Geophysical Research Abstracts,
Vol. 11, EGU2009-5569, 2009
EGU General Assembly 2009

Water uptake strategies of maize under varying levels of water stress

M. van der Ploeg (1), H.P.A. Gooren (1), G. Bakker (2), and G.H. de Rooij (1)

(1) Wageningen University, Environmental Sciences, Sub-Departement Soil Physics, Agrohydrology and Groundwater management, Wageningen, the Netherlands (martine.vanderploeg@wur.nl), (2) ALTERRA, Wageningen, the Netherlands

More frequent and intense droughts due to global climate change, together with an increasing agricultural water use emphasize the importance of understanding root water uptake under water-stressed conditions. While root water uptake is driven by potential gradients, measurement of soil water potentials was limited by the measurement range of water-filled tensiometers (-0.085 MPa). A recently developed polymer tensiometer (POT) can measure soil water potentials down to -1.6 MPa. Monitoring low soil water potentials in the presence of root water uptake may help gain knowledge of a plant's strategy to cope with water stress, and allows improved determination of local water stress levels in experiments.

To investigate plant strategies that cope with water stress, soil water potentials were measured in the vicinity of maize roots in three lysimeters. The lysimeters received different irrigation amounts: an optimal irrigation gift ($-0.05 < p < -0.02$ MPa) and minimized irrigation to create moderate (minimum $p = -0.45$ MPa) and severe (minimum $p = -0.80$ MPa) water stress.

Measured soil water potentials showed that the water stressed plants started to take up water from deeper soil layers, and continued to take up water under very dry conditions.

This research was funded by the Dutch Technology Foundation (STW).