

Project tackles maize concerns

Maize crops—and the bare fields that they leave over winter—are generating soil and water quality concerns. Could undersowing be the answer to alleviate these problems?

Undersowing maize with grass can provide a viable solution to address the ‘problem’ of bare winter maize stubbles—preventing soil erosion and nutrient leaching during winter rainfall.

The practice also boosts soil organic matter, provides a valuable winter grazing opportunity and allows easier preparation of spring seedbeds for following crops, according to the results of a pilot project funded through the WWF and Tesco Partnership, and carried out by a number of Müller Milk and Ingredients’ dairy farmers who supply into Tesco.

“The government has highlighted the need to address improvements in soil health in its proposals for the Sustainable Farming Initiative to be launched this year,” says Liz Price, head of land use at the Wye and Usk Foundation (WUF), a regional rivers trust that works closely with farmers throughout the two rivers’ catchment area across Herefordshire and Monmouthshire.

“Farmers will be expected to find ways of meeting these environmental obligations as the agricultural payment landscape shifts,” she says.

“The trials and programmes that we have conducted with local farmers show that undersowing addresses many of the criticisms levelled against maize stubbles in the winter period but also provides measurable advantages to



An undersown grass crop photographed on November 26th, 2020, following maize harvest on September 24th.

encourage this concept as a practical, viable and accessible option.”

In addition, she says, it helps WUF achieve its objectives of reducing soil and nutrient runoff—nitrates and phosphates in

particular—from reaching rivers and other watercourses, where it

can cause eutrophication, preventing fish from spawning and harming general biodiversity.

The programme was boosted in 2019/20 after the WWF and Tesco Partnership came on board, with the specific intention to adopt the practice amongst Müller and Tesco farmers in Wales.

Nick Duggan, technical support manager with Field Options—the programme’s on-farm delivery partner—explains: “Before 2016, there had been some experimentation with planting grass into maize crops. It was always broadcast, and sometimes harrowed in, but both methods rely heavily on rain afterwards so it wasn’t terribly reliable.”

Field Options’ attention was drawn to Denmark, where undersowing maize has become common practice and there were valuable lessons to be learnt. “Danish farmers have to meet strict quotas on Nitrogen use in every crop, which in turn are determined by the proportion of cover crops sown on each farm,” explains Mr Duggan. “If they fail to meet the cover crop stipulation, their Nitrogen quota is reduced.

“By the time we came to look at the Danish results in 2016, they

Continued on page 46.

WWF and Tesco projects target sustainability

The maize undersowing initiative being administered by the Wye and Usk Foundation is part of three initiatives that WWF (formerly the World Wide Fund for Nature) has established, in partnership with Tesco, and regional rivers trusts in England and Wales. The initiatives work with farmers, suppliers and other stakeholders to develop, test and share innovative approaches to secure soil, water and nature benefits, and ensure a sustainable farming future for the UK.

“Nearly 80% of shoppers want supermarkets to do more to offer food sourced in a sustainable, responsible way,” says Simon Aguss, of WWF’s UK food and landscapes team. “Through this partnership, we’re helping Tesco to understand the environmental impact of its supply chain and address these sustainability challenges.

“This and other partnerships can ensure long-term protection for environments most affected by UK food production. By working with supply chain partners as well, like Müller, we can help set up farms for the future that can produce sustainable, healthy and affordable food—enabling farming communities to thrive economically while acting as custodians of nature.”

Mr Aguss adds that a similar project on maize crops for AD plants is being conducted in East Anglia in association with Coca Cola.

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‘Don’t let “Cowslip” down’

Continued from page 44.

had already identified key factors for success,” recalls Mr Duggan. “What to sow, when to sow and, most importantly, how best to establish it—drilling the seed and consolidating behind, ensuring it has good contact in moist soil.”

Custom-built drill

With sufficient understanding of the Danish findings, Field Options and WUF worked with local contractor Roy Price to design and build a custom drill specifically for undersowing within the maize crop. With input from Weaving Machinery and with several parts imported direct from Denmark, the drill went into operation in 2016, drilling 130 acres.

During the first year, the prototype drill achieved a 100% success rate in its establishment of the grass cover crop. As the area undersown has increased, much of the Danish research has now been verified under UK conditions, Mr Duggan notes.

