Six Steps Towards Consistently Better Silage

Cut to Clamp
A Volac initiative
Six-step plan towards consistently better grass silage

1. CUTTING – OPTIMISE YIELD AND QUALITY
   ✔ DO: Cut grass just before heading as it gives the best balance of yield and quality; after heading, digestibility falls by about 0.5%/day
   ✘ DON'T: Cut too low as the stem base has the lowest digestibility and you risk contaminating with ‘bad’ microbes, which could hinder fermentation and cause aerobic spoilage (heating)

2. WILTING – QUICKLY ACHIEVE THE RIGHT DRY MATTER
   ✔ DO: Wilt to 28-32% DM to reduce effluent and optimise fermentation
   ✔ DO: Wilt as quickly as possible as it minimises loss of sugar; use mower-conditioners and tedders to speed up wilting, but check machinery is not dragging in soil

3. HARVESTING – USING THE CORRECT CHOP LENGTH
   ✔ DO: Adjust chop length to crop DM – it is vital for good consolidation and fermentation
   
<table>
<thead>
<tr>
<th>GRASS DM%</th>
<th>EXAMPLE CHOP LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;30%</td>
<td>15-25mm*</td>
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<tr>
<td>20-30%</td>
<td>25-50mm</td>
</tr>
<tr>
<td>&lt;20%</td>
<td>Up to 100mm</td>
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   * If being fed as part of a high maize diet, this should be increased to ensure sufficient effective fibre in the diet.

4. TREATING – MAINTAIN CONTROL OF FERMENTATION
   ✔ DO: Look at additive results; as well as reducing DM losses, a quality bacterial additive can improve ME and D value and boost milk yield (by an average of 1.2 litres/cow/day in the case of lactobacillus plantarum MTD/11)
   ✘ DON'T: Leave preservation to chance; you don’t know if bacteria populations on grass are sufficient for an effective fermentation; used correctly, a quality additive will supply one million ‘good’ bacteria per gram of forage

5. CLAMPING – KEEP AIR OUT
   ✔ DO: Consolidate properly, especially the clamp edges; trapped air reduces fermentation quality and increases risk of aerobic spoilage; grass layers 150mm deep are the maximum which can be consolidated effectively
   ✔ DO: Sheet properly to exclude air, using side sheets, an oxygen barrier film and a top sheet, with generous sheet overlaps plus good weighting all over

6. FEEDING – KEEP CLAMPS CLEAN AND TIDY
   ✔ DO: Minimise air ingress at feedout by maintaining a tidy clamp face, moving across it quickly and avoiding cutting the top sheet back too far; however, don’t pull the top sheet down over the open face as it encourages aerobic spoilage
   ✘ DON'T: Allow mouldy silage to contaminate the clamp with ‘bad’ microbes as it reduces quality and intake

Would you like to know more about how Cut to Clamp could help you? Visit www.cuttoclamp.com
New initiative launched to help farmers produce better silage

With nine out of 10 dairy farmers rating better use of grass silage as extremely or very important in their goal to reduce bought-in feed costs, Volac has launched its new Cut to Clamp initiative to help. We explore its first three steps.

**1. CUTTING**

**Cutting grass at the correct stage is crucial, agree Mr Jones and Dr Davies. Although it is a challenge, with weather and contractor availability to wrestle with, it is essential to achieve the optimum balance of yield and quality. They point out:**

Mr Jones says: “As grass approaches heading, yield increases, but leave cutting too late and protein, digestibility and metabolisable energy decline. The optimum is cutting just before heading.”

Dr Davies agrees farmers often delay cutting to boost silage yield. But while this might produce a heavier crop, he says because its nutritional value will be lower, it will not have the same capability to support production of milk.

**Extra energy**

He says: “If you cut at 11.5 ME and you have 1,000 tonnes of silage, it is the equivalent of 300,000 MJ of energy extra compared to cutting at 10.5 ME. This is approximately equivalent to 60,000 litres of milk.”

