



GARDINER
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QUALITY PASTURE SILAGE

FIVE EASY STEPS

Acknowledgements

Gardiner Dairy Foundation invests for a strong, prosperous and sustainable dairy industry. As an independent and flexible supporter of the Victorian dairy industry, we moved quickly to contribute funding towards the state-wide, collaborative industry response to the drop in milk price in April 2016. Part of our \$1.3 million commitment to that response is to proudly fund this roll-out of this Quality pasture silage – Five easy steps. We believe that maximising the performance of a farm's feedbase underpins farm business profitability, which in turn, underpins the entire \$13 billion industry. Portions of this booklet have been adapted from the TopFodder Successful Silage manual.

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INTRODUCTION

Making and feeding high quality silage with lower fibre levels encourages higher feed intakes and better cow performance. This booklet highlights five easy steps for making high quality temperate pasture silage. This booklet complements the *Ryegrass – spring grazing management, paddock guide*.

MAKING HIGH QUALITY SILAGE

Cut pastures early

Wilt quickly and harvest
as soon as possible

Compact forage as
densely as possible

Seal quickly and well to exclude air

Repair holes immediately
using specific silage tape.

CUT EARLY IN THE SEASON

For maximum silage quality, cut pastures when they are at or near canopy closure. This is also the optimum stage of growth for grazing in spring.

Providing pasture is at or only slightly past grazing height, and harvested in good weather conditions, milk production will be only marginally less than if the same pasture had been grazed by the cows. Wilting rate of the mown pasture has a big impact on silage quality. The time of day that pasture is cut impacts on the wilting rate.

The following should be considered when deciding on mowing time to aid rapid drying but to avoid overdrying:

- Mow after dew has lifted.
- Match mowing and harvesting operations so mown material is not left unharvested for lengthy periods.
- Reduce wilting periods for forages, such as legumes and young, leafy plants.

- Delay mowing until mid to late afternoon to reduce the risk of overdrying the forage during hot, dry and windy weather.
- Stagger mowing and narrow the swath width if there is a real risk of over-drying.

Figure 1 Cut pastures early



Figure 2 Mowing



WILT AND HARVEST QUICKLY

Have the forage in the pit or bale within 24–48 hours, if possible.

Wilt rapidly to reduce potential dry matter and quality losses. Several strategies that can increase wilting rates:

- Mow crops at canopy closure (lighter crops with more leaf and less stem).
- Use a mower-conditioner with flail or tynes.
- Follow the mower with a tedder to spread the forage. Ted within 0.5–2 hours after mowing while plant stomata are still open, if possible, to substantially increase rate of wilting.
- Leave the swath of the conditioned forage as wide as possible (moisture evaporates quicker from thin, wide swaths).
- Do not over wilt – field losses increase and silage is harder to compact.
- Additives are available to improve fermentation if wilting conditions are poor.
- Inoculants may also improve silage quality and animal production.

Figure 3 Tedder



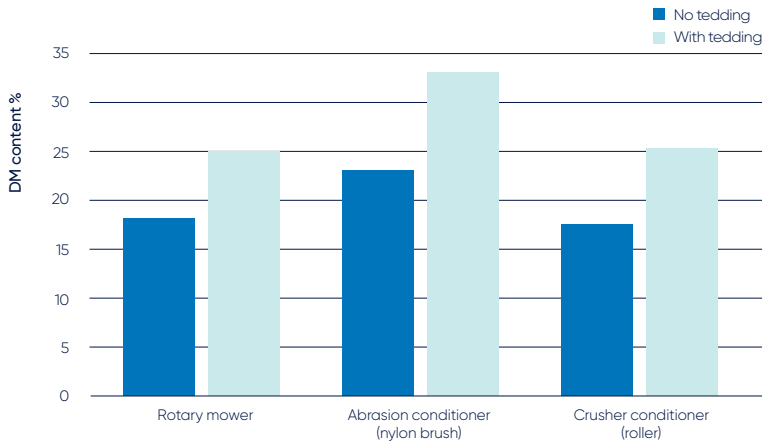
Figure 4 Tyned mower conditioner



TARGET DRY MATTER (DM)

- baled silage 40– 50% • pit silage 32–38%

Figure 5 Effect of drying treatments on dry matter content of pastures



Source: Wilkinson (1995)

Use Table 2 and 3 (page 16 and 18) to identify exact target DM for your crop.

