

# Black gold on the Darling Downs

By Martin Mead

**D**alby cotton producers can access a huge crop nutrient supply in the form of feedlot manure. There are approximately 681 registered feedlots in the Dalby area alone. Queensland produces 382,050 tonnes (dry weight basis) of feedlot manure annually.

On the Darling Downs the full potential of feedlot manure is not being realised — although some farmers are making use of it and have been for a number of years. Most report favourable results from using feedlot manure whether alone or in conjunction with inorganic fertilisers.

As a source for nutrients feedlot manure is a valuable commodity. It's mostly used for its high P and K values — potassium can be obtained for as little as \$3.14 per unit and nitrogen for as little as \$1 per unit.

Manure also has a beneficial effect as a soil conditioner — the additional organic material improves soil structure and water retention (see Table 1). Humus particles are negatively charged and therefore act on positively charged ions such as ammonium, calcium, sodium, magnesium and zinc. Manure can have a significant effect on the cation exchange capacity (CEC) of a soil as it has an EC capacity of around 2.5.

## SOLUBLE NUTRIENTS

It is also a good source of nutrients, reducing the requirement for inorganic fertiliser. These nutrients are in a mineralised, plant-available form. The nutrients are released to plants slowly, reducing the loss



Spreading manure with the right equipment is an easy operation (DPI, 2001).

of the nutrients to the environment.

Some farmers are using raw, uncomposted manure. This manure is taken straight from the feedlot and at times only heaped for a few weeks. This is done to take out the heat and reduce the moisture content. One farmer prefers to use raw manure that has been in heaps for a year or more, this gives a composted product that is more friable and easier to apply.

There are a number of companies producing co-composted manure — mixed with another organic waste product such as sawdust — for commercial sale. The composting process starts with manure from the feedlot pens which are usually cleaned when the depth of manure reaches about 100 mm.

This manure is stacked in heaps or windrows. It is then mixed with sawdust or feedmill wastes to provide a source of carbon for the organisms that will break down the manure. This also allows oxygen to be trapped in the stacks which is important as composting is an aerobic process.

Water is added to the heaps and it is this ingredient that triggers and controls the composting process. The resultant heat is important in controlling pathogens and weed seeds. When the temperature within the stacks starts to drop, the heaps or windrows are turned and re-watered to keep the process going. The heaps may be

turned several times during the 14–16 weeks it takes to produce a good quality product.

## ADDED ADVANTAGES

Although the co-composting increases the cost of the product, it has some advantages not found when using raw manure. Organic material is broken down and nutrients are mineralised into plant available form. There is a minimal odour.

Rocks and clumps may be removed by screening, giving smaller particles which spread easier. Weed seeds are made unviable through heat during the composting process. Pathogens are also killed by the high temperatures, enabling safer handling.

The disadvantages of composting are the extra cost involved and the time taken to produce a suitable product. A source of organic material to mix with the manure needs to be available to provide a consistent product.

A problem using raw manure is that much of the nutrient content is in the inorganic form, unavailable for immediate plant use. When applied to soil, the microbially active fraction of the manure can cause short term nutrient draw-down, inducing nutrient deficiency on the crop.

## RATES

Applying five tonnes per hectare of manure should satisfy the nutrient requirements of a 7.5 bale per hectare crop. The



A number of companies are producing co-composted manure.

PHOTO: Department of Primary Industries and Fisheries, Queensland

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cost of a tonne of raw manure can be as little as \$5 collected at the feedlot, or up to \$60 for a co-composted product that has been screened and collected at the feedlot.

This gives a five tonne product cost of between \$25 and \$300. But applying five tonnes of manure would also give 490 kg of calcium which is equivalent to one tonne of gypsum. The biological activity is likely to be helped by the nutrients contained within the organic matter, giving a vital energy boost for soil biota.

Farmers are reporting marked crop improvements with just one application of manure. One farmer believed he was still seeing benefits from a single application five years later. This was a supplementary application to his normal fertiliser regime. Most farmers agreed that to get the best results, manure had to be applied on a regular basis.

This is probably due to the slow release of the nutrients of the applied manure and also due to increased soil organism activity acting on crop residues. Another farmer likes to apply manure every three to four years as a supplement to his normal fertilising program, as he feels that in a good year he is sure to have the nutrients available to take advantage of the improved conditions.

**TABLE 1: Typical feedlot manure analysis — pH level 7.5**

Nitrogen	1.00%
Phosphorus	0.35%
Calcium	0.36%
Magnesium	0.27%
Sulphur	0.19%
Chloride	0.35%
Sodium	0.19%
Copper	15.1 ppm
Zinc	65.4 ppm
Iron	5000 ppm
Boron	35.6 ppm
Nitrate	10 ppm
Conductivity	2.9 dSm
<a href="http://www.icm.com.au/MANURESALES.html">http://www.icm.com.au/MANURESALES.html</a>	
From Organic Matter and Soils (1993)	

All the farmers agreed that applying manure, whether composted, co-composted or raw, was highly beneficial to their soils and the subsequent crops. A farmer who has been using raw manure noted that his soil analysis figures had not really improved much over the period but was confident that his crops were significantly better since he had started using the manure.

He wondered whether this was due to soil sampling techniques being geared for detecting inorganic fertilisers and not to detect increased microbial activity. The problems of applying high rates of material did not deter them in their enthusiasm for the product.

### SOME PROBLEMS

A problem with using manure is the large bulk of the product which increases transport and application costs. But handling of large quantities is possible on most cotton farms with existing equipment. In reality, it is not much different than spreading large amounts of gypsum.

Manure has a bulk density of approximately 700 kg per cubic metre. This makes it an expensive commodity to transport and to spread when compared to inorganic fertilisers. The Downs farmers have a distinct freight advantage over their colleagues from more remote cotton growing areas. Farmers successfully apply raw manure with the same gear they use for spreading gypsum. A composted product presents no difficulty in spreading.

This article was written by Martin as an assignment for the CRC Cotton course at the University of New England.

