

BETTERRETURNS



Making grass silage for Better Returns

Growing good grass

- The starting point for growing good grass is ensuring you have good soil structure and fertility
- Soil test - than 30% of beef and sheep farmers soil test

Selecting the right type of grass:

	Specialist silage leys (1–3 years)	Medium-term cutting and grazing leys (2–4 years)	Long-term cutting and grazing leys (5+ years)
Perennial ryegrass (diploid)	X	✓	✓
Perennial ryegrass (tetraploid ^a)	✓	✓	X
Italian ryegrass	✓	X	X
Hybrid ^b ryegrass	✓	✓	X
White clover (small leaf)	X	✓	✓
White clover (medium leaf)	✓	✓	✓
White clover (large leaf)	✓	✓	X
Red clover	✓	✓	X

Nutrients for silage

Applying inorganic fertilisers can boost the nutrient status of grassland.

- **Acidity** – if the pH falls below the ideal of 6.0-6.5 then yields will be reduced
- **Phosphate and potash** – fields regularly cut for silage have higher requirements of phosphate and potash
- **Sulphur** – sulphur deficiency is common in grassland. Indicated by poor growth and a yellow tinge to the leaves. Apply a sulphur containing fertiliser
- **Nitrogen** – nitrogen application needs careful consideration as too much produces grass with low sugar and too little compromises yield

Bales or clamp?

- Dependent on system
- A combination of both is often beneficial

	Advantages	Disadvantages
Clamp	<ul style="list-style-type: none"> • Good for harvesting large areas • Easier and quicker feed out • Good for TMR 	<ul style="list-style-type: none"> • Need investment in infrastructure, ability to collect effluent, labour and expertise • DM losses can be higher for clamp systems
Bales	<ul style="list-style-type: none"> • Good for harvesting small areas • Much more flexible • DM losses can be lower than clamp systems 	<ul style="list-style-type: none"> • Need to dispose of plastic waste appropriately

The ensiling process

Silage making preserves grass in the lactic acid that is produced by bacteria on the crop. These allow fermentation which maintains nutrient content.

- Wilting – as soon as the crop is cut, plant respiration can cause the grass to lose nutrients. Rapid wilting and ensiling minimizes these losses
- Sugar – crop needs an adequate sugar content
- pH – the required pH drop will depend on the DM of the crop: low DM silages need a greater drop than higher DM silages

Well-fermented silage has a fruity smell and should look bright.

The ensiling process



What happens when it goes wrong?

- Listeriosis – bacteria from soil that can be picked up in the crop and survive with a very small amount of oxygen. Affects cattle and sheep. Can be fatal
- Botulism – a toxin likely to be from a dead animal ensiled in the forage. Despite fermentation this will survive and kill livestock

Making good silage

Cutting date – has a significant impact on yield and quality. Optimum cutting date is influenced by stock the silage will be fed to.

Moisture content – reducing moisture content by wilting saves carrying water and reduces effluent.

The target DM should be:

- 28–32 per cent for clamp silage
- 35–45 per cent for bales of silage

Table 4. Targets for silage quality

	Good	Moderate	Low
D-value	0	65	60
% of ear emergence	25	50	100
Energy ME (MJ/kg DM)	11.5	10.5	9.5
Crude protein content %	16	12	10
Feed to	Finishing stock, ewes carrying multiples	Growing cattle, autumn-calving suckler cows, ewes carrying singles	Dry stock, spring-calving suckler cows

Key: D-value = measure of feed digestibility

Making good silage



Good practice for when silage is in the field:

- Mow after the dew has dried off. Sugar levels are higher in the afternoon. A rapid wilt concentrates sugars
- A conditioner on the mower splits the grass so there is a larger area for water loss
- Leave a stubble of 5cm to allow air movement beneath grass
- Spread the crop quickly and over a wide area to aid water loss
- Ensure tedders and rakes are at correct height so they don't pick up soil or manure
- Wilt as rapidly as possible for a maximum of 24 hours
- Row up into even 'box-shaped' swaths before pick up or baling

Making good silage



Chop length – chopping as picking up or baled results in more efficient fermentation as more sugars are released and oxygen trapped. Chopped silage breaks down rapidly in the rumen and is easier to consolidate.

Additives – additives cannot make a bad grass crop into good silage but can improve fermentation and animal performance if used effectively on a good grass crop. Generally applied when the grass is picked up or baled.

