Sustainability starts with...slurry?

Romney Jackson, Director of Sylgen Animal Health, talks about soil microbes.

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Soil microbes are the forgotten heroes of dairy production, he maintains. "We often don't think about it, but they are integral to all we ask of grassland."

Soil biology has multiple roles

Both soil fungi and bacteria play a pivotal role in the development and maintenance of soil structure, which determines how much water a soil can absorb in times of flood, and retain for use during a drought.

"Fungi create vast networks of mycelia – up to a 100m in just one cubic centimetre of soil, in some cases," says Romney. "Not only do mycelia bind the soil particles together, but with its huge contact area, fungi can access far more water and nutrients than grass roots. This is particularly important when these resources are scarce."

The relationship between plants and soil microbes is symbiotic. Plant roots release a carbon-rich food, known as exudates, to attract soil microbes. In exchange, the bacteria and fungi will supply the plant with water and nutrients. Some species also help plants defend themselves, against pests and diseases.

"Just as different herbivores are specialists and serve different purposes in an ecosystem, the bacteria and fungi underground have their niches," explains Romney. "Plants use this and change the chemical composition of its exudates in order to attract different microbial species, depending on what they need.

"Unfortunately, the relationship is delicate and it's been shown that synthetic fertiliser disrupts the balance. With nutrients in abundance, plants stop investing in the relationship and over time, the soil microbial populations are depleted.

"Using fertiliser long-term leads to less resilient plants. Having lost much of their capacity to gather nutrients and water from soil, defend themselves from pests and diseases, and suffering as a result of poorer soil structure, synthetic fertiliser can lower, rather than increase yields."

Rebuilding soil biology with slurry

Fortunately, most organic matter, provided it is applied in reasonable quantities, doesn't have this detrimental effect. Instead, it's often a valuable food source for soil organisms, and subsequently plants.

"On dairy farms the most abundant organic matter is slurry. It is nutrient-rich and can easily be inoculated with soil-borne bacteria and fungi which will help break it down and, more importantly, contribute to the long-term health of plants and soils," says Romney.

"It's important to note that few slurry additives are designed with this in mind," he continues. "Most are formulated for ease of slurry handling, breaking down crusts and reducing the need for stirring during storage."

Fungi, he says, are a crucial component in a good slurry inoculant.

"Unlike bacteria, some fungi – like those in SlurryForSoil – are adept at breaking down and capturing the nutrients found in lignin – the compound that gives plant cell walls their strength and rigidity. Lignin is abundant in slurry. It's found particularly in the partially digested maize and maize silage as well as in any straw that's swept into the slurry store."

SlurryForSoil contains 18 different microbes. Each has been carefully selected, not only for their abilities to break down slurry, but because they have been scientifically proven to enhance plant growth.

"In terms of what a slurry inoculant is and does, SlurryForSoil is changing the rulebook," says Romney. "It turns slurry into a highly effective bioactive fertiliser that does much more than simply supply nutrients, it actively supports soil and plant health.

"All the microbes in SlurryForSoil are Plant Growth Promoting Rhizobacteria or Plant Growth Promoting Fungi. They have been shown to: induce plants' systemic resistance; fix nitrogen from the air; clean up hazardous contaminants in soils; increase root and plant growth by secreting plant growth hormones; improve plant tolerance to stress and drought; and, improve the concentrations and transportation of many minerals within plants."

The microbes in SlurryForSoil, he says, enhance the supply of nutrients to plants in three ways. As well as capturing and retaining nutrients with slurry, the fungi and bacteria are known to mine nutrients from sources in the soil, and transport them to plants as and when they need them.

"It's these abilities that, in the long-term, can help us reduce our reliance on synthetic fertiliser and their high environmental cost," he says.

SlurryForSoil proven in independent trials

In 2022, Duchy College tested SlurryForSoil. One of its dairy herds was split into groups, each with a dedicated slurry lagoon allowing researchers to isolate and assess SlurryForSoil'TM'S impact. Samples of the treated and untreated slurry were analysed by NRM labs, as were forage samples taken from the temporary grass ley which had received applications of the two slurries.

"Results showed an increase in the retention of key nutrients in the treated slurry, such as ammonium, phosphorus, potassium and sulphur as well as magnesium, copper, zinc and calcium," says Romney. "Across the four cuts, forage yields increased by an average of 24.3%, with some having more than a 30% increase in yield.

"Nutritional analysis of the silage showed SlurryForSoil also helped improve forage palatability with an average decrease in NDF of 10.7% and increase in plant sugars of 27.7% with corresponding increases in D value and ME."

SlurryForSoil - a financially and environmentally sustainable solution

With its ability to save fuel and fertiliser and increased grassland productivity, Romney argues that SlurryForSoil offers dairy farmers a tool that can contribute to both the financial and environmental sustainability of dairy production.

"The journey to net-zero is going to be challenging, especially when margins are being squeezed so tightly, so it's important to take easy decisions when and where you can," he says. "SlurryForSoil is a tangible solution that offers a financial return on investment while reducing the carbon footprint of dairy production."