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If growing maize makes you 'jittery', it could be time to re-think your forage options

'Marginal' measures

Is growing forage maize really the best option for all dairy units and herds? We ask a leading technical adviser for his thoughts and some vital do's and don'ts on growing the crop in marginal areas.

text **Rachael Porter**

Peer pressure, a desire to keep up with your neighbours or an unshakeable belief that it's the best option when looking to grow and feed a high-energy home-grown winter forage to complement grass silage. These can all be driving forces behind producers who grow maize in marginal areas. Yet it may not be the best option for their farms or their herds, according to KW Feeds' technical support manager Mark Scott.

"There are some producers who grow forage maize in marginal areas who struggle and they really don't need to," he says.

"A typical problem is that they worry too much about ground conditions and get 'twitchy' in early October. This can lead to cutting the crop too early."

Low starch levels

"The result is a silage that's invariably too wet and too acidic with reduced starch levels, which is a shame as it's the starch element that attracts them to growing the crop in the first place. And they then end up adding other sources of starch to make up the shortfall – often at considerable cost," says Mr Scott.

If this source of starch is rapidly fermentable – such as rolled wheat – and it's added to a low pH silage it can exacerbate the acidity problem and in some instance may push the rumen environment over the edge. "Yet still they feel that they should be able to grow maize."

If ground conditions concern you in October and if you can't consistently achieve good results of between 28% and 30% dry matter and 30% starch then it's time to question why you're growing maize and to look at the alternatives.

"Growing in areas that are simply too marginal or choosing varieties that won't reliably perform in your region will produce a silage that can be expensive to balance in the ration," says Mr Scott.

"And if maize isn't going to reliably do what it's supposed to do in the ration, producers are better off growing a good crop of wholecrop cereal silage than a bad crop of maize."

Growing wholecrop wheat, for example, is more flexible than maize when it comes to drilling and harvesting windows.

A wet spring can delay maize drilling and make producers growing the crop in marginal areas more prone to worrying about the crop before it's even in the ground. Wheat, on the other hand, offers growers a huge drilling window, between September and February.

Take your time

"If you want to grow maize, flexibility is key and so is a willingness to take your time. Maize needs time, so don't rush it. If you can't give it the time required to ensure you grow a successful crop, due to weather conditions or pressure to sow a winter cereal or a new ley after harvest, then think again about growing it in the first place," says Mr Scott.

He says that producers should be willing to accept that growing maize could require the land to be allocated to the growth and harvest of the crop for 12 months. "If you're in a marginal area and you can't make that commitment, then again it may be time to reconsider. Pressure to drill a winter cereal after maize could result in a poor forage crop. So it's vital if you're investing in growing maize to make it your first priority."

Again wheat offers a much wider and considerably early harvesting window and with the wheat price so high, growing your own could protect your business from some of the volatility in the market.

Flexible forage decisions

"There are many opportunities to harvest wheat and decisions can be made on the basis of how well first and second cut grass silage cuts have gone," says Mr Scott.

Wheat can be crimped at the stage when the grains change from 'milky' to 'cheesy', or slightly later in the summer when they're 'cheesy' to 'doughy' to make wholecrop.

This window runs from late June to mid July. There's a third opportunity to cut when the crop is dry and either roll it or soda treat it. And this also produces straw – another valuable feed commodity.

Growing wholecrop wheat does require more hectarage to produce the same volume of forage as maize – about a third more. A typical yield for maize silage is around 37 tonnes/ha compared to between 20 tonnes/ha and 25 tonnes/ha for wholecrop. "But remember the added flexibility of wholecrop. After cutting there's still enough time to take a third grass silage cut to make up any shortfalls.

"And there's more time to think about other options to fill any forage gaps. A disappointing maize crop in October or November leaves little, if any, time to consider options to make up forage shortfalls – adding pressure to disappointment."

Driven by quality

Mr Scott says it's important, whatever forages are grown, to be driven by quality and not just yields. He says that maize can be grown successfully in marginal areas – many producers do it year after year. "Key to their success is research and local knowledge – they know what works in their area and talk to their neighbours about what's working for them too.

"Nancis – a forage maize variety that's been around for many years – is still the variety of choice for some marginal units in North Yorkshire. It grows well there and the producers know this. For them it's an area of management where being a sheep and following what everyone else is doing is definitely the way to go."

Producers who want to try out new varieties in these marginal areas do so with caution, often planting a small area within their allocated maize hectarage to see how it fairs.

