Plan Your Silage Strategy

The old adage “fail to plan, plan to fail” always jumps to mind around silage time, but often the only planning is around fertiliser and how much to apply. However, are there more questions we need to ask ourselves?

1. What quality silage do I require?

Step 1 is to look at the categories of stock on the farm and assess what quality silage you want for each. The reality is that the only category on any farm that requires average quality silage is suckler cows that are in good body condition pre-calving.

All other categories require top quality silage to maximise performance, otherwise the feed value has to be made up with expensive concentrates.

Figure 1: What quality silage do you require?

2. How much silage do I require?

This is a simple fodder budget, however with climate change we do need to take into account a buffer for a long wet spring and also are you in an area prone to summer droughts?

My policy is to add in a month extra for the winter and a month for the summer, but each farm will have to look at their own situation. It may not be possible to build this whole reserve in one year, but a good attempt should be made, especially when concentrates are €400+ per tonne.

Fodder Required					
	A	B	C	D	
Animal Type	No. of Stock for Winter 2023/24	Number of Months, Including a 4-6 Week Reserve	Pit Silage Needed (tonnes/animal /month)	Total Tonnes of Silage Needed (AxBxC)	Tonnes dry matter (x20%)
Suckler Cows			1.4		
0-1 year old			0.7		
1-2 year old			1.3		
2+ year old			1.3		
Ewes			0.15		
Total tonnes needed				D =	D =

Figure 2: Complete a fodder budget, building in a buffer for winter and summer.

3. What factors will affect quality?

a. ***Heading date***

The biggest one we hear of is heading date and this is very true, looking at the diagram below we can see the DMD of silage at each stage of growth. As we said we want mostly 70-72%+ DMD silage, so we want our silage cut before the heading date. This can be influenced by the varieties of grass we sow. Late heading ryegrasses can be harvested approximately 8 days later than

intermediate heading varieties, giving more flexibility. However, you should ensure all the varieties in the mix are late varieties if you consistently cut your silage late May/early June.

