

Dropping urea, building humus and utilising local resources

By ADAM WILLSON

For any producer considering certified organic production, the thought of leaving nitrogen fertilisers behind can be a little daunting, if not frightening. The fear of experiencing reduced yields, declining gross margins and problematic cashflows are real. The premiums for selling organic products, if available, can take 12-36 months to realise, depending on the level of certification required.

On the other hand, conventional farming is not a romp in the park. Oil-based input costs such as fuel, fertilisers, herbicides and insecticides are increasing significantly. Gross margins are very tight as commodity prices favour the larger operators. The pressure to expand or 'get out' is menacing. The rising value of land tightens the noose, especially in highly geared operations.

Herein lies the challenge. In order to move in an organic direction, how do producers reduce input costs without reducing cash flow? In essence, it is a business investment that is carefully planned and systemised.

The farm

The property is located on the Albert River, 70 kilometres south of Brisbane. It is approximately 180 hectares (450 acres) with 36ha of irrigation. The soil types vary from sandy soil used for night paddocks all the way through to heavy black river soils (cultivated for pasture and silage). The improved pastures are primarily kikuyu with mixed legumes (white, shaftal and lucerne), puna chickory, tonic plantain and winter ryegrass. Supplementary feed includes imported grain and on-farm-produced sorghum silage.

They had hit a wall

Robyn and Ged Plunkett are modern dairy producers milking about 190 cows on their property at Tamborine. In 2006 the business had

hit a brick wall as nothing was working. The cows were unwell and the pastures unpalatable (pastures were picked unevenly and stock returned for more wagon feed). Robyn, who is a qualified vet, recognised that something had to be done about the increasing incidence of mastitis, copper deficiencies and poor conception rates. They had been using a professional nutritionist, yet to no gain.

The links to the soil

It soon became apparent that many of the stock health issues were related to nutrient deficiencies in the soils. Legumes (which provide essential amino acids and vitamin B) did not easily grow. Paddocks were uneven and weed-infested and the soil rock-hard. To grow alkaline pastures and cost-effective silage, soil tests were undertaken to identify and monitor macro nutrients and trace elements. Nutrients of key interest were sulphur, calcium, magnesium, potassium, boron, zinc and copper. A paddock was set aside for trialling biological farming with a budget the same as for conventional dairying, namely \$250/ha/year for pastures.

Local resources used

The first issue tackled was the copper deficiency visually identifiable in the livestock. A free-choice mineral lick supplement was advocated with the view to addressing copper deficiencies in the soil over time. Following a comprehensive soil test, the conventional nitrogen:phosphorus:potassium (NPK) program was expanded to include humus building processes fundamental to a soil health program. Some of the locally accessible low-cost inputs used in the program included chicken manure, cow manure, lime, gypsum, dolomite, rock dust, trace elements and applied soil microbiology. The nutrients were applied using a belt spreader purchased to match the paddock sizes. They are now investigating on-farm composting as this makes nutrients more bio-available, speeds up soil

Growers look over shaftal clover.





Kikuyu grass now out-competes the crowsfoot weed problem.



Shaftal clover under a soil rebuilding program.



BTR sorghum grown without artificial nitrogen.

humification and stimulates white feeder roots.

Key observations

The first thing Ged noticed was even pasture growth across the paddocks and that the livestock actually ate the grass. Previously the cows had picked their way through the paddock. In most cases the cows had been reluctant to graze, the nutrition depending solely on brought-in feed supplements (exorbitantly expensive in a drought). As Ged discovered, pasture palatability was not dependant on urea applications but rather on balanced nutrition. Many of the legumes (previously small or non-existent) flourished under the new program. This was a direct response to nutrition and rebuilding the soil.

Other observations made by Robyn and Ged throughout the transition from conventional to biological farming include:

- cows are maintaining high production 6800 litres per cow per year despite increasing Jersey numbers to 50;
- significant reduction in farm costs – no longer using urea;
- the number of cows in calf has increased due to fewer retained placentas, and clean calving has been observed with no pulling required and improved fecundity;
- mastitis dropped 67% in less than a year from six to two incidents (leading to a significant reduction in veterinary requirements);
- brought-in feed has dropped 23% from 10.4kg to 8kg/cow/day;
- the nutritionist calculated that pasture feed used has increased 50% from 6kg to 9kg/cow/day;
- total silage production has gone from 600 to 900 tonnes without increases in water usage – the most silage ever produced on the farm. (Most of the feed comes from pasture or silage harvested on-farm, buffering the business from high grain prices.);
- increase in pasture quality in late autumn with increases of 4.5% amino acids in kikuyu in March. Pastures did not go to seed but held on well

into March. The cows loved these pastures; and

- reduction of supplementary mineral costs from \$0.38/cow/day to about \$0.14/cow/day, saving \$16,000 a year.

Simple and systemised

By using a systemised approach, the Plunketts have developed the confidence to grow pastures without synthetic fertilisers.

The first step is to observe the soil where crops are grown. Check to see if the soil is tight and prone to anaerobic conditions. (Compare to soil around fenceposts.) Observe what is happening to the fine root hairs and whether they are constricted. This is important when determining whether or not to rip the soil.

The next step is to carry out a comprehensive soil test. Be sure to look at short-term soil solutions, mid-term exchangeable nutrition and long-term total nutrition locked up in clay and organic matter. This is particularly important as biological producers can gain an idea of what nutrition is available relative to total present. For biological farmers it is important to obtain organic carbon, total carbon and total nitrogen. As most good producers are aware, building carbon also increases total nitrogen in the soil. Make sure you have cobalt, molybdenum and selenium measured. These are essential for healthy stock and prolific legume production.

The final step is to use local resources to achieve production and soil regeneration improvements. Here, composting and the judicious use of legumes reduce overall costs. Over time the root zone increases, leading to stable soil humus development and more efficient recycling of nutrients. Common signs of success include even crop and pasture production, softer soils and fine white root hair development. 🌱

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