Making good silage bales

- Baled silage can be wilted to 35-45 per cent DM. Drier crops are lighter but more prone to moulds and used less efficiently by livestock
- Bales can be round or rectangular

Baling

- Maintain baler
- Aim for dense and well-shaped bales
- Use net wrap to cover the edge of bale by 2-5cm to remove lumps and bumps

Wrapping

- Maintain wrapper
- Wrap bales as quickly as possible and move to store site within 12 hours of baling
- Use high quality film, 55-70% pre-stretching
- 6 layers of wrap
- Handle carefully

Stacking

- Ensure site is level
- Follow HSE guidance on stacking bales
- Stack more than 10m from watercourses
- Place best bales within stack as they retain quality better
- Net and bait stack to prevent bird and rodent damage

Making good clamp silage

Preparing the clamp

- Remove old, mouldy or rotting silage and clean clamp
- Use a side sheet to ensure silo walls are airtight
- Check there is adequate effluent drainage

Clamp filling

- Fill quickly, spread evenly and consolidate well
- Pressure from tractor wheels only exerted down to 20cm depth so fill in layers
- Sheet down overnight if silaging for more than a day
- Clean tractor tyres to prevent contamination
- Do not over fill
- Aim for 250kgDM/m³ or 750kg FM/m³

Clamp sealing

- Seal as soon as consolidation is complete
- Cover with 2 sheets of plastic
- Place tyres or bales on top
- Ensure sheet is not punctured. Protect from birds with netting
- Ensure they are waterproof if outside

Managing clamp effluent

- Effluent must be collected
- Most effluent produced in first 10 days
- Clamps should have a storage capacity for at least 2 days at peak flow
- Can be spread onto land but should be diluted 1:1 with water
- In a NVZ effluent is treated as organic manure

Silage analysis

Use an independent laboratory to analyse silage quality before planning rations. Basic indications can be carried out on farm.

Table 7. Estimation of metabolisable energy (ME) content of different stages of a ryegrass crop

Leaf and stem content	ME (MJ/kg DM)
Very leafy – no stem visible	12
Leafy – some stem present	11
Leafy with some flowering stems	10
Moderately leafy with large numbers of flowering stems	9
Stemmy – grasses at flowering stage	8
Stemmy – grasses at post flowering stage	7

Dry matter (DM)

Take a handful of silage, compress tightly for 30 seconds then release and note the effect on the ball.

Metabolisable energy (ME)

In ryegrass-based swards, energy can be estimated by the leaf and stem content.

Acidity (pH)

All silages can be measured with pH (litmus) paper. Put 10g in 90ml water in a polythene bag, mash gently and dip litmus paper into liquid.

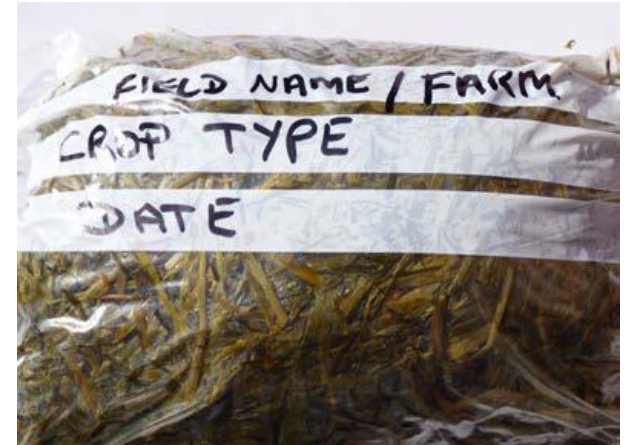
Table 6. Effluent released from silage of differing DM

Amount of squeezing	DM %
Juice easily expressed by hand	<20
Juice expressed with some difficulty	20–25
Little or no juice expressed but hands moist	>25
"Ball" shape	DM %
Ball retains its shape and some free juice expressed	<25
Ball retains its shape but no free juice is expressed	28–32
Ball slowly falls apart	32–40
Ball rapidly falls apart	>40

Silage analysis

Taking silage samples

- Wait until 6 weeks after harvest
- Take several cores across the clamp at least 1.5m deep or five from bales of the same batch to get a fair representation
- Pack into a polythene bag and squeeze the air out before sealing tightly
- Send to the lab early in the week
- Give the lab as much information as possible eg grass only, red clover, white clover etc



Making up a forage shortfall

- If planning early enough, sow a brassica crop
- Reduce stock numbers or out winter stock
- Find alternative forage sources such as standing maize
- Consider straw and concentrates or liquid feeds
- Plant a grass catch crop to allow early spring turnout
- Check weighing scales on mixer/feeder wagons are accurate
- Buy in additional feeds – take full loads and compare prices
- Reduce avoidable losses – in the field at harvest, in the clamp, in effluent and feeding out
- Clamp management – avoid aerobic spoilage - only expose silage needed, use narrow clamps and a shear grab
- Managing feeding – ensure there is no wastage caused by feeding methods



Calculating feed requirements and costs



Calculating winter feed requirements

Work out how much forage is available and then estimate how much is needed to feed the animals through the winter. Fresh weight (FW) does not reflect the nutrient status of a feed so focus on DM requirements and availability.

Calculating costs

It is important to calculate the cost of producing silage to know whether cheaper alternatives can be bought in or whether to grow different crops. There are 3 steps to calculating the cost of silage.

Instructions on how to calculate feed requirements and costs of producing silage this can be found in AHDB manual **Growing grass silage for Better Returns.**