“Yes, there will be a lower yield, but where you cut later, your losses are actually higher than in a lighter crop. So the yield difference is not as great as farmers think and the quality makes up for this difference.”

Also, a lot of farmers think the lower the cutting height, the higher the yield. “But if you cut higher, you are losing the base of the stem in the field which is the part with the lowest digestibility. So again you will improve overall quality by cutting higher.”

Mr Jones says cutting too low risks introducing soil microorganisms, such as Clostridia, into silage, increasing the risk of poor fermentation and reducing its feed value, or potentially contaminating with listeria.

**2. WILTING**

**Wilting to increase the percentage of dry matter reduces effluent. It also means silage stabilises at a higher dry matter, so less acid, hence sugar, will be required, as well as inhibiting spoilage bacteria, such as Clostridia, which falls out, but the crop has been photosynthesising for longer that day, but you probably have to wilt for 20 hours.**

“Over a 24 to 36-hour period, you can lose 6% of sugar which is huge, whereas if you cut in the morning, content might start off higher because of drier crops. However, too short a chop can also cause problems. As well as keeping knives sharp, ensure they are correctly adjusted according to the crop’s percentage DM.”

Mr Jones says: “I recommend you wilt grass to 28-32% DM, the target, he says. Dr Davies says: “The higher the sugar content the better. It is an indicator of good silage practice.”

“As soon as you have cut, sugars start declining because they are being used by the plant; because it is still living, and by undesirable bacteria. The aim should be to wilt as quickly as possible to 28-32% DM.”

“Many people wilt to a fixed window, but in good conditions the standard 24 hours could be too long.”

“If you cut in the afternoon, sugars will improve. However, against a background of unpredictability in milk price and bought-in feed costs, particularly with Brexit, becoming more self-sufficient in what you feed cows makes sound business sense.”

“During the process, you are looking to maximise the nutritional value of the grass you cut, but also to manage the first fermentation. This is precisely what Cut to Clamp is about.”

Independent silage consultant Dr David Davies says: “Feeding a high quality silage not only increases milk from forage, it can bring other benefits.”

In line with this, Mr Jones says Cut to Clamp divides silaging into six logical steps.

“Silage is produced when beneficial bacteria ferment sugars in grass to lactic acid when ‘pickled’ it to preserve nutrients.”

“Fermentation starts once the air in the clamp is used up, so the quicker you can achieve this the better.”

“A longer chop makes it more difficult to squeeze air out, particularly with dryer crops. However, too short a chop can also cause problems. As well as keeping knives sharp, ensure they are correctly adjusted according to the crop’s percentage DM.”

Mr Jones says: “Wilter is very important to help achieve this, the survey revealed some key shortfalls in silage-making techniques.”

**3. HARVESTING**

**When harvesting, optimum chop length is key, both experts agree, as it has a big impact on silage quality. Mr Jones says: “Fermentation starts once the air in the clamp is used up, so the quicker you can achieve this the better.”**

“A longer chop makes it more difficult to squeeze air out, particularly with dryer crops. However, too short a chop can also cause problems. As well as keeping knives sharp, ensure they are correctly adjusted according to the crop’s percentage DM.”

Mr Jones says: “Metering is always good at improving wilting speed of grass. However, if you have slower in the second the conditioner should be left as wide as possible because you can over-condition those crops.”

“Some farmers still refuse to spread because they think they are going to soil contamination, but if you do not spread, you will not hit the target DM.”

As a guide, Mr Jones says 1% of moisture is lost per hour of sunlight in bright conditions – greater if using metering-conditioning and tedding – however, tadders and rakes must be adjusted to avoid hitting the ground. Dr Davies says: “I recommend you check behind the machine that it is not dragging soil. If it is wet, look for concentric rings where the rake has scraped the soil. If it is dry, you are looking to avoid clouds of dust.”

