

Supplementary Material

Genotypic differences in deep water extraction associated with drought tolerance in wheat

Eric S. Ober^{A,F}, Peter Werner^B, Edward Flatman^C, William J. Angus^D, Peter Jack^E, Lucy Smith-Reeve^C and Chris Tapsell^B

^ANational Institute of Agricultural Botany, Huntingdon Road, Cambridge, CB3 0LE, UK.

^BKWS UK, 56 Church Street, Thriplow, Hertfordshire, SG8 7RE, UK.

^CLimagrain, Woolpit, Bury St. Edmunds, Suffolk, IP30 9UP, UK.

^DAngus Wheat Consultants, Ltd, The Pines, Rattlesden, Suffolk, IP30 0RA, UK.

^ERAGT Seeds, Grange Road, Ickleton, Essex, CB10 1TA, UK.

^FCorresponding author. Email: eric.ober@niab.com

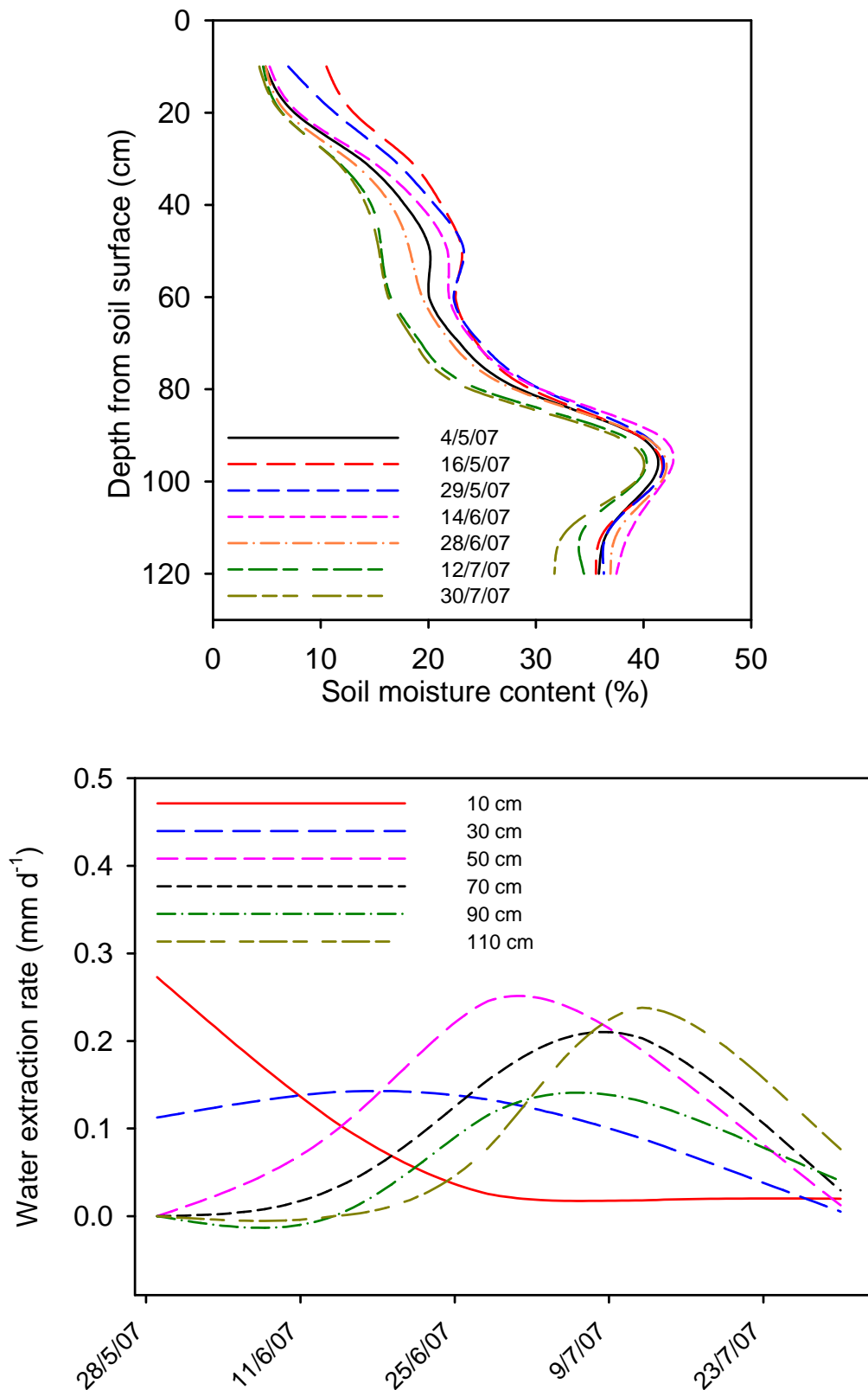


Fig. S1. Example of soil moisture patterns measured in a droughted plot of cv. Alchemy from stem extension to maturity in 2007 (upper panel). Water extraction rates were calculated from differences in soil water content between two consecutive dates, for each layer (bottom panel; some layers omitted for clarity). At each date, the depth that showed the maximum water use rate was the DMWU (see text).