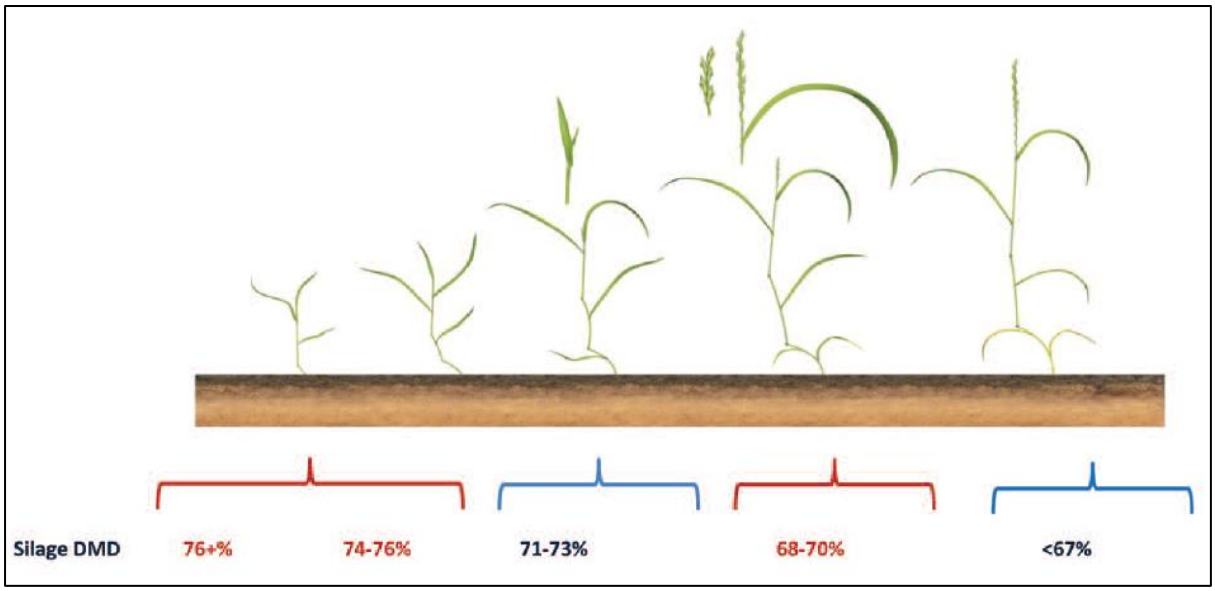


Figure 3: Stage of growth and DMD

b. ***Quantity v's quality - Soil fertility is key***

When asked, many farmers leave silage grow on longer thus getting poorer quality as they want to get bulk. To achieve both, you must have excellent soil fertility. As can be seen from Figure 4, if you are targeting a yield of 5t DM/ha or 9 bales to the acre (dependant on dry matter of the bale), if you have good soil fertility, ph >6.3, P&K indexes at 3 or higher, and apply correct fertiliser, you can reach your target yield by the 26th of May and have 72 DMD silage. On poor soil fertility, you will not reach the same yield for another 3 weeks when the DMD will be in the low 60's. Looking at it another way, swards on high fertility soils have earlier recovery and 3 weeks more growth for the second cut.

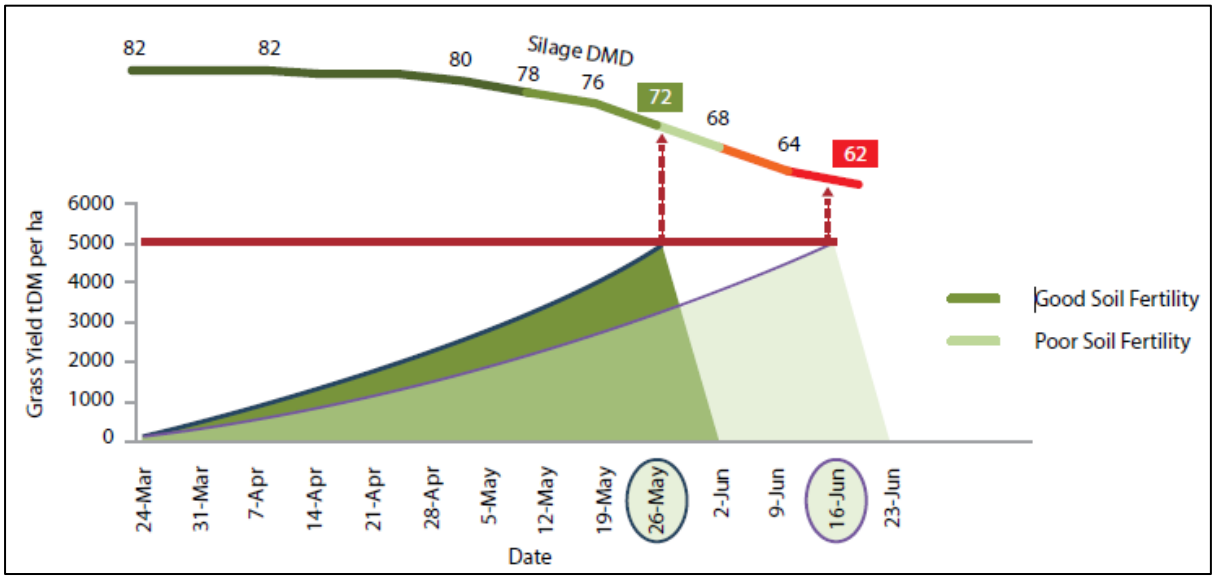


Figure 4: Soil fertility, date of cutting and DMD

Figure 4 also tells you if you want 76 DMD silage you will have to sacrifice quantity – cut on the 19th of May, get 4t DM/ha or 7 bales per acre, is this an option on your farm and if so what are the costs? Below shows two differing scenarios – you can use your own costs if you disagree with these, but looking at the silage made with 3,000 gallons of slurry, there is a €2 difference in the cost of the bale. Or to be more technical, if estimating 220kgs of DM in a bale, per Kg of DM there is a 1 cent difference in the cost.