**BENEFITS OF BETTER SILAGE**

- One of the most cost-effective ways to feed cows
- Reduced reliance on bought-in feed
- Improved returns from one of your farm’s main assets: your grass
- Reassurance of feeding wholesome, home-produced feed
- Hidden benefits from a more forage-based diet – for example, improved cow health and fertility and lower vet bills
Making better multi-cut silage with latest stepwise plan

As grass silage cutting dates edge earlier and more cuts are taken per season, Volac is adding new guidance to its six-step Cut to Clamp silage-making plan for producers taking this approach.

**Nutrition**
Dr Davies says: “The average dairy farm could improve income by thousands of pounds by making better silage. If you make better silage, you will get better nutrition from it.

"You would not graze high-producing cows on stemmy grass, so why make silage from it? To me, more silage cuts per year, or cutting intervals. From the obvious benefit of younger cut grass being more digestible, from being more leafy and less stemmy, and therefore having the potential to provide more metabolisable energy for milk production, Dr Davies says it also offers other advantages.

For a start, protein is likely to be higher, he says, and silage which is more digestible will not spend as long in the rumen, so cows can eat more of it, allowing forage intakes to improve.

Additionally, frequent cutting can give a better total grass yield over the season, he says. Anyone has a hidden benefit for milk yield could come from grass being at a more uniform growth stage when cut earlier, resulting in less variability in the clamp and, therefore, in the daily ration.

Mr Jones agrees, saying the latest updates to Cut to Clamp are designed to help producers make the most of these types of benefits.

He says: “Cut to Clamp was launched last year to help producers make constantly better silage.

“Since then, it has become apparent more people are going down the multi-cut route, so we have developed some updates for those preferring this approach.”

**THE AVERAGE DAIRY FARM COULD IMPROVE INCOME BY THOUSANDS OF POUNDS BY MAKING BETTER SILAGE**

Dr David Davies

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**One of the key points with multi-cut is that you are getting an efficiency of making more metabolisable energy for milk production, Dr Davies says.**

*For a start, protein is likely to be higher, he says, and silage which is more digestible will not spend as long in the rumen, so cows can eat more of it, allowing forage intakes to improve.*

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**Multi-cut: Example watch points**

- Ensure you do not over-silage lighter cuts
- Protein could be higher
- Sugar could be lower
- Stronger case for additive to improve fermentation
- May need to feed supplementary fibre
- May need longer chop to avoid clamp slippage

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For more information on Volac’s Cut to Clamp initiative, visit www.cuttoclamp.com
New initiative aims for maximum silage nutrients for milk

Continuing our exploration of Volac’s new Cut to Clamp initiative, which is aimed at helping producers insulate businesses against milk and feed price volatility by making consistently better silage, we examine the last three steps.

4. TREATING

If you are aiming for high quality silage, there is no question that using a silage additive can help significantly, says Dr Davies.

He says: “Do not think of a silage additive as solving all your management issues. It is there to improve fermentation and quality, but you still need to do your bit.

“There are lots of additives in the industry, so seek independent advice and ask for independent trial results to highlight animal performance benefits. You want to spend on an additive which will improve animal performance.”

Philip Jones echos this. He says: “By applying a proven additive at this stage, you are putting yourself in greater control of the fermentation process.

Dr David Davies agrees. He says: “By making high quality silage, more of the animal’s nutrient requirements will be fulfilled from silage.

“This will reduce costs of milk production, reduce concentrate input and maintain a healthier rumen, therefore reducing metabolic disease. All in all, it makes profitable milk production far more likely.”

To improve fermentation, you want to ensure maximum numbers of beneficial bacteria are present, such as Lactobacillus plantarum, which produce mainly lactic acid from the crop’s sugar, so the pH drops rapidly to inhibit growth of undesirable bacteria and moulds.

“Although fresh grass will contain some beneficial bacteria, they tend to be in low numbers and are not the best types for achieving a fast, efficient fermentation.

Beneficial bacteria

“A good inoculant should provide bacterial strains selected to be highly efficient at fermentation and can supply as many as one million beneficial bacteria per gram of forage treated when used correctly.

“However, do not just think of a silage additive as preserving forage. While the proven silage additive strain of Lactobacillus plantarum MTD1 has been shown to preserve dry matter, it also goes much further than that.

