Fertiliser savings: Do cows have it down pat?

Growers opting for an occasional cultivation for herbicide-resistant weed control may also find it a good opportunity to incorporate high phosphorus feedlot manure.

That's the view of Queensland Department of Primary Industries and Fisheries (QDPI&F) soil scientist Mike Bell from QDPI&F Bjelke Petersen Research Station.

"Growers looking to use feedlot manure as fertiliser should not overestimate available nitrogen nor overlook the phosphorus benefit – but it is most accessible to plant roots when it is worked into the soil," Mike said.

"While this causes concern with people committed to direct drill programs, the negative effects of a tillage operation to incorporate manure need to be balanced against the much greater nutrient recovery this will allow.

"We are not advocating that minimum till growers return to cultivation on a large scale but farming systems by nature are dynamic not static so occasional tillage may be useful."

Cost saving alternative?

Mike says feedlot manure may be a useful alternative to traditional phosphorus fertiliser due to rising input costs.

Grains Research and Development Corporation (GRDC)-supported research shows phosphorus concentrations in feedlot manure are often much higher than available nitrogen and availability can be on a par with artificial fertiliser phosphorus sources.

"Make sure recent manure analysis is obtained to determine inputs because in most cases inorganic fertilisers are needed to supplement and balance plant nutrient requirements, especially over time," Mike said.

"Our results show that under rain-fed conditions in a reasonable growing season, the amount of nitrogen made available to the first crop after manure application can range from zero (or even a reduction in nitrogen availability with some composted materials) to 20–25 per cent of the total nitrogen applied. "

Benefits for soils and crops

Mike said manures could provide many benefits to soil health, fertility and crop productivity but applied at low application rates, were generally a dilute source of major nutrients.

"Manures can play a valuable role in supplying nutrients but it is important to remember that they do not provide nutrients in the ratios plants demand," Mike said.

"With nitrogen, a number of variables will affect availability to crops in the rotation and careful consideration needs to be given to the quality of the material being sourced, the application rates and methods of incorporation before an assessment can be made of the overall economics of manure use."

Mike said manures were bulky and low analysis compared to traditional fertilisers and application rates needed to be much higher to supply the same total amount of nutrient.

"This is especially important when growers are looking at using manures instead of a traditional artificial fertiliser program," he said.

Manure is not a balanced fertiliser

Mike said like most organic amendments, the concentration of nutrient contained in manure varied and didn't provide a complete balanced fertiliser.

Manures contribute to soil biological activity but changes are likely to be relatively small unless extremely high application rates are used.

"Factors including animal diet, type and length of storage and treatment can alter nutrient concentrations over time," Mike said.

"Nitrogen, phosphorus and potassium concentrations vary considerably, especially with how long they have been stockpiled and how much leaching (wet weather) occurred during the stockpile period."

He said manures contained useful concentrations of a number of trace elements that can be important in a fertiliser program such as zinc. But there may also be trace elements of concern for food safety such as cadmium.

"Reliance on manures to replace current artificial fertiliser programs completely can be risky – at least in the early years of a program, or when soils have a known nutrient deficiency that has to be managed."

Mike said manure should be incorporated into the soil using tillage to gain the maximum benefits of available nutrients.

Manures contribute to soil biological activity but changes are likely to be relatively small unless extremely high application rates are used. Applying five tonnes per hectare manure will return about 1.5 tonnes per hectare carbon – about the same as 3.5 tonnes per hectare of cereal straw.

"If manure use results in poorer crops and less residues being returned to the soil, the soil biology benefits will be minimal."

Mike said a lot of research had been done to determine the value of nutrients in manure and to determine the economics of manure applications.

"General figures need to be modified to suit individual farms and manure sources to determine the likely success of any change to a fertiliser program."

Plants don't care

In terms of nutrient availability it is important to remember that plants do not care whether the nitrogen atom they just assimilated from the soil came from a decaying piece of residue, a lump of feedlot manure or a granule of fertiliser.

The important issue is ensuring the right amount of nutrients were available to the crop when the crop needed them. ■

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