Cost of making Silage

	9 Bales /Ac (5 t DM/Ha)		7 Bales/Ac (4 t DM/Ha)	
Operation	With Slurry	Without Slurry	With Slurry	Without Slurry
Fertiliser (€/bale)	€8	€21	€9	€27
Mow (€/bale)	€2.8	€2.8	€3.4	€3.4
Bale & Wrap (€/bale)	€10	€10	€10	€10
Plastic (€/bale)	€4	€4	€4	€4
Stacking Bales (€/bale)	€1.5	€1.5	€1.5	€1.5
Total Costs (€/bale)	**26**	**39**	**28**	**46**
	12 cent per kg DM		**13 cent per kg DM**	

Weanling on 72 DMD eats 1kg meal per day 120kgs in a winter, weanling on 65 DMD eats 2kgs 240kgs in a winter @€400/ton = €48 v's €96

- Contractor machinery charges (mowing €25/ac, baling €6/bale, wrapping €4/bale)
- Slurry valued at €44/1,000 gls (9-5-32)
- Pro-Urea +S - €700/t
- 13-6-20 - €755/t
- Plastic - €100/roll

- 2022 Pit Silage - ~€140/ac in the Pit
- With Slurry & Fertiliser = ~€232/ac
- Without Slurry (fert. only) = ~330/ac

**No land charges included

Figure 5: The cost of making silage

c. ***Lodging can cost 7 – 9% DMD***

It is very important with silage crops on good fertile soils and especially with reseeds that you take into account the nitrogen in slurry and what was applied for grazing, as excess nitrogen can cause heavy yielding crops to lodge.

Slurry applied in spring has between 6 and 9 units of available nitrogen per 1,000 gallons. A rule of thumb is to allow 25% of the nitrogen applied for grazing to be available for silage.

Say 20 units of Nitrogen was applied on the 14th of February and 2,500 gallons of slurry was applied the 25th March, reduce the nitrogen applied to silage by ~ 15 units per acre (5 + 10).

Watch the crop from late April, contact the contractor and have them ready to go as soon as weather allows.

d. <u>Dead Butt (not grazed) reduces DMD by 6-7%.</u>

This spring has been particularly tricky for grazing, leaving many farms with grazed and non-grazed silage fields. This will make decisions around cutting a little more complicated this year; you may have to amend fertiliser allowances and cut silage fields at different times with differing yields to avoid that dead butt and a huge cut to your DMD.

Un-grazed fields – Perhaps have covers >2,500 Kg DM/ha. Do you apply 40 -50 units of nitrogen and cut the first week of May? You don't want to have a dead butt, but you have to balance this with a very low yield. Remember our rule of thumb is grass silage takes up 2 units Nitrogen per day, so apply 40 units and cut in 20 days. Then get your slurry out onto these fields ASAP and close for a good second cut.

Grazed fields – Perhaps it is late for slurry and silage fields have too much of a cover. Now you need to apply P&K in a chemical form instead of 2,500 – 3,000 gallons of slurry per acre. Do you apply 2 – 3 bags of 13-6-20 and 1-1.5 bags of pro-urea? Make sure to get your 12 - 15 units of sulphur per acre applied. Teagasc trials have shown a 39% increase in yield on light soils and a 23% increase in yield on heavy soils where sulphur deficiencies occurred.

Figure 6: Causes of DMD losses in silage

e. ***Bad preservation can reduce DMD by 2-3%***

We are seeing more and more mould on bales and in silage pits. Perhaps this is due to the finer weather at cutting and bales are too well wilted, not chopped and the bales are not compact enough. It could be down to poor quality silage wrap and not enough of it or it could be the pit is not sealed properly. Below is a list of points to observe around harvest.