“Those are trials which show treating with MTD1 also improves silage metabolisable energy, digestibility, animal dry matter intake and, most importantly, leads to higher milk yield. Across a range of brassicas, milk yield was improved by an average 1.2 litres/day.”

5. CLAMPING

THE IDEAL FERMENTATION PROCESS

| Sugars in grass | Converted by beneficial bacteria in air-free conditions | Lactic acid | Brings about a fast, efficient fermentation with minimum dry matter losses, inhibiting undesirable bugs which could spoil the fermentation |

There are many actions which can improve silage quality in the clamp and at feedout, both experts agree.

Mr Jones says: “Begin with a clean clamp and repair any cracks.”

Additionally, Dr Davies highlights one of the biggest issues as being silage density. He says: “We are not consolidating because farmers are arriving at the clamp face too quickly.

“If you tip too much silage into the clamp it is in layers no more than 15cm deep, compact the layer and repeat. I know it is a challenge, but thin rolling only once is often enough to achieve a target density of 350kg of DM/ou mand.”

For machinery, Dr Davies advocates consolidation with a compacter rather than a tractor.

He says: “With a full width compacter, you are rolling the whole width of the clamp, not just individual wheel widths.

“Another thing we often see is clamp overfill. As soon as we fill allows the walls, silage density drops by 10%. If you go over the top of the walls, you should consider putting that silage into bales.”

Mr Jones says farmers should pay particular attention to consolidating clamp edges, which are more difficult to compress.

Once fully consolidated, it essential the clamp is sealed properly to prevent oxygen ingress during storage, he says. Dr Davies adds: “For this, we use side sheets as essential. Ideally, use oxygen barrier film for the top and the walls, with a minimum overlap of preferably 1.5m. This will give you a much better seal than standard sheets, although you will still need a standard sheet over the top of the film. Finish off with plenty of weight to maximise the density of the vulnerable top area.”

Dr Davies says another key area to get right is the clamp: “Too many farmers cut the silage sheet too short. We should ensure at least 500mm of extra silage sheet at the front with gravel bags all around the edge to seal carbon dioxide.

“If we allow carbon dioxide to fall out of the clamp, we create a vacuum, which sucks oxygen in. Ideally, every grass silage clamp should be sealed for a minimum of two months. During those two months, you reduce the yeast population which initiates aerobic spoilage and heating at feedout.”

6. FEEDING

WHEN it comes to feedout, cleanliness is everything. Mr Jones and Dr Davies say.

Dr Davies says: “I like to see a clamp you could eat your dinner off the floor in front of. In particular, mouldy silage in front leads to mould spores contaminating the exposed face, increasing the rate of aerobic spoilage.

“Spilled silage, whether due to a poor fermentation or aerobic spoilage, will upset rumen fermentation. Do everything you can to avoid producing it. It you have it, discard it.

“Too much of it ends up getting mixed in with the good silage and has a disproportionately large negative effect.”

To take silage out of the clamp, Mr Jones urges the use of a shear grab. He says: “This maintains a tidy, tight clamp face, which reduces air ingress, reducing risk of aerobic spoilage, causing loss of nutrients, reduced palatability and potentially production of mycotoxins.

“For the same reasons, move across the face quickly to reduce the time silage is exposed. Avoid pulling or cutting the top sheet back too far once the clamp is opened and keep the front edge of it weighted down.

“It is important to avoid pulling the sheet down over the clamp face itself during feedout. This is because it creates a microclimate, which encourages yeasts and moulds, increasing risk of spoilage and heating.

“Remember to scrutinise your silage analysis. It will tell you how good a job you did last season and help pinpoint ways this year’s silage production can be improved.”

Would you like to know more about how Cut to Clamp could help you? Visit www.cuttoclamp.com
On-farm consultations offer a route to better silage

With interest in more milk from forage, Volac is offering free consultations to help improve silage-making under its Cut to Clamp initiative.

