

Nitrogen for your Summer Forage Crops

The nutritional value of turnips is comparable to grain, apart from the lower protein content of the turnip bulbs. However, both the yield and the low protein content of turnips can be increased by the application of nitrogen (N) fertiliser or effluent.



Crude protein (CP) levels in turnip leaves (and other Brassica leaves) are commonly around 12% CP, but may be as low as 5% CP in the bulbs. However, these levels can be elevated to 14% CP in the leaves and 9% CP in the bulbs by the application of nitrogen within 6 weeks of grazing (see Table 1).

In addition, correct usage of nitrogen on turnips has potential to increase a 6 to 8 ton/ha yield into a 13 to 15 ton/ha yield over the same period. Recent work in Western Victoria reported yield increases of as much as 50% with a single application of 23 mm of dairy effluent.

Table 1. Crude protein and dry matter yield of turnips for a range of Gippsland dairy farms

Crude Protein (%)	Nitrogen fertiliser applied	
	No nitrogen	Between 40 – 120 kg N /ha
Leaves (range)	12.1 (10.9 – 13.6)*	14.2 (8.7 – 20.6)
Bulbs (Range)	7.9 (6.8 – 9.3)	9.0 (5.1 – 14.5)
Whole plant (Range)	9.8 (9.9 – 11.4)	11.1 (6.7 – 17.6)
Yield (kg Dry matter/ha)	9.5 (3.6 – 13.2)	9.6 (4.0 – 14.6)

* Maximum and minimum CP levels recorded.

Assuming that the turnips are already established and that some nitrogen was applied around planting time, a second application of N could be considered around New Year. Research in Tasmania estimated that this second application of N grew an additional 3 t DM/ha to result in a 14 t DM irrigated turnip crop.

The efficiency of this second N application will depend on:



be spread on the turnip crop this can provide a valuable source of both N and water at a time when both these can make a big difference to the final yield.

1. If there is sufficient soil moisture available (i.e. the soil is damp in the top 100 mm when dug up with a shovel, etc.), then an application of 45 to 50 kg N/ha (2 bags Urea/ha) should boost the crop yields by almost a third more.
2. Urea applied in summer may be very inefficient and subject to volatilisation (lost as a gas) losses if applied under hot and dry conditions. However, a turnip crop around New Year should have some canopy cover thereby reducing potential volatilisation loss of the urea.
3. Alternatively, if effluent is available and can

Recent surveys, by the DPI Nutrient Management Extension Team, have reported N concentrations in dairy effluent of between 5 to 777 milligrams per litre (mg/l) in Western Victoria, and 40 to 1700 mg/l in Gippsland. This emphasises the need to test the effluent first, as the rate of application should aim to apply no more than about 50 kg of nitrogen per hectare. Using just the Gippsland figures, this means that an application of 25 mm of effluent per hectare (0.25 ML/ha) could apply anywhere between 10 and 425 kg of nitrogen per hectare. All the more reason to get the effluent tested first!

One caution with the application of nitrogen (or effluent) is that Brassica leaves take up nitrate rapidly from the soil and store this in the leaf for conversion to protein as the plant grows. By grazing too soon after nitrogen fertiliser application, cows will ingest a high level of nitrate, which could be potentially toxic and cause death. To avoid this, do not apply nitrogen or effluent closer than 6 weeks from the expected grazing date.



In summary:

1. In addition to the nitrogen applied at planting, a second application of either effluent or fertiliser at a rate of 50 kg N/ha around New Year could increase yields by 50%. However, applying a higher rate of N than recommended above will not necessarily produce a higher yield and the N fertiliser will only increase growth if there is sufficient soil moisture.
2. The effluent application rates should be based on a laboratory analysis of the N content.
3. If effluent is not an option, Urea is by far the cheapest source of nitrogen and, although there may be some volatilisation loss, much of this will be trapped by the canopy of the crop; assuming the soil is not bone dry.
4. To avoid any risk of nitrate or protein toxicity, the second top dressing of N fertiliser should not be closer than 6 weeks from the first date of grazing.

Richard Eckard

The University of Melbourne and DPI, Ellinbank.

For more articles see www.nitrogen.landfood.unimelb.edu.au