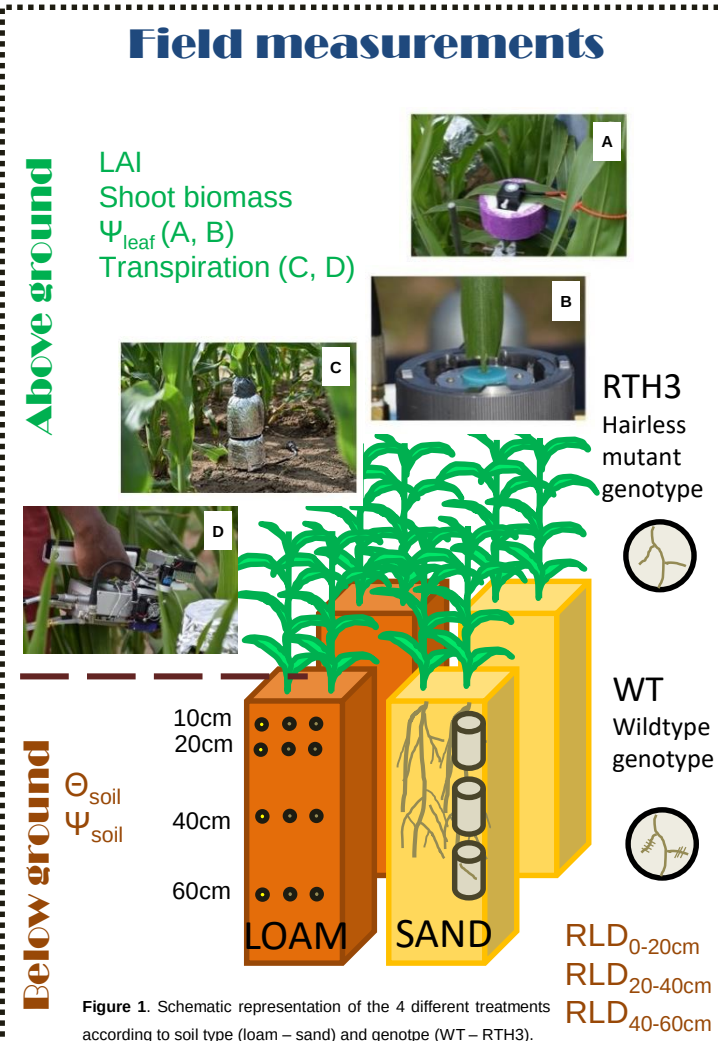


Figure 1. Schematic representation of the 4 different treatments according to soil type (loam – sand) and genotype (WT – RTH3).

1D Hydrus simulations

Water sink term per depth (Couvreur et al., 2012):

$$S(z) = K_{rs\ 1D} \cdot (h_{Te} - h_{T\ leaf}) \cdot NRLD(z) + K_{comp\ 1D} [h_t(z) - h_{Te}] \cdot NRLD(z)$$

Water losses

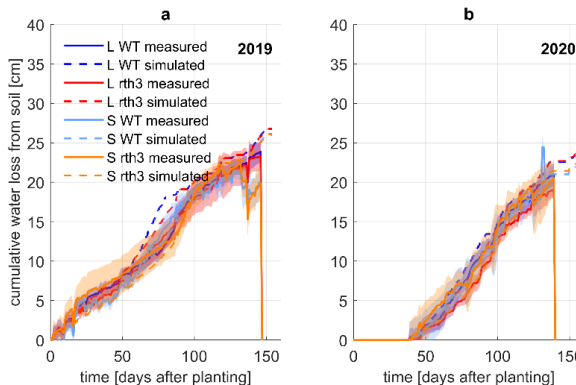


Figure 2. Measured (solid line) and simulated (dashed line) cumulative water losses from the soil. Measured water losses are estimated from WC measurements in the soil and data of precipitation and irrigation. Simulated losses correspond to evaporation and transpiration fluxes. Measured water losses show no significant differences among genotypes and soil types. Simulated losses match well the measured losses.

Simulated and measured Ψ_{leaf}

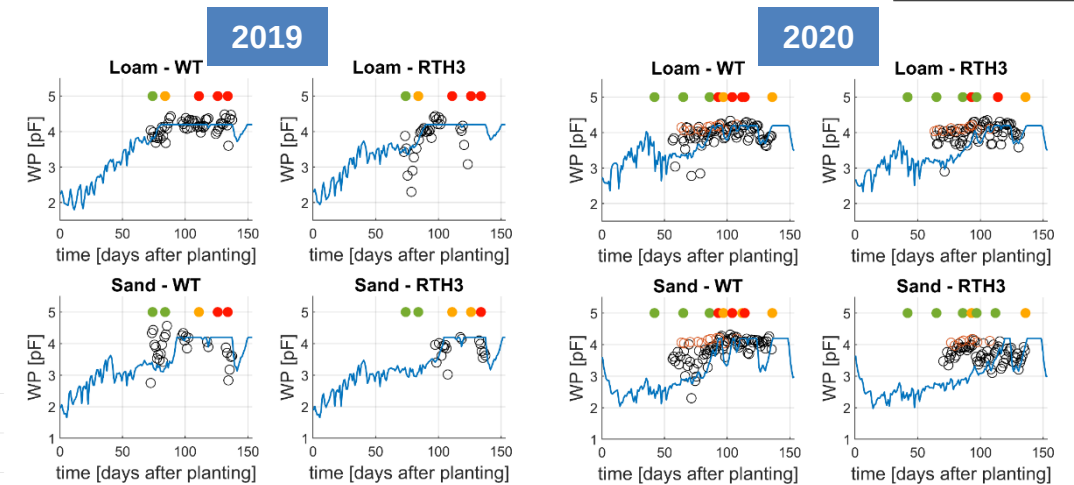


Figure 3. Noon values of measured leaf water potential (black circle: PSY; red circle: SB), simulated collar potentials (blue line) and observed stress levels for all treatments, in both 2019 and 2020.

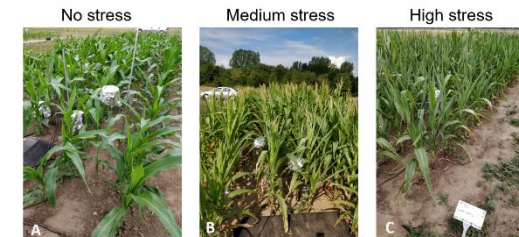


Figure 4. Examples of observed stress levels in maize during the 2020 growing season: A. No stress: FP04: Loam – WT on 86 DAS at 8.30 a.m.; B. Medium stress: FP16: Sand – WT on 112 DAS at 11 a.m.; C. High stress: FP10: Loam – RTH3 on 104 DAS at 1 p.m.

Main conclusions:

Soil type had a larger impact than genotype
Root hairs seem not to play a role in RWU