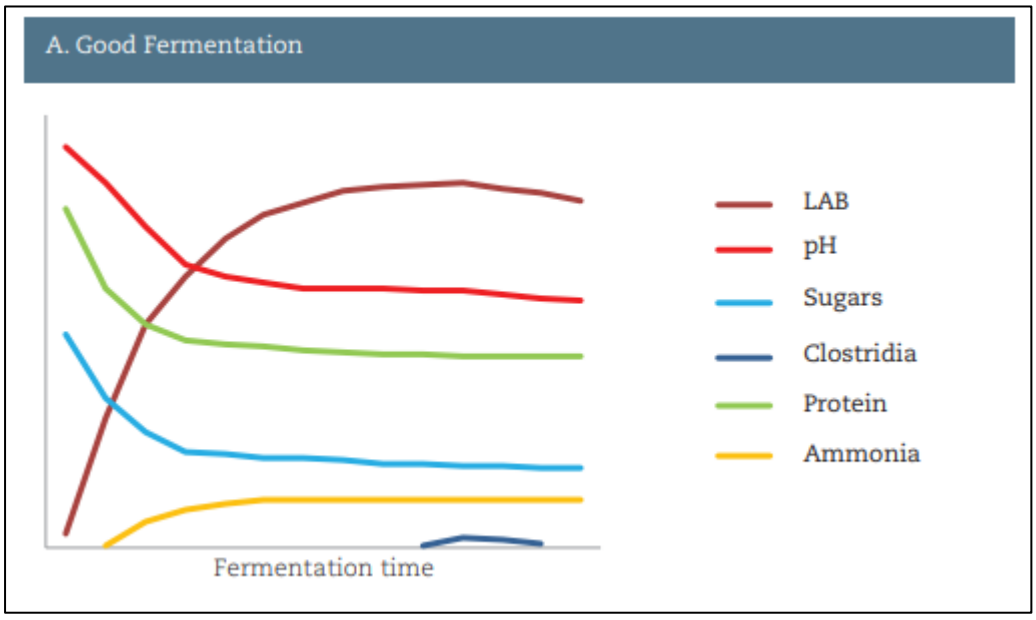
- ***Check sugars and nitrates***

When ensiling silage the aim is to get the bacteria in the silage to convert the sugars available as quickly as possible to lactic acid to drop the pH of the silage to around 4, this is where the silage is stable. The higher the sugar content, the more food for the bacteria and the quicker the pH drops. The target sugar content to ensure good fermentation is 3% or higher and this is measured in Teagasc offices using a refractometer.

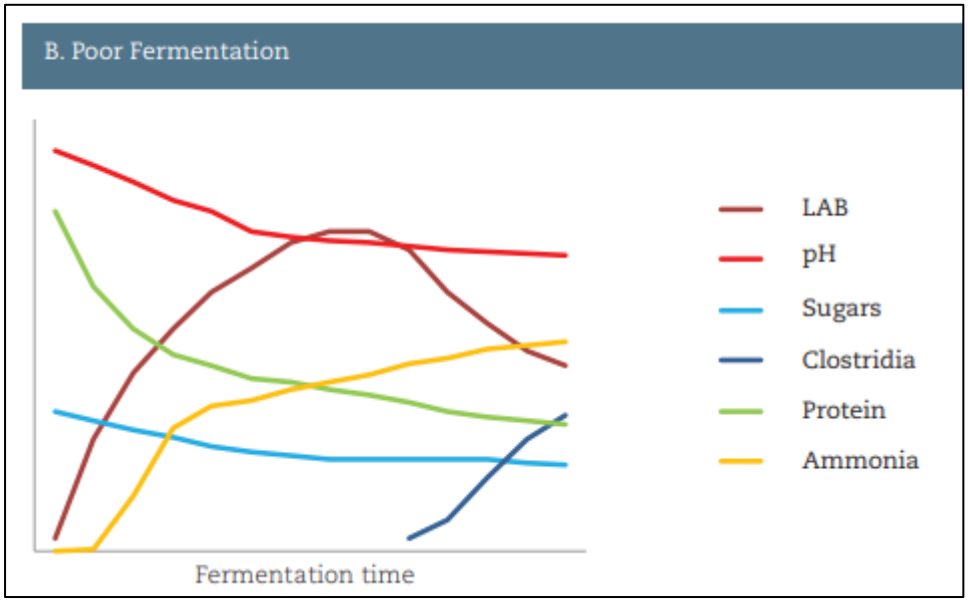
On the flip side high nitrate levels in grass are bad as they increase the buffering capacity, making it more difficult to get the pH level down. As a rule of thumb, as grass grows it uses 2 units of Nitrogen per day, so if you applied 100 units per acre, it will take on average 50 days for this fertiliser to be used up. However, this is dependent on how fast grass is growing, which in turn is dependent on many factors such as, is it old or new pasture, what is the soil fertility, is the weather cold, or too dry etc. To know for sure, get the nitrate level tested using test strips and this will give you a very good indication of where the nitrate level is. If your nitrate test reading is high, the most likely cause is that not enough time has elapsed from the spreading date.

