Addressing Soil Quality

Addressing soil and cow health has helped one Cheshire farm cut feed costs by 4.37p/litre and increase milk from forage by 1,321 litres a cow per year.

Getting more milk from home-produced forage should be the aim of any dairy farm looking to boost profits, but farmers could be fighting a losing battle if soil performance is not up to scratch.

Two years ago brothers Neil and Nigel Matthews, Poplar Hall Farm, Chester, were experiencing problems with low forage use and poor cow health and fertility in their herd of 230 Holsteins. Dairy consultant Phil Clarke was subsequently brought in to address cow body condition and he identified forage quality as a major influencer to reduced cow health and performance.

Rising Costs

"One of the reasons cow condition was suffering was because forage was not providing enough energy." says Mr Clarke. "As a result, more cake was being bought in to maintain yields and cows were more stressed as a result. All this too against the backdrop of falling milk price."

Feed costs were about 8p/litre and rising as the farm found themselves buying in more additives and protected fats. "In 2010 we decided we wanted to cut out yeasts and fats, but the only way to take out fats is to make better use of forage - something which is even more important as feed costs rise."

However, to do so, the farm needed to get to the root of the problem. They agreed to host a soils day at the farm and it was this day that proved to be a major turning point for the business.

Independent consultant, Jo Scamell from Ground Level Nutrition, explains that analysis results from an example soil sample from Popular House Farm showed soil could be the cause of many of the cow health production issues being experienced by the brothers.

Soil Compaction

"Initial forage mineral analysis showed very high molybdenum levels which was affecting copper availability", says Mr Clarke. "Although comprehensive soil analysis showed pH was satisfactory, calcium levels were very low relative to magnesium, Mrs Scamell says. "This aggravated a soil compaction issue which left the soil inert, the grass unpalatable and high in antagonistic elements such as iron and molybdenum."

Mrs Scamell explains that copper is related to hormone levels and at low levels can cause weak bulling activity resulting in irregular cycling.

The soil compaction issues were addressed through silt aeration and deep flat lifting. However, as Mrs Scamell points out, the problem would not be solved by tackling this in isolation. Illustrating why benefits had not been exposed after prior attempts.

"It's not just about physical aeration - you need to get the chemistry of the soil right at the same time. Aerating without correcting the mineral balance may actually cause the soil to slump back into tighter compaction in the long term."

Soil Chemistry

Gypsum (calcium sulphate) was subsequently applied in the Autumn at 1.5t/acre to reinstate the calcium-magnisium balance. By doing so the molybdenum and copper balance was improved in the forage.

In 2009, molybdenum levels were classified " very, very high" at 1.9mg/kg, with copper availability at 27.7%. In 2010, molybdenum levels were recorded as "average" at 0.61mg/kg, in turn improving copper availability to 68%.

Potash levelswere also iodentified as being too high relative to sodium. As a result, Mrs Scamell recommended salt be applied at 125kg/ha in the Spring and Autumn over three years.

This has resulted in a marked improvement in forage palatability allowing the brothers to easily achieve grazing residuals of 1,400 - 1,600kg DM/ha, where they had struggled to do this in the past.

"We were wasting a lot more grass and having to top more before we implemented the soil strategy", says Neil.

Forage Use

Mr Clarke continues, "The aim is to try and get more milk per cow as efficiently as we can. Part of this is reducing feed costs for every litre whilst maintaining production."

By improving soil and forage quality, concentrate and dietary supplements have been steadily reduced from 0.32kg/litre to 0.27kg/litre and milk yields have risen alongside gains in butterfat and protein percentage. In turn, cow health and fertility has show big improvements.

"The soil strategy has resulted in a more nutritious forage with lower levels of antagonists. This means the cows are under less metabolic stress and able to perform more efficiently", adds Mrs Scamell. "The more palatable forage also means intakes are improved and concentrate levels have been reduced."

A move away from umbilical application to slurry injection has meant Matthews have also seen a better response from slurry than artificial fertiliser further reducing costs.

"We're using about one third less artificial fertiliser an acre that we were in 2008/9", says Neil. "Fertiliser costs have been 0.2/litre less in the last 12 months versus 2009, despite a £100/t increase in prices."

The soil strategy has been combined with a number of other improvements on-farm which have contributed to the overall gains in health and production.

Management Changes

"Addressing a significant starling issue has formed part of the overall aim to get more from forage and keep cows healthy", Neil and Nigel explain. "Starlings were eating a significant amount of ration every day and consequently, we were seeing a major milk drop." They mitigated the problem by putting up netting around the feed also preventing associated salmonella risk.

"Addressing first lactation heifer management has also played a significant role in improving cow health", adds Neil. "Our culling rate in the first lactation was much too high - something which was expensive considering we rear all our own replacements." Heifers are now kept in a separate group during their first year in milk. Although it was initially thought this would cause too much extra work, the Matthews have seen a marked improvement in health, reducing problems and associated workload.

Fertility

All these factor, together with working alongside RMS technical, Peter Jackson, has helped impact fertility performance figures (see table). Improvements in overall conception rate from 23-40% has helped drive pregnancy rate up. The benefits of having a separate heifer group are also marked, with the significant gains in first lactation fertility figures.

"The fact that fertility figures have improved, despite protected fats being removed from the diet, demonstrates that with good soil management, good fertility in high yeilders can be achieved without expensive fats", comments Mr Clarke.