



*Drilling, and not broadcasting, when maize is at the 6-8 leaf stage has been shown to be the most effective method of under-sowing.*

# Under-sowing maize for improved soil health

*Pressure to avoid leaving maize stubbles bare over winter is growing. Luke James reports on a project to develop successful methods of under-sowing.*

Establishing a cover crop that avoids bare maize stubbles over winter offers significant soil health and wider environmental benefits as well as the potential for additional forage production. The problem is, success from drilling post-harvest is by no means guaranteed for the majority.

Sowing into standing maize, to create a crop that is already established as the maize comes off, is a far better solution. However, methods such as broadcasting seed directly onto the ground, or broadcasting and tine harrowing, have proven relatively ineffective.

Following collaborative development work involving Field Options, Wye & Usk Foundation, and Herefordshire contractor Roy Price, new methodology is now proving its worth, with an increasing acreage being successfully under-sown in Herefordshire and Monmouthshire.

At the heart of the project is a specially developed inter-row drill, but success is as much about timing, tailored agronomy and

using the right cover crop species as it is about the machinery, says Field Options' Nick Duggan.

"Trials and development work have been ongoing since 2016, so we now have quite a lot of knowledge and experience of the practice," he explains. "Optimum timing for drilling is when the maize is at the six to eight leaf stage – or one week after the last herbicide application. By this stage the maize is established, so able to cope with competition from the cover crop. There will also be minimal effect from any residual herbicides."

Drilling the cover crop in rows between the maize means there is space between plants, again minimising the effect of any competition. Using an effective double disc opener and press wheel arrangement also delivers the required seed to soil contact that ensures germination in what can be dry conditions.

Nick adds: "To date we've found that the most effective cover crop is an Italian ryegrass blend, as it has



*Nick Duggan of Field Options in an Italian ryegrass crop established from under-sowing.*



*Ben Nott in a cover crop of Italian ryegrass in January, established by under-sowing in maize in the previous July. The good root structure of the grass helps with water infiltration.*

the vigorous growth characteristics required for successful establishment in the conditions. It will then provide a crop that can offer out-wintering potential and/or good spring grazing."

The team are continuing to evaluate other species, including legumes, herbs and vetches. Mixed species mixtures are also available. However, the Italian ryegrass blend has proved nearly 100% successful and produces up to 3t/ha DM by the end of March, at 12ME and 12% protein. This equates to approximately 1,500 ewe grazing days, or 300 heifer grazing days, per hectare, so valuable extra production.

The extra forage produced

should more than cover the cost of the operation, which as an all-in contracting operation through Field Options is estimated to be £80-£100/ha. The environmental gains could also provide a far more significant payback.

## Compliance

Although future agricultural policy remains uncertain, there is little doubt that there will be greater imperative to farm with high levels of environmental responsibility. The common view is that it will become mandatory to avoid bare ground over winter.

As a catchment adviser for the Wye & Usk Foundation, Ben Nott's

role is to work with farmers to achieve the good agricultural practice that ultimately keeps silt and sediment out of rivers. However, his approach is more about promoting the benefits of good soil health.

"Establishing a cover crop certainly helps to avoid soil run-off, and that is about protecting the farm's greatest asset," he says. "With foliage on the surface, you are reducing the impact of rainfall, and then the roots under the ground create channels to allow effective water infiltration.

"With live root structures in the soil, the organic matter increases and there will be higher levels of microbial activity, and that will mean more earthworms which in turn return more organic matter to the soil. A healthier soil is not only better for the environment, but it's also more productive, so cover crops really are a win:win."

## Top Tips for under-sowing maize

- Avoid fields with heavy grass weed burden.
- Inter-row drill, not broadcast.
- Drill at 6-8 leaf stage.
- Work with an experienced agronomist.
- Use a proven cover crop mixture.

## Case study - Trevase Farm, Hereford

David Pursey, who farms at Trevase Farm, south of Hereford, grows around 200ha (494 acres) of maize each year, primarily as a feedstock for his 499KW anaerobic digester.

For the past five years, he's successfully under-sown around a fifth of this area with an Italian ryegrass blend. This has created an effective overwinter cover crop and valuable grazing for ewes and lambs from early January.

With maize yields typically in the region of 50-60t/ha, even when under-sown, David reports no detrimental effect on the primary

crop, and now sees the practice as an integral part of his system.

"We'll invariably under-sow the maize we are growing at home, if the ground is going back into maize the following year, and expect the cost to be covered by the value from the grazing," he says. "It's important that we're looking after the ground, and – apart from the extra grazing – the cover crop provides an area where we can spread digestate from the AD plant over the winter."

Apart from some changes in the use of post-emergence herbicides, the strategy has had no impact on

the way maize is grown. However, maize grown on rented ground will not be under-sown as there is no guarantee they will have the land for the following year.

David adds: "The extra grazing is certainly welcome and, if anything, we can often have too much grass. It's not practical to mow it as the ground is usually rutted, so we're not afraid to spray off the surplus if we have to."

If maize is not under-sown, David does sometimes have the option of using a combi-drill post-harvest, but this is substantially more expensive. 