

Catch crops reduce the risk of nitrogen leaching after winter grazing

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Nitrogen (N) leaching losses require careful consideration because of the related risks to surface and ground water quality. In New Zealand, the greatest risk period is typically during the months of winter and early spring when drainage events are more common. This period coincides with the grazing of high yielding winter forage crops (e.g. kale, fodder beet); an important management strategy to maintain livestock productivity during winter when pasture growth is constrained. However, the high stocking densities that are often associated with winter forages mean that these production systems are particularly susceptible to high N leaching losses from animal urine-deposition areas that typically remain in a fallow state for 3--5 months after grazing. This long fallow period provides a window of opportunity for establishing winter-active catch crops to 'mop-up' residual soil mineral N. This two-year field study investigated the potential benefit of establishing either an oat [*Avena sativa*; Years 1 (2015) and 2 (2016)] or ryecorn (*Secale cereale* L; Year 2) catch crop in a winter forage crop system under high N loading conditions (400 kg N/ha as urea), simulating urine deposition areas. The catch crops were direct-drilled on two sowing dates (early July and early August, both years); changes in soil mineral N (0-120 cm depth) and biomass production were assessed. In Year 1, oats reduced soil mineral N throughout the profile between the months of September to November (final harvest). For example, under simulated urine, soil mineral N was reduced by approximately 33% by early September at 0-120 cm depth, and 71-75% by late November at 90-120 cm depth, compared to the respective fallow treatments. Oat yields at final harvest were similar for both sowing dates at 10-12 t DM/ha, removing approximately 230-240 kg N/ha from the soil. Results of the trial in Year 2 will also be presented with comparisons made between the oat and ryecorn crops.