

Selecting pastures and crops for silage production

SILAGE NOTE NO. 4

Silage can be produced either from crops grown specifically to harvest as silage, or from pastures or forage crops when there is a genuine surplus of forage that cannot be grazed.

Selecting the most suitable pasture or crop for silage production is dictated by both climatic and agronomic constraints and by the silage system to be used, e.g. maize and grain sorghum crops are not recommended for baled silage.

From paddock to successful silage

Maximising the production potential of silage begins with the choice and management of the parent forage.

Selecting pastures and crops for silage production

Pastures and crops more commonly used for silage production are included in the accompanying tables.

Because it's impossible to list all pasture and crop species that can be successfully ensiled, a simple guideline to follow is that all non-'grass' species should be treated as for legumes, and wilted accordingly, to promote a good silage fermentation.

GOALS FOR SUCCESSFUL SILAGE

Select pasture or crops that produce high quality forage and have high yield potential.

Harvest at the recommended growth stage.

Wilt to the target dry matter range as quickly as possible.



Table 1. Yield and quality potential of crops grown for silage production, identifying requirements to ensure quality silage.

Crop	Perennial ryegrass & clover	Forage ryegrass	Other temperate perennial grasses & clover	Pasture legumes & legume dominant pastures ¹	Lucerne	Kikuyu & other tropical grasses	Forage sorghum	Millet (several types)	Cowpea & lablab
Growth stage at harvest	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	1m high	Pennisetums: 1m high Japanese: pre boot	Flowering
Potential yield ² (t DM/ha/cut)	2.5–4	2.5–4.5	2–4	2–3.5 ¹	1.5–3.2	2–3.5	2–5	2–5	1.5–6
Potential number of cuts per year ²	1–2	1–2	1	1–2	4–7	1–3	1–4	1–3	1
Wilting requirement	Yes	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	35–40
Baled	35–50	35–50	35–50	35–50	35–50	35–50	35–50	35–50	35–50 ⁶
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	8.5–10.5
Crude protein ³ (% DM)	12–22	12–20	12–16	14–26	18–24	12–18	7–17	10–18	14–18
Ensilability ⁴	**	**	**	*	*	*	**	**	*
Suitable for chopped bulk silage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Suitable for baled silage	Yes	Yes	Yes	Yes	Yes	Yes	Yes ⁵	Yes ⁵	Yes ⁶

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 forage quality are as 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.
- Although cowpeas and lablab may be made into baled silage, it is not the preferred option.

Consider the following when selecting the most suitable pastures and crops for silage production:

- What best fits into my whole-farm program – a pasture or forage crop with potential for grazing before and after harvest or a crop that will produce a one-off silage cut? Is buying a neighbour's standing crop or pasture an option?
- What are my yield and quality targets?
- Is my present silage system suited to the forage type chosen? Am I prepared to change my silage system?

Good agronomic management of the parent crop or pasture is important in achieving high forage yields of high nutritive value.

Poor quality forage will never become good quality silage.

Growth stage at harvest has a major impact on forage quality and yield. Wilt to the target dry matter range as quickly as possible. The forage dry matter and quality losses are minimised if dry matter targets are reached, ideally within 24 hours but certainly within 48 hours.

When forage is stored at dry matter levels below 30%, there is a risk of quality loss through effluent production. Good compaction in storage becomes difficult when the dry matter content is at the higher end of the range.

Table 2. Yield and quality potential of crops grown for silage production, identifying requirements to ensure quality silage

Crop characteristics	Maize	Whole crop winter cereal		Whole crop winter cereal /legumes mixtures	Grain sorghum	Sweet sorghum	Soybeans
		Oats	Wheat & Barley				
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	65% pod fill
Potential yield ¹ (t DM/ha/cut)	12-25	5-15		5-15	4-10	10-25	4-10
Potential number of cuts per year	1	1		1	1	1	1
Wilting requirement	no	boot yes/dough no		yes	no	no	yes
Target range DM content(%)							
Chopped	33-38	35-40		35-40	30-35	25-35	35-40
Baled	NR	35-50		35-50	NR	NR	35-50 ⁴
ME ² (MJ/kg DM)	10-11	9-10.5		9.5-11	9.5-10.5	9-10	8-9.5
Crude protein ² (% DM)	4.5-8.5	6-16		8-18	6-9.5	4-8	15-20
Ensilability ³	***	boot **/dough ***		**	***	***	*
Suitable for chopped bulk silage	yes	yes		yes	yes	yes	yes
Suitable for baled silage	no	yes		yes	no	no	yes ⁴

Notes:

- Yields at the higher end of the range can be obtained with irrigated crops or crops grown under ideal growing conditions.
- These ME (metabolisable energy) and crude protein levels are achievable with good management.
- Ensilability is the likelihood of achieving a good silage fermentation without wilting or a silage additive.(^{*} Low,^{**} Medium or ^{***} High).
- Baled silage is not the preferred option for soybeans.
- NR not recommended.

FOR FURTHER INFORMATION

The information in this silage note is taken from the Successful Silage manual.

This Silage Note is No. 4 in a series prepared as part of TopFodder Silage a joint initiative of Dairy Australia and NSW Department of Primary Industries, which aims to improve the quality of silage produced on Australian farms.

For comprehensive information ask about:

- Successful Silage - a technical manual (including the TopFodder Silage DVD).
- TopFodder short courses in your area.