"And the key here is to grow it in a typical area where you grow maize – be realistic. You need to know if it could out perform your usual variety year after year if you made the switch," says Mr Scott.

"Forget the sales patter, the recommended list and what you think you should be able to grow if you're in a marginal area. Grow what you know and make sure that you know why you're growing it." |

Wider windows: wheat offers more drilling and harvesting options

Navigate a path through the maze of the latest developments in forage maize

New 'ways' with forage maize

We round up the latest maize products, research and technical advice and offer some timely pointers to help you make some important decisions about this year's forage maize crop. Read on to find out more about fertiliser, seed bed preparation and much more.

text **Rachael Porter**

Fertiliser is tailor-made for maize grown under plastic

Producers grow maize under plastic to ensure that the crop gets established quickly. Now they can also apply a fertiliser that's tailored to meet the specific requirements of the crop.

Poly Maize, which has been launched by plant nutrition and soil management experts Glenside, contains a precisely formulated balance of macro and trace elements and humates to help ensure a rapidly growing and healthy plant.

"The unique micro-environment created when maize is grown under plastic means that it faces particular nutritional needs," explains the company's Ian Robertson.

"The plastic helps to warm the soil up more quickly and phosphate from soil, slurry or manure is more readily available, which means that no additional phosphate is required.

"Growers usually apply a general purpose 25:0:10 type of product but this will not meet all the complex nutritional demands of the crop. This new fertiliser is specifically formulated to meet these needs by combining a wide range of nutrients."

Poly Maize is a 20.5:0:12 with added trace elements and humates. Calcium is added to help buffer the acidity created when slurry is applied, encourage strong root development and improve the uptake of nitrogen. Sulphur also helps nitrogen absorption while copper, zinc and boron are included to offer, among other benefits, plant health and starch transfer from leaf to cob. Humates help to build soil microbial activity, which in turn will strengthen root development. They are particularly important for the uptake of water by the plant.

"It is not widely known, but maize has a higher demand for trace elements than potato crops, which are seen as a high demand crop. So the addition of trace elements and humates mean that this product delivers balanced nutrition to the plant and helps ensure rapid establishment and a good return on the investment in growing under plastic," adds Mr Robertson.

Plastic population: this maize has specific fertiliser requirements

Subsoil to prevent stunted maize growth

Maize is a deep rooting plant and so it is essential to remove any soil compaction in the ground to prevent stunted plants from depressing crop yields. For David Partridge and his son Clive of Ennerleigh Farm, near Tiverton, this problem is simply avoided by subsoiling the land early in spring using a Sward-Lifter, a piece of kit that was originally designed for use in grass swards.

"We took on some rented land and could tell the ground had received a hammering during recent years from heavy harvesting machinery," explains David. "In some areas of the field the growth of the maize plants was stunted and the resultant cobs were smaller.

"Tractors are a lot bigger these days and better able to go out onto land in the wet when previously we wouldn't have gone out. So there's a lot more compaction damage about."

The OPICO Sward Lifter had typically been purchased to improve areas of grassland where compaction was preventing water from draining away and resulting in wet areas in the fields. However, the Partridges' experience of poor maize crops prompted them to use the kit as part of their routine preparations for maize.

"Wherever we plan to drill maize, we always go through with the Sward-Lifter," says David. "First the residue from the previous crop – be it potatoes, cereals or grassland – is ploughed in. Then the Sward-Lifter is used to subsoil below the plough pan. The ground is then power harrowed, and the maize seed is drilled in early May.

"Subsoiling helps the plants get away faster, and ensures good solid cobs are produced. Plants sown in compacted ground do not start off well and certainly never catch up."

Although originally designed to subsoil grassland without damaging the sward, the kit can be used as a conventional subsoiler to break up the plough pan, working down to a maximum depth of 12 inches, according to OPICO's James Woolway.

"Subsoiling is routine for arable producers, but it is far less common on livestock units and rarely used in seedbed preparations for maize. Yet, due to the extensive root systems of maize plants, taking this 'arable' approach will ensure compaction is not a limiting factor to crop performance."

Digging deep: Clive Partridge shows the depth he routinely subsoils to using the OPICO Sward-Lifter

Early cob maturity and 'stay-young' forage maize

Early cobs coupled with later maturing plants can be a winning combination

Will Miller: "Harvest is a compromise between starch content and leaf digestibility"

Forage maize growers could get more from their crops, and produce better quality silage, by taking into account the maturity of the cob versus the stover, as well as the variety's whole plant maturity class, on the NIAB Descriptive List.