1. Silage Analysis Interpretation
   - Nutrient quality: For a picture of what the animal can take from the silage nutritionally, based on factors such as digestibility, energy content, sugar and crude protein.
   - Keeping quality: For a picture of the efficiency of the preservation, based on factors such as fermentation quality and ammonia production, and others.

Nutrient quality
Mr Ward says: “If the silage scored low for digestibility, we would ask about quality of grass to begin with. “Is more regular reseeding needed? We would look at cutting date, because after heading, digestibility of grass falls by about 0.5%/day.

“Similarly, protein content of grass will decline as the season progresses, giving an indication of plant maturity when cut. Additionally, a breakdown product of protein, ammonia, gives a useful measure of keeping quality.”

Keeping quality
Explaining this, Mr Ward says a high ammonia content is an indicator of a poor fermentation, because protein has not been fully preserved.

“We want a high sugar content, as low sugar can be an indicator of a poor fermentation by the wrong type of bacteria. These produce the wrong acids, as well as carbon dioxide, from sugar, which wastes energy.

“We want to produce lactic acid to stabilise grass into silage. This uses less sugar and is more efficient. So, as well as plant, we look at proportions of lactic acid to less desirable acids, such as acetic, propionic or butyric.

“Good silage would have five times as much lactic acid as other acids. A bad-scoring silage could have a ratio as low as 1:1.”

2. Clamp Inspection
   - Tidiness/temperature: “We look at how uniform and tidy silage is in the clamp. An untidy silage face increases chance of air penetrating, resulting in wastage from aerobic spoilage, characterised by heating. We check the temperature at several points with a probe. “How tidy is the floor? It should be clean right up to the edge of silage to avoid contaminating the face with old silage.”

Colour, texture and smell
Visually, Mr Ward says colour will be checked, with olive green an indicator of good grass silage, while brown could mean a poor fermentation.

“We look at the amount of stem and leaf. You want mainly leaf, as stems are less digestible. Excess stem can mean cutting date was too late. You don’t want it to be small like vinager or sticky sweat, but have a nice, clean smell.”

Consolidation
To assess consolidation, Mr Ward says straight horizontal lines showing in the layers of silage are a good sign. Watery lines indicate uneven consolidation. “The degree of difficulty pushing the temperature probe into the silage also indicates how well it has been consolidated, while the shoulders, which are harder to consolidate, will be visually checked.”

Sheeting and sealing
Mr Ward says: “We check whether side sheets have been used, and check how many layers are on the top. Many farmers think they do not need side sheets in a concrete clamp, but porous concrete is not as good as plastic for keeping air out. “Ideally, we would look for an oxygen Bam films on top, with side sheets overlapping as far as possible over the top, then at least one black plastic sheet on top, and the whole thing properly weighted. “It’s important sheets are rolled back from the clamp face once opened to divert rain water from the top of the clamp from penetrating into the face.”

3. Silage Production Assessment
   - Willing: He says: “We review the full willing process. For example, has a tedder been used? Most moisture is lost through pores in grass leaves, the stomata, which can lose up to 100 litres of water per tonnes per hour. But they only stay open for two hours after cutting. Tedding within two hours of cutting gives better quality.”

Harvesting
Mr Ward says: “You need to use the right chop length for the stage of cutting and your target percentage DM, so you get the best consolidation in the clamp. “We consider harvest machinery was it a rapid foreign harvester, or a slower trailed harvester or foreign wagon? All these affect how long it takes to get the crop in the clamp.”

Improvements
“By conducting the consultation, Mr Ward says, it is possible to pinpoint areas for improvement by making next season’s silage, but it can also provide tips to get more from silage already in the clamp.

He says: “The more milk produced from silage and forage, the better.”

For more information on Volac’s Cut to Clamp initiative, visit www.cuttoclamp.com
The Ecosyl range of silage additives

Developed over a period of 30 years, the range is based on the high performance *Lactobacillus plantarum* strain MTD/1.

[Image of Ecosyl products]

www.cuttoclamp.com

Brought to you by Volac, producers of Ecosyl

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