

Milk quality: maize silage plays a key role in improving constituent yields. [Page 24](#)

Shredlage: harvesting technique can unlock the true potential of forage maize. [Page 26](#)





Growing and feeding quality forage increases milk constituent yield

# Maize drives milk returns

Producing top-quality milk to meet a constituent-based contract starts with growing and feeding the best quality forage, for one Cornwall-based producer. We find out how he meets challenging growing conditions head on to ensure that he sees a good return on his investment.

text **Phil Eades**

**M**aize is a key part of the diet fed to James Warren's 305-cow herd, not least because his focus is on producing high quality milk to exploit his new milk contract.

Based in Cornwall, close to coastal cliffs, he grows the crop in what he describes as 'pretty harsh conditions': "But by carefully selecting varieties we are able to produce a good quality feed, which is essential for feeding our all-year-round calving mixed breed herd and producing

top quality more for our constituent-based contract."

James, who is also chairman of the English Guernsey Cattle Society, farms at St Buryan, just five miles from Land's End, in partnership with his mother Rosemary. The herd comprises 105 Guernseys, 110 Jerseys and 90 Holsteins. "We started introducing black-and-white cattle a few years ago, because our milk contract, at the time, wasn't paying enough for the high milk fat and protein the Channel Island breeds were



James Warren (centre) with his daughter Sophia, ForFarmers' Louise Woolcott (left) and Matt Jenkin (right)

producing," he explains. "They increased litres and dilute constituents. But in April 2017 we moved to a constituent-based contract with Roddas and are now pushing for milk quality."

In November, milk sold averaged 5.28% butterfat and 3.72% protein, which meant that more than 25 pence of the 38.24ppl received was directly related to butterfat payments.

The Jerseys are currently averaging 6,750 litres, at 5.3% fat and 3.85% protein. The Guernseys are averaging

*Maize crop: Pinnacle is a new LGAN accredited variety and one of the highest starch yielders on the list*



7,000 litres at 4.92% and 3.73%, and the Holsteins are producing more than 10,000 litres, at 4.1% fat and 3.37% protein.

### Limited grazing

The herd is run as one milking group, along with a small fresh cow group. Dry cows are run as two groups. The cows are still grazed by day from early March until early November. At night they graze, but have access to a partial TMR in the yard. This is to support production and it is also offered because there is a limited grazing platform, with just 40 hectares accessible from the dairy buildings.

The herd is fed a single TMR, formulated by ForFarmers' Matt Jenkin. He says that the challenge is ensuring adequate energy intakes for the high-quality milk. "Producing such high-quality milk requires more energy per litre and we have to also address the reduced intakes of the Channel Island breeds," he explains. "High quality forage is essential and James has invested in good quality grass swards and taking four cuts of grass silage. The milking herd is fed predominantly on first cut.

"To achieve a consistent ration, he also feeds maize all year round, believing it is better to feed a bit less per day if this

means it can be fed every day. It accounts for around 30% of total forage intake." The milkers' ration comprises grass and maize silage, whole crop, fodder beet, potatoes, a bespoke blend, molasses, minerals and a protected fat. The maintenance-plus value of the diet is adjusted for the different breeds to reflect the milk quality and an 18% high starch compound is fed to yield in the parlour.

### Maize hectareage

Maize is an integral part of the system and James has been growing the crop for 15 years, starting with just six hectares but increasing to 45 hectares as he looks to feed more maize to more cows.

"We are not in a brilliant maize growing area, but we manage to achieve respectable fresh-weight yields of between 34.5 and 37 tonnes per hectare and, importantly, produce a high-quality feed," explains James.

"A large proportion of the crop is grown on rented land, usually rotated between potatoes and cauliflowers. There is a lot of competition for land, so we work closely with the vegetable producers and it works well. They appreciate the large amounts of slurry that we apply and the soil pH after vegetables is around 6.5, which is ideal for maize. He rents around

102 hectares for growing maize and we have several different soil types and growing conditions."

So variety selection is important to success and James works closely with ForFarmers' forage specialist Louise Woolacott.

"We opt for Group 9 maturity class, to avoid a late maturing crop," she says. "Then we focus on forage quality, looking to produce a crop at around 35% dry matter and 35% starch. We look closely at dry matter yield and the factors affecting quality, particularly starch content and cell wall digestibility. "While 100% of the starch in the cob is digestible, half the total energy is in the vegetative part of the plant. So it's also important to consider how much nutrition can be derived from the rest of the plant, which is indicated by cell wall digestibility. Cell walls make up a large part of the maize plant structure. So the higher the cell wall digestibility, the greater the availability of nutrients."