- ***Exclude all air from the pit/bale***

Anaerobic conditions are essential for initial fermentation and to prevent subsequent spoilage. Fill the silo quickly and roll well to exclude air. Chop length of 1.0 to 1.2cmpromotes good compaction. Cover with 2x0.125 mm polythene sheets. Use vertical sheets along silo walls. Check for 3-4 days to ensure seal remains intact as the pit settles. Prevent bird damage.



Fermentation begins after oxygen in the pit is depleted during the initial aerobic ensilage phase. Under good conditions, lactic acid bacteria (LAB), which are present on the grass, multiply rapidly and convert available sugars to lactic acid. This causes pH to decline quickly- the optimum end point depends on silage dry matter. Some nutrient losses and protein degradation to ammonia occur during this phase, however once target pH is reached, a clean forage with good intake potential is the result. The nutrient value of this silage is preserved until re-exposure to air at feed-out.



In contrast, a poor silage fermentation occurs where one or more of the necessary conditions (high sugars, low buffering capacity, air-free conditions) is not met. In the example shown, low initial available sugars restricts the growth of LAB, causing an insufficient drop in pH. This allows clostridia bacteria, also present on the crop but increased with soil contamination, to begin a secondary fermentation. Ammonia levels rise as protein is broken down. Clostridia bacteria convert residual sugars, lactic acid and protein to butyric acid, which results in a dark, foul-smelling silage with low feed value and poor intake characteristics.

- ***Be careful with wilting time***

The change to grass dry matter content due to wilting is affected by the duration of wilt and mechanical treatment of the sward. Dry matter of grass cut into large rows will change little in a 48 hour period. Tedded swaths wilted for >24 hours may become excessively dry. Pit silage DM over 33% will not improve animal performance and may have poor aerobic stability at feed out.

Wilting Hours			
DM% of crop	0	24	48
6 metres per row	17	19	23
3 metres per row	17	23	31
Tedded Out	17	30	50

Figure 7: The effects of wilting

Plan Your Silage Strategy

Tips for Making Round Quality Bale Silage

• Mow when dew has evaporated and wilt to a target of 30 to 35% DM

• The aim is for dense, well-shaped bales with over 220kg DM per bale. Baler choppers increase DM per bale by 10-15%

• Use a slow tractor speed to produce well-packed bales. Adjust the baler density setting to a high/maximum position

• Avoid rough handling of unwrapped bales as this can cause them to lose shape. A bale lifter is preferable to a spike for transport

• Use a recommended plastic wrap sourced from a reputable supplier

• At least 4 layers of plastic are required for adequate preservation. Under good management conditions the benefits of 6 layers is small

• If bales are to be stored for a prolonged period (9 months+) then 6 layers are advised

• Ideally transport bales to final storage area before wrapping. Damage to wrap during transport is a significant source of DM loss

• Bales made from low DM or very leafy grass will lose shape when stacked, increasing spoilage losses. Store on ground level instead

• Check for damage and repair plastic on a regular basis

• Aim to have bales consumed within 2 days at feed-out. Do not feed mouldy bales or parts of bales to livestock

---

This tech note was produced by Martina Harrington, FutureBeef Programme Manager, Teagasc.