PVC TAPE DISCOLORATION METHOD OF RECORDING RELATIVE WATER-TABLE DEPTH: ADVANTAGES AND CONSTRAINTS IN FENS

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In wetlands, recognising water-table dynamics is crucial for a thorough understanding of species-environment relationships, ecosystem function and changes during restoration. The PVC tape discoloration method proposed by Belyea (Functional Ecology, 13: 431–434, 1999) makes it possible to conduct spatially and temporally extensive studies of reductive conditions connected to long-term water-table dynamics in peat soils. So far, the reliability of the method has been verified only for ombrotrophic bogs, even though wide usage can be expected in minerotrophic fens.

Using data from 49 plots in poor and moderately rich fens, we correlated the directly measured lowest and highest water-table depths and the same variables indicated by discoloration of PVC tape attached lengthwise to green bamboo stakes installed vertically in the soil profile.

The depth to the first sign of PVC discoloration was highly correlated with the directly measured position of the highest water-table, whereas the correlation between the depth of complete discoloration and the directly measured position of the lowest water-table was poorer. The exactness of the minimum water-table measurement depended on the thickness of the peat layer. Surprisingly, the depth at which the green bamboo stakes turned brown correlated highly with the minimum water-table.

The PVC tape discoloration method reliably indicates the water-table maxima in fens, but minima are strongly biased. The depth of green bamboo discoloration is an alternative indicator of the minimum water-table, even in fens and mineral soils. Combining both methods enables efficient, time- and money-saving monitoring of water-table dynamics at a large number of mire sites.