

Use of near-infrared reflectance spectroscopy to predict the percentage of dead versus living grass roots

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We tested the potential of near-infrared reflectance spectroscopy (NIRS) to predict the percentage of dead versus living roots of five grass species grown in monocultures in container and in a grassland community in field condition. Root death was induced after total severance of aboveground vegetation according to Picon-Cochard et al 2009. Root samples were collected immediately after this treatment to obtain predominantly live roots (L), and dead roots at three dates: T0, T1 and T2, corresponding to date of aerial cut, one and two months after the cut, respectively. NIRS spectra of live and dead roots were compared with measurements of root vital coloration, root and soil respiration and minirhizotron. These results show the potential of NIRS to predict the percentage of dead and live roots for grass monocultures and for a grassland community in field conditions and open up new opportunities in estimating more accurately below-ground net primary production of grasslands.

Keywords: grassland, NIRS, root mortality, vital coloration, root and soil respiration, minirhizotron