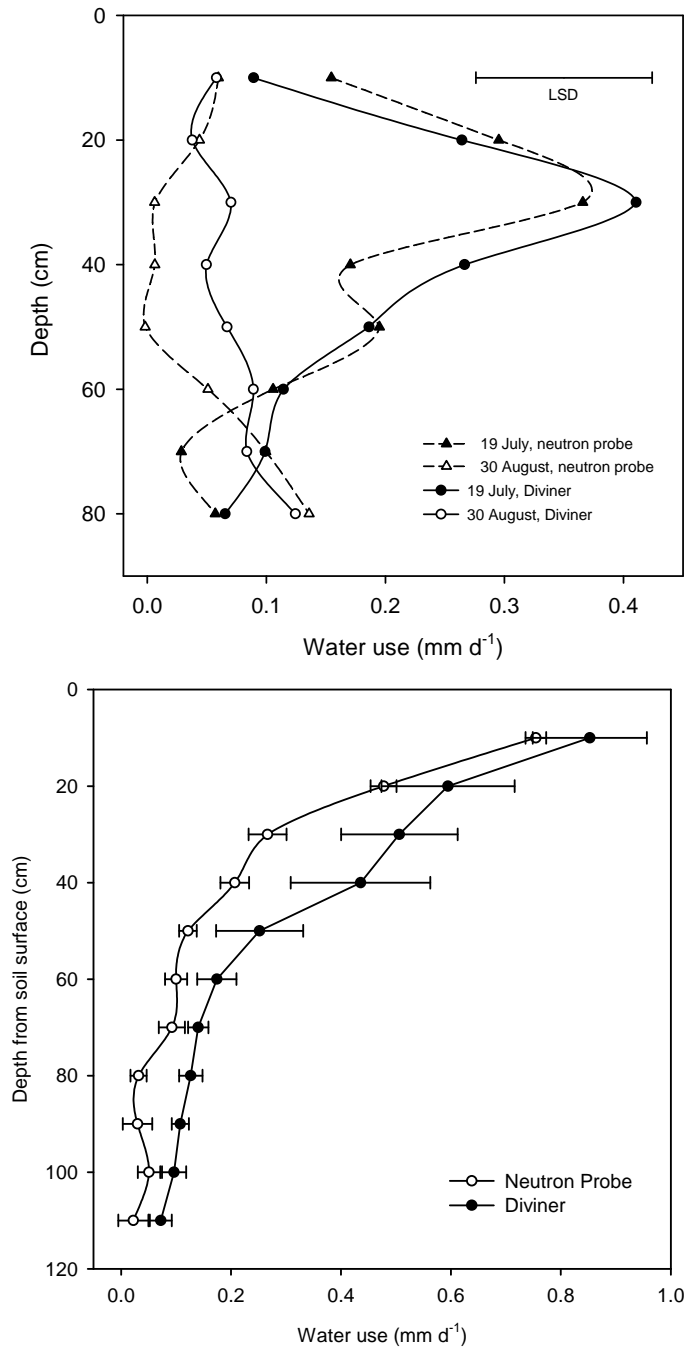


Fig. S2. Comparison of measurements of soil water extraction rates through the soil profile measured with a neutron probe (NP) or capacitance-type soil moisture probe. Upper panel: Measurements made over a 42-day period from 19 July 2000 to 30 August 2000 in covered, droughted plots of sugar beet (*Beta vulgaris* L.). NP and Diviner access tubes were placed within 1 m of each other within the same plot. Symbols represent the mean of four plots. The bar indicates the $LSD_{0.05}$ for the depth \times probe interaction term from ANOVA. Lower panel: Measurements made over a 2-week period from 20 July 2004 to 2 August 2004 in droughted plots of sugar beet. Symbols represent the mean \pm s.e. ($n = 6$).