Growers have long been aware of the extended harvest window and easier clamping provided by 'stay-green' varieties where the stover has a slower dry-down relative to the cob. But Will Miller from Syngenta Seeds explains that for some varieties, with an early cob on a later plant, the advantages go beyond just harvest and clamping. "Energy content, one of the most important factors when growing maize, can be heavily influenced by the way a variety matures," he says.

Although starch is the primary contributor to the metabolisable energy value of maize silage, the digestibility of the leaves and stem that make up the stover is also very important. Good metabolisable energy content is achieved with a combination of starch content and digestible plant matter.

Unfortunately the two are opposing. As a maize cob matures it lays down more starch, but as the stover matures it becomes less digestible.

"Optimum harvest timing is a compromise between starch content, which gets higher the longer you leave it, and digestibility of the leaves and stem, which gets lower the longer you leave it," says Mr Miller.

By developing new varieties with an early cob, but a slightly later-maturing plant that maintains its digestibility for longer, the Syngenta Seeds breeding team has effectively reduced this compromise and in doing so has raised the overall metabolisable energy content at harvest.

The company calls this variety type 'stay-young' and it differs from pure 'stay-green' varieties. A stay-young variety's less mature stover contains more sugar and less lignin making the silage more digestible, increasing intakes and delivering more energy to the cow.

NK Bull is a prime example of a stay-young variety, with a cell wall digestibility of 60.2% together with a high starch content of 33.4% to give an outstanding overall metabolisable energy value at harvest. Syngenta Seeds has other stay-young varieties coming through its maize breeding programme, including the earlier-maturing variety Utopia, new on the 2011 NIAB Descriptive List.

"NK Bull's cob maturity is much earlier than its maturity classification suggests but because the plant doesn't senesce as fast as most varieties it has a lower whole plant dry matter when the trials are harvested, which makes it appear later. The many NK Bull growers around the UK recognise its true maturity, allowing them to access the high yields and excellent feed quality it offers," adds Mr Miller.

More milk from the same clamp space

Growing maize varieties bred with a high cell wall digestibility results in a crop with a higher energy content and enables more milk to be produced from the same clamp space. So says Limagrain's Tim Richmond, who explains that the extra 0.18MJ/kgDM of metabolisable energy in new variety Atrium, a 100-cow herd could produce another £2,700 worth of milk.

"There are two key factors to consider when selecting which maize varieties to grow," says Mr Richmond. "First is the conditions at the growing site – varieties need to be of a maturity class that will enable the cobs to have ripened sufficiently by harvest time. Having established whether varieties should be selected from the NIAB Favourable List or only from the Less Favourable List, the next consideration is yield potential – of both dry matter and energy.

"The metabolisable energy level in clamped maize is derived from the starch and fibre. To maximise the starch content of a crop, look for varieties with high starch yields on the NIAB List and always ensure cobs have matured before harvesting. The other factor that affects the resultant energy content of silage is the cell wall digestibility of the plant – the better the digestibility, the higher the energy from the fibre component.

"Good cell wall digestibility is one of the selection criteria in the LG breeding programme, and in the past few years a new breeding line has been discovered in which varieties exhibit this trait, in addition to high DM yields. One of the first of these varieties to reach the market is Atrium. "Atrium makes its debut on the 2011 NIAB list as a maturity class 6 for growing at favourable sites.

"It has an exceptionally high metabolisable energy content of 11.7 MJ/kgDM, which is also the highest energy content on the list – an extra 0.18 MJ/kgDM above the previous highest variety NK Bull. This means Atrium can deliver a significantly higher milk production potential.

"For example, making silage with an extra 0.18MJ/kgDM of energy and including it at 60% of the ration for a 100-cow herd milking for an average of 300 days of the year, and consuming average daily DM intakes of 20kg, provides an extra 65,000 MJ of energy. So there's potential for an extra 12,200 litres of milk to be made through feeding high energy Atrium silage – assuming 5.3MJ of energy is required to produce a litre of milk," he explains.

"Across the favourable List, the average ME is 11.2 MJ/kgDM – this difference of 0.5 MJ/kgDM is worth around 31,700 litres of milk, equivalent to around £7,000 of extra income.

"The main objectives for success are always to select a variety suitable for the growing conditions, and maximise DM yield by attention to variety selection and agronomy. However, by also paying attention to the overall ME potential, including that provided by cell wall digestibility, growers can ensure even greater returns from the clamp."

Maize clamp space: are you getting the most from yours?