

## Predicting the supply of plant-available nitrogen from dairy effluents using APSIM

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The land application of dairy effluent to produce forage and arable crops represents an opportunity to reuse shed, feed pad and barn nutrients that are generated from intensive dairy systems. To do so in a profitable and low-risk manner requires an understanding of the effects of effluent characteristics on nutrient supply patterns. During 2014 an assay was conducted that investigated the nitrogen (N) release dynamics of dairy effluents when applied to soil, and linked these to initial effluent characteristics measured from the time of application. The assay included five slurry and six solid dairy effluents collected from commercial farms in the Waikato region of New Zealand. The assay showed that the pattern and magnitude of N supply across slurry and solid effluent treatments varied considerably, consistent with the large variation in initial effluent characteristics. These results were subsequently used in an assessment of the performance of the Agricultural Production Systems simulator (APSIM). The fit of the APSIM modelled outputs to the measured data improved when the model was parameterised with additional characterisation data compared with the fit with the default farmyard manure parameterisation in APSIM. However, the existing method used in APSIM to relate characteristics to the carbon pools did not result in consistent fit for prediction purposes. Further work will model data collected in a second assay and analyse the relationships between effluent characteristics and modelled nitrogen dynamics. Ultimately the project will develop simple grower approaches to predict the supply of plant-available N from dairy effluents to grow crops.