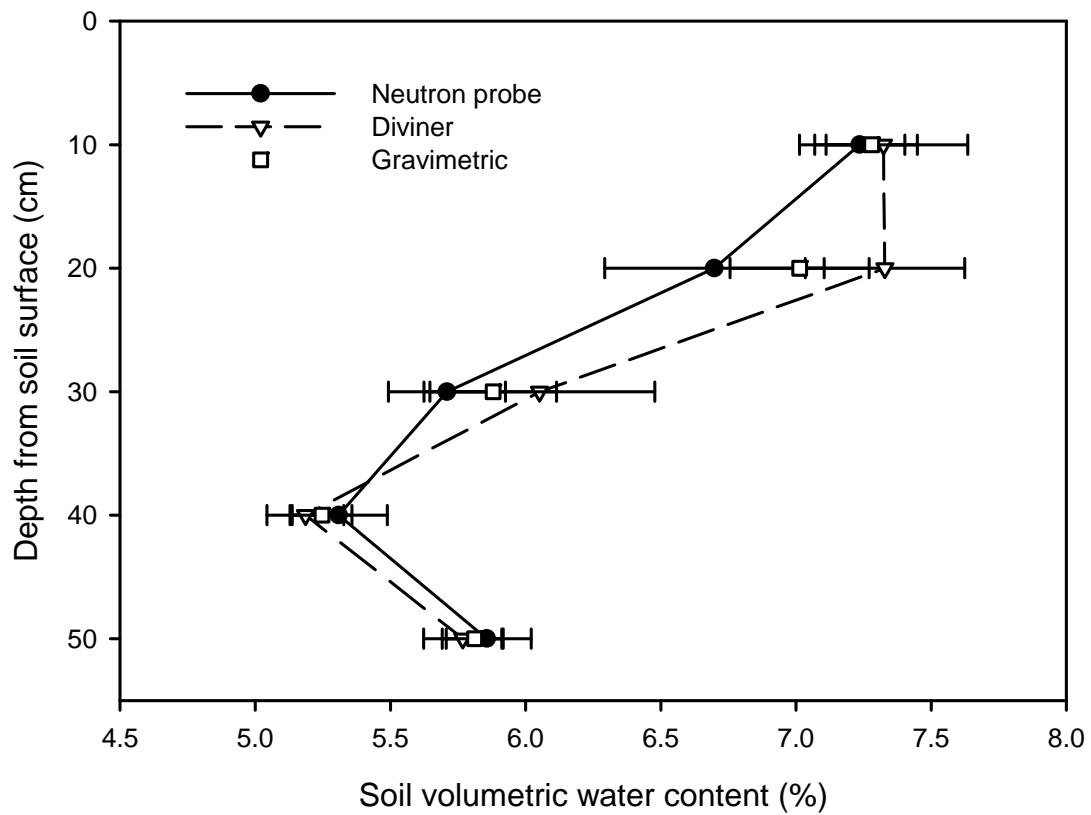


Fig. S3. Comparison of measurements of soil water content through the soil profile measured with a neutron probe (NP) or capacitance-type soil moisture probe (Diviner) in covered, droughted plots of sugar beet in sandy loam soil on 12 September 2001. NP and Diviner access tubes were placed within 1 m of each other within the same plot. Values estimated using the probes were compared with gravimetrically-determined values obtained directly from soil samples at each depth. Symbols represent the mean \pm s.e. ($n = 6$).

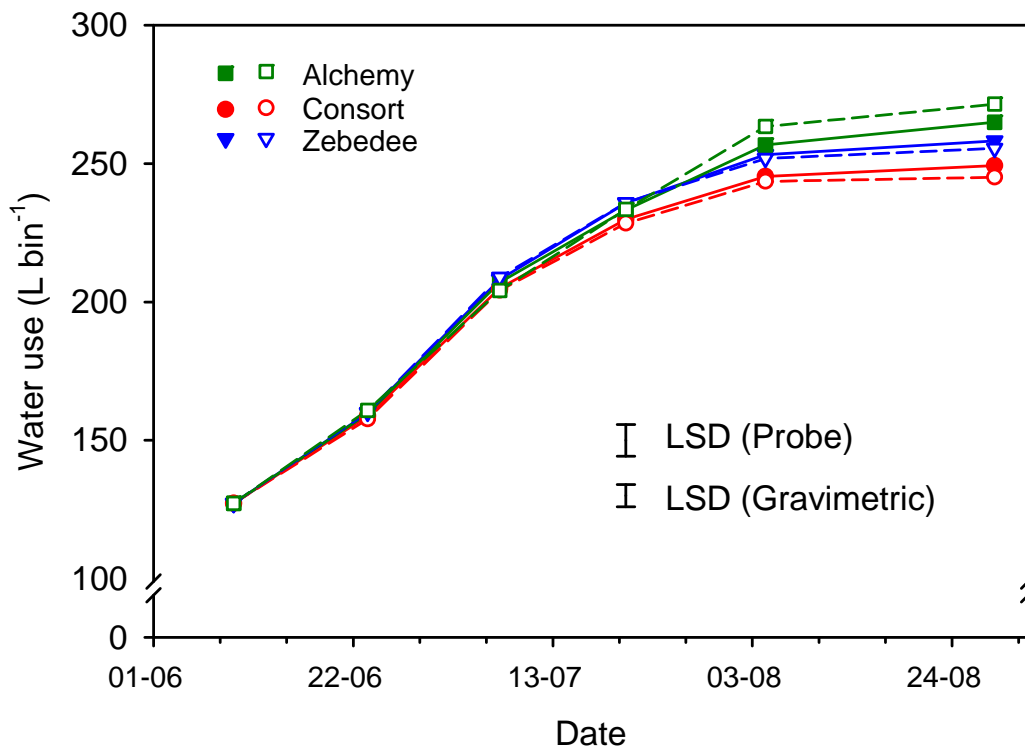


Fig. S4. Crop water use determined on plants grown in large, weighing lysimeters and estimated via measurements using a soil moisture probe (closed symbols, solid lines) compared with direct gravimetric measurements (open symbols, dashed lines). Three wheat varieties were compared. On 14 May 2009, lysimeters were covered from rainfall using shelters similar to those used in the field. Crop water use prior to that date was estimated on the basis of Penman-Monteith evapotranspiration adjusted for canopy development. Water use measurements spanned the period from 27 May to 28 August 2009, with the starting water use values normalised to the summed evapotranspiration value from 1 April to 26 May. Symbols represent the mean of three lysimeter bins. The LSD for the genotype x date interaction term from repeat measures ANOVA is shown. Differences between measurement methods and between varieties were not statistically significant.