She adds that LG Ambition has been a consistent and reliable performer and this year James tried eight hectares of Pinnacle, a new LGAN accredited variety and one of the highest starch yielders, combined with high cell wall digestibility. "This means it provides an excellent balance of energy from both starch and digestible fibre, leading to high ME content in the silage."

### Later drilling

James doesn't expect to drill the crop early in the year and waits until soil conditions are suitable. Being close to the coast, the wind and exposure mean that he has to wait rather than going early.

Maize was drilled on May 8 in 2017, but it can be nearer the end of May. By delaying drilling he achieved good establishment and early growth, which set the crop up well. It was harvested on October 22 and the Pinnacle analysed well at 33.7% dry matter, 11.4MJ/kg DM ME, and 32% starch.

"It wasn't the best maize growing year, but the Pinnacle always looked good," says James. "It got away quickly and, despite the wet weather from July onwards, it matured well with full cobs. As for feeding out, it is complementing our grass silage well.

"Our focus is firmly on producing a constant supply of high quality milk, to make the best of our contract, and top-quality forage is certainly a major factor in how well we achieve this." |







*Shredlage maize differs from regular maize silage: on the left is standard chopped maize and on the right is a shredded crop*



Harvesting technique helps to unlock crop potential

# Shredlage makes more of maize

Interest in shredlage, forage maize that's harvested using a method that makes the plant more digestible, is growing in the UK. But is it something that you should consider when cutting your 2018 crop?

text **Rachael Porter & Diane Versteeg**

**W**ith improved forage analysis and better utilisation, and offering more milk and potentially more constituents, it's little wonder that interest in shredlage maize is growing. Positive reports from the US about increased milk production, on dairy units where shredlage was made and fed, initially fuelled interest in Europe. So much so, that ForFarmers and a Dutch agricultural machinery distributor, Kamps De Wild, set up a practical feed trial, at Dairy Academy Oenkerk, to investigate the effects of shredlage maize in dairy rations. And now the news and knowledge about this technique and what it can do has spread to the UK. Shredlage chopped maize is characterised by a stalk length of between 26mm and 30mm and pulverized grain. "A shredder crusher literally rubs the grain and stalks apart. The crop is shredded," says Kamps de Wild's manager Eite van der Veen. "And this creates more structure in the maize silage, which means that it requires less of 'scratch factor' ingredients such as straw when fed. For a 100-cow herd, using less or no straw in the TMR can save more than £3,500 per year.

Previous shredlage research had been carried out in the US and this was the basis for trial work in the Netherlands, according to ForFarmers' manager Bertho Boswerger.

In the US, the maize proportion of the ration is typically 70% and trials feeding shredlage saw a production increase of 1kg of milk per day. "We did not expect these results in our research because the proportion of maize fed in Dutch, and

indeed UK, dairy rations in much lower," he explains. "But there were also promising reports about improving animal health."

The Dutch work, carried out at the Dairy Academy Oenkerk between December 2016 and late February 2017, involved 83 cows split into two groups. Their ration remained the same, only the maize chopping method was different. One group was fed shredlage chopped maize for six weeks. The second group was fed the same ration for another six weeks. The groups were balanced, based on milk production, lactation stage and lactation number. No significant differences were found between the two groups for milk yield, kilogrammes or percentage of fat and protein production, rumen pH, or rumination score (see Table 1).

## Milk urea

The reduction of milk urea, from 20mg to 19mg per 100g of milk, was the only significant difference found between the two feeding regimes. "It's the result of the intensive processing of the maize

grains with shredding. Starch is available a little faster and this means that the balance between protein and carbohydrate is better in the rumen," says Mr Boswerger.

"The trial results met our expectations," adds Mr van der Veen. "We didn't anticipate that producers who feed shredlage maize would have to rush out and buy a larger bulk tank."

The reduction in milk urea can be an indication of better animal health. "The cow may not produce more milk, but she has the potential to milk for longer in the herd. And a healthier cow can increase her feed conversion efficiency. To know this for sure, more and longer-term research is needed."

He's certainly heard anecdotal evidence from producers feeding shredlage about improved cow health. "They tell me that feed intakes are higher and that they have fewer udder and lameness problems."