THE 'HAND SQUEEZE' METHOD FOR ESTIMATING DRY MATTER

Hand squeezing is a quick and easy method to use in the field to estimate dry matter and is more accurate than 'wringing' a handful of unchopped grass.

- 1 Collect representative samples of the forage.
- 2 Mix the samples thoroughly and take a subsample.
- 3 Cut the forage into 1–2 cm lengths.
- 4 Tightly squeeze a handful into a ball for about 30 seconds.
- 5 Quickly open hand.
- 6 Estimate DM content from Table 1 (below).



Table 1 Estimation of dry matter content from the hand squeeze method

DM content	Condition of the sample
Below 25%	Free moisture runs through fingers as material is being squeezed. When pressure is released the ball of chopped forage holds its shape. A lot of free moisture is present on hand.
25%–30%	Ball just holds its shape. No free moisture expressed. Hand moist.
30%–40%	Ball falls apart slowly. No free moisture. Little or no moisture on hand.
Over 40%	Ball springs apart quickly.

COMPACT STACKS AND MAKE BALES AS DENSE AS POSSIBLE

The better the compaction, the less air will be trapped in the stack or bale resulting in a higher quality silage.

For bulk stacks:

- chop material short (10–30mm)
- spread the forage thinly (150mm) to ensure thorough compaction
- roll slowly to allow the tractor weight to compact the forage.

For baled silage:

set bale density as dense as possible on the baler

slower baling will increase bale density

chopping balers (knives) can increase density by 8–15 per cent

ensure feedout equipment can handle shorter chopped bale silage.



Figure 6 Wrapped silage bales



Compacting
Stacks and bales

SEAL AIRTIGHT AS SOON AS POSSIBLE AFTER HARVESTING

Seal stacks, don't just cover them

- Finish rolling immediately after harvest is completed. Avoid rolling the next morning as this just 'pumps' more oxygen into the stack. Rolling should keep up with forage delivery from the paddock.
- Seal pits or stacks as soon as harvest is complete.
 - If leaving overnight minimise air getting into the stack by placing plastic on the stack and weighing down the edges.
 - Finish weighing down the stack next morning and ensure seals are airtight.
- For an airtight seal use gravel bags, filled with pea gravel or washed sand along bunker walls and stack surface. Even a double row of tyres around the perimeter does not achieve an airtight seal.

Figure 7 Sealing stacks with bags





For baled silage:

- Apply at least four layers of film to individually wrapped bales.
- Apply six layers if:
 - placing on stiff stubble, e.g. cereal
 - for wrapping stalky crops e.g. lucerne
 - transporting
 - wishing to store for up to two years.
- Apply at least six layers on continuous in-line wrapped bales.
- Minimise damage to stretch wrap by wrapping at the storage site or use specialist equipment to transport bales to storage.
- If a white/grey mould is present in your silage, air has been or is present and should be prevented in future.

REPAIR HOLES IMMEDIATELY USING SPECIFIC SILAGE PATCHING TAPE

Maintain silage quality by repairing holes as soon as possible.

- Ensure the area to be patched is clean and dry.
- Use specific silage repair tape of similar colour to the holed plastic. This minimises the difference in contracting and expanding in hot/cool conditions and stops the seal leaking.
- Cut tape to length before applying.

