

Nitrogen leaching from cut-and-carry lucerne

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Water in Lake Taupō is deteriorating due to increasing nitrogen levels. Waikato Regional Council's Regional Plan has adopted a catchment-wide target of a 20% reduction in manageable-N entering the lake. The target is challenging and farmers are now looking for economically viable, low N-loss options for land use.

Overseer[®] V5 is the model used to obtain nitrogen discharge from farming platforms. When the N reduction target was established Overseer[®] did not contain a module for cut-and-carry lucerne. With published data for N-leaching under cut-and-carry lucerne ranging between 5 and 26 kg N/ha/y, Waikato Regional Council set the N leaching under cut-and-carry lucerne at 19 kg N/ha/y. This disadvantages uptake of this option and constrains use of lucerne if the actual leaching values are in fact lower. The relatively high N leaching value chosen by the Council reflected uncertainty both in the availability of data and the N fixing capability of lucerne.

As a consequence, Lake Taupō Protection Trust and the Sustainable Farming Fund funded a trial on N-leaching under cut-and-carry lucerne. Twelve barrel lysimeters (950 mm diameter × 1500 mm high) of intact soil were collected and installed around an underground collection facility. For comparison purposes four replicates of ryegrass/clover were included and harvested on a similar rotation to a farm grazing rotation, while the eight replicates of lucerne were harvested at 10% flowering. Nitrogen leaching from the ryegrass/clover is low – less than about 5 kg N/ha/y. As a result of cultivation, there was a spike in N leached under lucerne, which started and finished in Year 2. In the following 2 years nitrogen leached from the lucerne at a similar rate to that of the ryegrass/clover treatment.