



Mitigation Options for Phosphorus and Sediment (MOPS): exploring the potential of in-field treatments to reduce surface runoff losses from arable soils to water

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Losses of phosphorus (P) from agricultural soils are of particular concern, as agricultural systems traditionally have high inputs of P applied in fertilisers and manures to enhance productivity. The Defra funded Mitigation Options for Phosphorus and Sediment (MOPS) project is investigating a range of in-field treatments with potential for mitigating soil erosion from arable land associated with combinable crops, either by reducing surface runoff and the sediment and nutrient carrying capacity, or by trapping sediment and nutrients on the soil surface. Field monitoring is being carried out over three field seasons on fifty-two unbunded hillslope length plots at three field sites in the UK (Herefordshire, Staffordshire, Leicestershire) with contrasting soil types (silty clay loam, sandy loam, clay). At each site, trial treatments have been selected which are appropriate for each soil type. The treatments investigated include tramline disruption, the use of crop residues, minimum tillage, contour cultivation, and the use of beetle banks as vegetative barriers. Treatments which reduce runoff and erosion within the tramlines have been found to be effective in reducing sediment and associated nutrient losses from the soil, with tramline disruption using a ducksfoot tine consistently reducing runoff, sediment and P losses to levels comparable to non-tramline areas. Chopping and spreading straw, instead of baling and removing it also significantly reduced runoff, sediment and P losses from arable land, typically by 30-

60 %. Both minimum tillage and cultivation on the contour reduced sediment and P losses compared to conventional tillage and up-and-down-slope cultivation, and the use of vegetative barriers across the slope also appears to be effective as this reduces the slope length and promotes contour cultivation. The results from the 2007-2008 winter field season are expected to provide further evidence to support and explain the effectiveness of different mitigation options in reducing P losses from arable land.