

Differences in the diurnal pattern of soil respiration under adjacent *Miscanthus x giganteus* and barley crops reveal potential flaws in accepted sampling strategies

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Soil respiration (R_s) plays an important role in the global carbon cycle and contributes *ca.* 30% of global ecosystem respiration. However, for convenience, measurements used to compare R_s from different land uses, crops or management practices are often made between 09:00 and 16:00, with an implicit assumption that R_s is largely controlled by temperature. Three months' continuous data presented here show distinctly different diurnal patterns of R_s between barley (*Hordeum vulgare*) and *Miscanthus x giganteus* (*Miscanthus*) grown on adjacent fields. Maximum R_s in barley occurred during the afternoon and correlated with soil temperature, whereas R_s peaked in *Miscanthus* during the night and was significantly correlated with earlier levels of solar radiation, probably due to delays in translocation of recent photosynthate. Since daily mean R_s in *Miscanthus* coincided with levels 40% greater than the mean in barley, it is vital to select appropriate times to measure R_s if only single daily measurements are to be made.