

USING DURATION CONTROLLED GRAZING AND DIET TO MANIPULATE N LEACHING LOSSES

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As part of the Pastoral 21 (P21) research programme a farm scale trial was established in 2013 at Massey University's Dairy 4 Farm to test the hypothesis that a commercial, system 3-4 dairy farm, operating a free stall barn as a standoff/feeding facility and practicing duration-controlled grazing (DC) could alleviate winter-spring treading damage on imperfectly drained soils. This would increase pasture production, and at the same time reduce N leaching loss and P contamination via runoff, when compared to a dairy farm operating a standard feed pad system.

Two 200-cow farms were set up. The "House" farm (2.88 cows/ha, 69.5 ha effective) utilised a 200-cow free-stall barn to winter all cows on-farm and practice DC grazing in summer and autumn to reduce the excretal load on pastures, and in winter to reduce the treading damage. The "Standard" farm (2.63 cows/ha, 76 ha effective) was managed as a typical pastoral based, system 3-4, farm in the Manawatu region with an uncovered concrete feedpad (250-cow capacity), which was used to feed maize and pasture silage supplements to this herd and 40% of the cows in the herd were grazed off over the winter period. Farms were matched with a similar distribution of soil types, overall fertility, distance to the milking shed, and herd characteristics (age and average BW of $122 \pm 1\%$ and PW of $145 \pm 1.5\%$). Both farms had a spring seasonal calving pattern. The dominant Pallic soil types on both farms were mole and pipe drained Tokomaru silt loam and Ohakea silt loam, with small areas of Halcombe hill soil on the easy slopes. Mole and pipe drainage water quality was monitored at the paddock scale.

Total milk solids production (2014/15 and 2015/16) per hectare was on average 8% higher in the House (1317 kgMS/ha) than the Standard (1211 kgMS/ha) system. Year-round DC grazing (50% of the cows time off paddock) achieved a 48% reduction in nitrate leaching, whilst DC grazing only in late-summer/early-autumn (~20% time off paddock annually) achieved a 29% reduction in nitrate leaching. Differences in P runoff between the systems were not significantly different.

The operating costs (including depreciation on capital) for the House and the Standard systems were \$5.73 and \$4.61 /kgMS, respectively. The increased production was not sufficient to cover the higher operating costs of the House system.

Editor's Note: An extended manuscript has not been submitted for this presentation.