Tropical dairy pasture yield and nitrogen cycling: effects of fertiliser rate and a nitrification inhibitor

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In the dairy industry of north Queensland, an intensive and N-loaded production system, little is known about losses of N to the environment, and management practices that may reduce those losses. Such research is vital, given the proximity to environmentally sensitive areas such as the Great Barrier Reef World Heritage Area, and increasing economic constraints on dairy production. This study sought to determine the effect on pasture yield and N losses, of N fertiliser application rate and a nitrification inhibitor, 3, 4-dimethylpyrazole phosphate (DMPP). The experiment was a factorial design with two fertiliser rates (industry standard, 57 kg N/ha as urea per application versus half that), two DMPP rates (with and without) and 4 replicates, carried out on a dairy farm on the Atherton Tablelands, Queensland, over one year. Applying urea at half the industry standard rate, together with DMPP, provided similar pasture yields and much lower losses of N to the environment than applying urea alone at the standard rate. While it was not possible to accurately allocate losses to particular mechanisms, most appeared to be lost in deep drainage, with losses as runoff and N_2O small. Mean losses in deep drainage were lowered by reducing N rate and by application of DMPP. The findings indicate good potential for farmers to use DMPP-treated urea as a means of reducing fertiliser rates and losses to the environment without loss of productivity.