

Forage crop responses to second pond effluent

EFFLUENT pond sludge could replace some but not all farm fertiliser requirements, an eight-year study has shown at DemODAIRY, near Terang.

Results from the study into sustainable use of dairy effluent on farm was outlined by Graeme Ward from the Warrnambool Department of Primary Industries (DPI) at an April 7 farm information session.

The first project involved the irrigation of second pond effluent (based on a traditional two pond effluent system) at different rates onto pasture or forage crops and monitoring the effect of plant yield and quality.

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The second pond effluent was found to possess the following characteristics:

- Very salty (At DemODAIRY this is due to the salty bore water used for wash-down and the dairy chemicals used).
- High levels of Nitrogen (N), most of which is readily available for plant uptake,

- High levels of Potassium (K),

- Useful levels of Calcium (Ca) and Magnesium (Mg), and

- Alkaline pH – has liming effect on the soil.

Effluent was applied at 15 millimetres intervals from 0mm through to 75mm. The

The second set of projects involved using dairy sludge (from the bottom of the first effluent pond) at different rates to promote the growth of forage crops and pastures.

Following showed the best conditions for yield response:

- Apply effluent to actively growing plants (around six week stage on brassica crops to prevent burning off and to give maximum effect),
- Apply to nitrogen responsive crops or pastures (turnips showed the best results),
- A good follow up rain or irrigation promoted the best responses to the effluent (a

week or so after application would be ideal),

- Match effluent application rates to the plant nitrogen requirement, and
- Plant responses are generally short term and are due to the nitrogen and the water in the effluent.

The results from the project indicated that:

- Yield responses were quite variable between years,
- Responses ranged between 5 and 60

kilograms of drymatter per hectare per mm of second pond effluent applied, and

- Responses are an interaction between;
- The irrigation effect (water),
- The Nitrogen fertilizer effect, and
- Growing conditions of the crop.

The payback period for the whole system was estimated at 3-4 years.

Pasture and crop responses to first pond sludge

The second set of projects involved using dairy sludge (from the bottom of the first effluent pond) at different rates to promote the growth of forage crops and pastures.

The first pond sludge was found to possess the following characteristics:

- It is difficult to handle – specialised equipment is needed,
- The solids content is variable

(DemODAIRY was 8% dry matter)

- Very high in organic matter (organic forms of nutrient need bugs to break them down and convert them to forms readily available for plant uptake),
- High in nitrogen (N) and phosphorus (P),

- Less than 5% of the N & P is immediately available for plant uptake (95% is tied up in organic matter),
- High in potassium (K), calcium (Ca) and magnesium (Mg),

- Generally highly saline,
 - Alkaline pH – has a liming effect
- There were two different sludge utilisation concepts trialed. The first was 'Direct application to established pasture', and the second was 'Soil incorporation and forage cropping'. The sludge was applied at different rates at two sites, one at DemODAIRY and one at Naringal.

The trials showed the following pasture and crop responses to sludge:

- There were high yield responses to sludge,
- Responses continued throughout the

