HOW NITROGEN IS ACCOUNTED FOR IN OVERSEER 6

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HOW NITROGEN IS ACCOUNTED FOR IN OVERSEER 6

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The pastoral model within OVERSEER® Nutrient budgets (*Overseer*) version 6 includes a change to a monthly input and calculation time step that had started to evolve in the previous version. Some of the important differences can be summarised thus:

- Model split into urine and non-urine ('background') sub-models
- The urine model is new and is based on
    - Monthly deposition of urine and a monthly calculation step
    - A modelled N load per urine patch of 700 kg N/ha
    - Other sub-models varying in complexity account for all other competing processes for N (denitrification, volatilisation, immobilisation, uptake)
    - Leaching driven by a relationship between drainage and soil Available Water Capacity (AWC)
    - Additive effects of the inorganic component of effluent and/or fertiliser on top of urine patches
    - Losses adjusted for other animal species by applying a scaling factor
- Background model now based on crop model and integrates fertiliser, effluent and other non-urine sources of N.
- Fodder crop model now based on the same principles in the crop and the urine patch models

When compared against measured N leaching data from farmlet trials, there was reasonable agreement with sites receiving <200 kg N/ha annually but a tendency to slightly underestimate losses (slope of line 0.92, r^2>0.8). This is a good performance for a biological model.

Some consequences for the revised model are:

- *Shallow soils* - The drainage and N leaching estimates are sensitive to changes in soil AWC. The soil AWC is modified by soil order, type of non-standard subsoil material (sand, stones) and depth to that layer.
- *High rainfall* - Validation sites do not include sites >1400 mm, and so the model (as with previous versions) is extrapolating into these conditions. This version generally has a steeper response to rainfall/drainage than previous versions.
- *Fertiliser and effluent* -Fertiliser N and the inorganic fractions of effluent or organic fertilisers are added to urine patches as part of the calculation. Leaching losses are sensitive to these additions and can increase leaching when applied later in the season. Thus:
    - Losses from effluent blocks can be larger than with previous versions

Effects of winter applied N are larger than with previous versions

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