Linking water uptake with rooting patterns in grassland species

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Knapp 2003), concentrate total root biomass in the shallow soil layers (0–10 cm), but can have roots to depths > 2 m

and a Micromass VG Optima (Manchester, UK) isotope

sampling date, topographic position and species main effects on the isotopic signature of water within the plant stems. The interactions of date · topography and date · species were also highly significant ($P < 0.001$). Henceforth, interpretations of water use and xylem water differences are expressed in terms of these two-way

C_4 grasses showed greater collective dependence on water in the top 30 cm of the soi770471profiletopC

be interpreted best by considering differences in soil depth

soil profile having greater negative impacts on C_4 grasses than on some C_3

periodic drought in this ecosystem prevented absolute ‘‘day of year’’ predictions of water use. Other studies reporting seasonal patterns in water use have been conducted in semi-arid systems (Schwinning et al. 2002) or environments with distinct wet/dry seasons (Zencich et al. 2002). Two years of water-use patterns in the tallgrass prairie show significant seasonal variation in the signature of the water used, and this variation had distinct seasonal trends with plants earlier in the season having lighter sig-

ing season progressed (Fig. 4). However, these differences appeared to be regulated predominantly by prevailing isotopic signatures in precipitation and the preceding drought

Scrimgeour CM (1995) Measurement of plant and soil water isotope
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