## Processing technique

He adds that, key to their success with shredlage, is attention to detail when harvesting and ensiling the crop. ForFarmers tested the density and temperature of conventionally chopped and shredlage chopped maize on 43 dairy units. "The highest and the lowest density crops were monitored at the point of ensiling. Careful rolling and compaction is vital to remove as much air as possible from the crop and pit. And using an additive is also advisable.

Table 1: Feeding trial results from Dairy Academy Oenkerk and Haus Riswick (Germany)

	Dairy Academy		Haus Riswick	
	conventional	shredlage	conventional	shredlage
milk (kg/day)	34.3	33.9	38.5	37.8
fat (%)	4.21	4.23	3.70	3.61
protein (%)	3.53	3.5	3.26	3.24
fat (g/day)	1.418	1.423	1.42	1.38
protein (g/day)	1.202	1.182	1.27	1.24
urea	20	19	21	19
rumination time (min./day)	531	521	544	653
rumen pH	6.28	6.31	5.84	6.19
time rumen pH <5.8 (min./day)	26	49	—	—



*Clamp management: careful filling and thorough consolidation are vital, and it's also advisable to use an additive*

According to Mr van der Veen, shredding maize also offers an advantage in pit stability. "Customers say that the sides of the pit are much more solid – the silage particles lock together better and this helps to reduce waste," he says.

### Contractor experience

Shropshire-based contractor Adam Richards says that all the maize he harvested in 2017 was cut as shredlage. "It was the first season I was able to offer it and uptake among my customers was 100%. I cut 570 hectares of maize all shredlage."

Mr Richards, who works in and around Market Drayton, says that he did make shredlage for one customer in 2016 as a demo. "I harvested half the crop as conventional chopped maize silage and the other as shredlage – with a chop length of 26mm. The producer was so pleased with the results – both the quality of the crop and the way it fed out – that all his maize was harvested as shredlage in 2017."

It does take more power, so he also upgraded to a larger Claas forage harvester in 2017.

"This has prevented power loss when the shredlage processing rollers are fitted to the machine and means that it takes the same time to harvest as conventional chopped maize. It does require more power and fuel, so we charge an extra £9.80 per hectare for harvesting shredlage. But I know that my customers will easily recoup that – and more – due to the quality of the resulting forage and the additional milk production potential."

"I've certainly had no quibbles from my customers – they're all happy with their maize silage and how it's

feeding out this winter. I know feeding shredlage means that you can reduce the amount of straw that's required in a TMR – if not remove it completely. And I think that all my customers will want shredlage again in 2018.

### Shredlage convert

Somerset-based producer Kayleigh Stowell says that her family's 250-cow Holstein herd is milking well on this year's winter TMR; the forage proportion of which comprises 60% shredlage and 40% grass silage. "In fact, our constituent levels have never been higher and milk yield is slightly up too. We know that's due to the maize shredlage," she says.

Maize has been grown and fed to the herd, based near Clevedon, for many years and, until 2017, it was always chopped at harvest. "But our contractor

*'Fluffier' crop: shredlage has more structure compared to standard chopped maize*



suggested we give shredlage a go when he turned up in October and we thought 'why not'. We'd heard a little about it and the benefits that it offered, in terms of unlocking more feed potential from the crop, through our nutritionist Matt Green," explains Miss Stowell. "My father was a little apprehensive at first, but once we began feeding it all doubts disappeared."

### Higher constituents

Average milk yield for the herd, which is housed and fed a TMR all year round, is more than 9,000 litres, with butterfat up at 4.38% and protein at 3.44%. "We've never seen fat and protein like that before. And there's been no sacrifice with yields either. So we'll definitely be opting for shredlage when harvest comes around again this year."

ForFarmers' nutritionist Matt Green says that the Stowells have also reduced the amount of straw fed in their herd's ration by 75%. "Some producers have removed it completely. That's certainly been a boon this winter with straw prices being particularly high at around £120 per tonne," he says.

"I was fascinated to see what the shredlage would look like," adds Miss Stowell. "It was much 'fluffier' than conventional chopped maize and, for a moment, it looked like we'd struggle to get it all in the clamp. But with good consolidation we got it all in. It did take a little more time to get it in the clamp, but again the payoff is worth the additional effort. And we'll definitely use an additive on it this year, so help prevent secondary fermentation, just because the silage has a more open structure. We had a little heating at the front of the pit, but that was poor management on our part. Despite that, it's certainly the best maize crop we've ever grown and fed." |