Figure 8 Silage bales



Figure 9 Maintain quality by repairing holes with silage tape of the same colour



RESOURCES

Table 2 Production potential, management requirements and suitability of pasture and forage crops for silage production

Crop	Perennial ryegrass and clover	Forage ryegrass	Other temperate perennial grasses and clover	Pasture legumes & legume dominant pastures ¹	Lucerne	Kikuyu & other tropical grasses	Forage sorghum	Millet (several types)
Growth stage at harvest	Canopy closure 1 st head emerge on ryegrass	10–20% head emergence	Stem elongation of grass component	Early to mid flowering	Very early (<10% flower)	25–35 days growth	1 m high	Pennisetums: 1m high Japanese pre-boot
Potential yield ² (t DM/ha/cut)	2.5–4.0	2.5–4.5	2.0–4.0	2.0–3.5	1.5–3.2	2.0–3.5	2.0–5.0	2.0–5.0
Potential number of cuts per year ²	1–2	1–2	1	1–2	4–7	1–3	1–4	1–3
Wilting requirement	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



Target range								
DM content (%)								
– Chopped	30–40	30–40	30–40	35–40	35–40	35–40	30–40	30–40
– Baled	35–50	35–50	35–50	35–50	35–50	35–50	35–50	35–50
ME ³ (MJ/kg DM)	9.5–11	9.5–11	9.5–10.5	9.5–11.5	9–10.5	8.5–10	9–9.5	9–10
Crude protein ³ (% DM)	12–22	12–20	12–16	14–26	18–24	12–18	7–17	10–18
Ensilability ⁴	**	**	**	*	*	*	**	**
Suitable for chopped bulk silage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Suitable for baled silage	Yes	Yes	Yes	Yes	Yes	Yes	Yes ⁵	Yes ⁵

Notes

- High density legumes have potential to produce higher yields (3.5–7.0 t/ha) than pasture legumes sown at the usual rates. Management requirements for silage production and potential for forage quality shown here are for pasture legumes.
- Yields and potential number of cuts are for crops cut at the optimum growth stage. Yields at the higher end of the range can be obtained with irrigated crops or crops grown under ideal growing conditions.
- The ME (metabolisable energy) and crude protein values shown are in the range that is achievable with good management.
- Ensilability: likelihood of achieving a good silage fermentation without wilting or additives (*Low **Medium ***High).
- Baling is not recommended for tall, rank crops unless the baler is fitted with knives.

Source: *TopFodder Silage Note no. 4*

Table 3 Yield and quality potential of crops grown for silage production, identifying requirements to ensure quality silage

Crop characteristics	Maize	Oats	Wheat & barley	Whole crop winter cereal/legume mixtures	Grain sorghum	Sweet sorghum
Growth stage at harvest	Milk line score 2–3	Boot to flowering	Boot or mid dough	Boot to dough of cereal component	Milky dough (middle of head)	Head emergence to dough
Potential yield ¹ (t DM/ha/cut)	12–25	5–15		5–15	4–10	10–25
Potential number of cuts per year ²	1	1		1	1	1
Wilting requirements	no	Boot yes/dough no		Yes	no	no
Target range DM content (%)						
– Chopped	33–38	35–40		35–40	30–35	25–35
– Baled	NR	35–50		35–50	NR	NR



ME2 (MJ/kg DM)	10–11		9–10.5	9.5–11	9.5–10.5	9–10
Crude protein ² (% DM)	4.5–8.5		6–16	8–18	6–9.5	4–8
Ensilability ³	***		Boot**/dough***	**	***	***
Suitable for chopped bulk silage	yes	yes	yes	yes	yes	yes
Suitable for baled silage	no	yes	no	yes	no	no

Notes

- 1 Yields at the higher end of the range can be obtained with irrigated crops or crops grown under ideal growing conditions.
- 2 These ME (metabolisable energy) and crude protein levels are achievable with good management.
- 3 Ensilability is the likelihood of achieving a good silage fermentation without wilting or additives (*Low **Medium or ***High).

Source: *TopFodder Silage Note no. 4*



FURTHER SUPPORT

For more support on grazing management contact your RDP



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