“The most important aspect was identifying the target period

for sowing. This is no earlier than one week after the last herbicide is applied and before the maize reaches knee-high at around six to eight leaves,” he says. “Any later and the canopy is closing over, stifling the emerging grass seedlings.”

Working in growing maize crops is a job for experienced operators with specialist inter-row drilling equipment. Funding through a number of projects has allowed WUF to increase its fleet to four drills, at a cost of nearly £20,000 each. The programme gives access to this service so that growers do not have to invest capital in expensive machinery.

“Unsurprisingly, everyone wants to drill at the same time,” says Jonny Pugh, WUF catchment adviser “This was a problem when we only had two drills. Even with four drills, the planning can be difficult to manage.

“At 155 miles, the Wye is the UK’s fourth-longest river and, with the Usk adding another 78 miles, our catchment area is large. “There’s a lot of road work to

cover between farms, particularly as the additional funding from Tesco and Müller has seen us expand further into neighbouring Monmouthshire.”

WUF’s advice to farmers expressing an interest in undersowing maize is to focus on the high-risk fields, notes Mr Pugh, even where they’re planning to follow maize with winter wheat. To ascertain risk, the reference point—used by most UK rivers trusts—is SCIMAP (www.scimap.org.uk). This is a risk mapping framework that identifies the likely origin of diffuse pollution, by combining digital mapping data with knowledge of land use, vegetation and rainfall patterns.

Targeted approach

By targeting the high-risk fields, we can have the greatest effect on run-off while also delivering the maximum benefit to the farmer by improving soil structure and ability to travel.

“Between similar fields, we’ve found between 70% and 80%

more traffic damage in those that weren’t undersown,” he points out.

While word of mouth has proved a valuable means of communicating the project’s value, so too has the positive engagement that Müller has created among its farmers. “Generating awareness and interest is one thing—but there’s nothing like seeing the results for yourself. That’s why the open days and workshops that we held—pre Covid, of course—were the ultimate conversion tool,” says Mr Pugh.

“Digging out a soil spit remains one of the most valuable ways to show soil structure. There’s no better method.”

The open days also provided an opportunity to discuss species and seed choice, adds Mr Duggan. “A straightforward blend of Italian ryegrass is the simplest option, providing a vigorous sward and the greatest potential for growth post harvest.

“In trials, IRG has provided up to 2.5t DM/ha by mid March—a very attractive proposition for

SPOTLIGHT ON MAIZE



The custom-built drill designed specifically for undersowing maize

extra winter grazing after maize,” he suggests. “This gives up to 300 heifer grazing days per hectare, or 1,500 ewe grazing days. Diploid or tetraploid perennial ryegrass

blends are also available, the former offering a lower seed rate with good groundcover and nutrient retention.”

Where a farmer is seeking a

more significant boost to fertility and soil biology, Mr Duggan recommends introducing legumes. “IRG and a winter-hardy hairy vetch can deliver up to 3.5t DM/ha by March. Alternatively, there are non-hardy varieties of vetch and clover. While these will suffer in a hard winter, the residual Nitrogen will be mopped up by the companion grass.

“We warn growers against undersowing in fields known to have problem weeds, as these may need later applications of herbicide to which the newly sown grass would be susceptible. The general advice to anyone opting to undersow is to speak with their agronomist about how best to manage herbicide choice for their specific situation.”

While the cover crop can produce impressive results and dry matter yields, Mr Duggan advises farmers not to get carried away with plans to utilise it. “Despite the dramatic improvement in soil structure, maize harvesting can still damage the field and leave it uneven. So, while you could harvest the cover crop for silage,

there’s a big risk of soil contamination. Maize stalks would also need to be flailed off.”

The most frequently asked question is about yield. He states that they’ve seen no detrimental effect on the yield of the maize crop when undersowing a companion crop, provided that the cover crop is drilled when the maize plant is at the critical six to eight leaf stage.

Müller farmer benefits

Phil Scott, retail group manager for Müller Milk and Ingredients, has been delighted with the project’s progress, uptake and achievements so far. “With the objective of improving the natural environment, the Wye and Usk Foundation has provided our supplying dairy farms with advice and funding to improve soil structure, nutrient management, natural flood management and farm infrastructure.

“This valuable resource has allowed participating farms to improve efficiency but also ultimately profitability. It’s a definite win-win for all concerned.”