



Field drains as dominant pathways of sediment and nutrient transfer in small lowland agricultural catchments

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Field monitoring of a 30 ha, artificially-drained, mixed-agricultural catchment in Herefordshire, UK, over two hydrological years has indicated that field drains are the dominant pathway for the transfer of sediment and nutrients to the stream. There are four reasons for the dominance of the subsurface pathway rather than surface runoff pathways. First, higher runoff volumes in field drain runoff during events result in higher SS and P loadings in drainflow than in surface runoff, where concentrations may be higher but runoff volumes are low. Second, the increased duration of drainflow compared to surface runoff, both due to a larger number of event runoff responses to rainfall inputs and due to longer event runoff durations. Third, the field drain network is highly connective, while surface runoff pathways are generally well-buffered by woodland, buffer strips and riparian vegetation. Finally, the herringbone design of the tile drain network means that the artificial drainage pathway has a large contributing area, whereas the contributing areas for surface runoff may be much smaller, particularly where runoff is generated principally on compacted surfaces. The results presented in this paper provide evidence for the importance of runoff transferred through field drains in lowland agricultural catchments, and suggest an urgent need for consideration of edge-of-field or instream mitigation strategies.