WINTER MANURE APPLICATION TIMING AND TILLAGE INFLUENCE ON NUTRIENT LOSS IN RUNOFF

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Abstract: Manure is a source of nutrients in organic production systems. However, winter manure application may contribute substantial nutrient loss during rainfall and influence the water quality. The goal of the study was to develop alternative best management practices (BMPs) for winter manure management. The study was designed to compare nutrient concentrations in runoff from three dates of cattle manure application at 30 tons hectare^{-1} on untilled and winter-tilled rice stubble. Eight terraced fields (~0.2 hectare each)were selected in the winter. Treatments were randomly assigned so that each field had two control plots, two that received manure during December, two in January, and two in February. Runoff from each field was collected during winter and sub-samples were analyzed for ammonium-nitrogen (NH_4-N), nitrate nitrogen (NO_3-N), total suspended solids (TSS), total Kjeldahl nitrogen (TKN), total phosphorus (TP) and total dissolved phosphorus (TDP). Runoff concentrations and loads of NH_4-N, TP and TDP trended higher in runoff from manure application treatments compared to the control. The concentration and load (calculated as runoff volume area^{-1} x concentration) of NH_4-N were significantly (LSD 0.05) greater from untilled compared to fall-tilled plots. The December application significantly increased RO, NH_4-N concentration and NH_4-N, NO_3-N and TDP loads in runoff compared to January and February applications. In general, tillage before winter manure application decreased nutrient losses compared to untilled fields. The results are significant for environmental sustainability, policy makers, and organic producers in the region.