

## 6. Conserving those valuable pastures

Ryegrass characteristically produces high quality and high yielding spring growth. Often however, this production is in excess of livestock requirement. Surplus pasture can be conserved by cutting it for hay or silage and utilised at a time when feed is low. Conserving high quality pasture and maintaining that quality is a balancing act between the plant growth stage, weather conditions and adequate storage.

### Yield and quality

Plant growth stage will determine the quality and yield (particularly with ryegrass pastures). Table 6.1 emphasises the effect of growth stage on quality and yield of ryegrass. While the metabolisable energy and the crude protein levels are higher in the vegetative state (indicating a higher quality) the potential yield is lower than a more mature plant. Ideally you should cut pastures in the late vegetative to early reproductive growth stages before quality deteriorates with plant maturity. For silage, a rule of thumb for ryegrass is between 10–20% ear emergences. For hay it is at a higher percentage of 20–30% ear emergence.

**Table 6.1:** The effect of growth stage on quality and yield of ryegrass<sup>30</sup>.

DM; dry matter, MJ; Megajoules.

Growth stage	Metabolisable energy (MJ/kg DM)	Crude protein (% DM)	Potential yield (t DM/ha)
Vegetative (30 cm)	9.7 – 11.0	14.0 – 22.0	2.0 – 3.0
Head emergence (45cm)	9.0 – 10.5	12.0 – 20.0	2.5 – 4.5
Flowering	8.0 – 9.0	8.5 – 18.0	2.5 – 5.5
Mature seed	6.0 – 8.0	3.5 – 7.5	2.2 – 5.0

### Time of cutting

When to cut, as highlighted above, is often a compromise between quality and yield. Timing of cutting is also determined by wilting rate. Wilting rate simply refers to drying out the pasture to achieve a desired dry matter (DM) content<sup>31</sup>. A quicker wilting rate is better, hence time of cutting should coincide with ideal drying conditions. Unfortunately this typically coincides with a later plant growth stage. Wilting rate will vary depending on the pasture composition. Broad-leaves tend to dry at a slower rate than ryegrass.

### Silage - the fermentation process

Silage is the product formed when herbage of high moisture content is stored in an oxygen-free environment<sup>31</sup>. Ensiling, the process by which silage is formed, preserves the plant material by natural lactic acid fermentation. Encouraging the proliferation of naturally occurring lactic acid producing bacteria will best achieve this. To make quality silage, acidification must be rapid<sup>31</sup>. Providing the storage is completely airtight, the lactobacilli bacteria will immediately start to use the sugars in the plant material to produce lactic acid<sup>31</sup>. If this environment is not created or is later changed many problems start to occur.



Ryegrass being harvested for silage.

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There are many undesirable micro-organisms that can enter the silage storage by soil or livestock waste during harvest. These populations might be further exasperated if the environment in the silage storage is incorrect. Some of the undesirable micro-organisms include *Escherichia coli* (E. coli), *Listeria monocytogenes* (Listeria) and *Clostridium botulinum* (Clostridia)<sup>32</sup>. The type of fermentation these micro-organisms promote can result in less palatable and less digestible silages which may lead to reduced feed intake, production and in some severe cases death. Well preserved silage is sweet smelling, palatable and contains lactic acid as the main acid<sup>32</sup>. In contrast, poorly preserved silage is foul smelling due to acids such as butyric acid<sup>32</sup>. Following proper harvesting and storage procedures will prevent outbreaks of these micro-organisms.

### Storage

Although many high quality crops are harvested efficiently, there can be significant losses of DM and quality if the storage system is inadequate. These losses for silage are due to excessive respiration, effluent loss and aerobic spoilage in the stack or bales. There are a few different storage designs for silage with stacks and bales the most common. The equipment available and feeding techniques will determine what storage system suits your operation.

Hay losses are primarily caused by growth of fungi or moulds and chemical reactions that bind up some nutrients and reduce nutritive value. Adequate storage will minimise these losses and ensure a high quality feed source when you need it. Silage and hay are effective ways to manage pasture surpluses and so improve pasture utilisation.

### Feeding System

Planning an efficient feeding system must take account of the farm production goals, number and class of livestock to be fed, location of the silage storage and feedout sites, current facilities and equipment<sup>36</sup>. An efficient system must minimize losses caused by aerobic spoilage and wastage at feedout. Feedout losses have a major effect on the success and profitability of silage in a farm system<sup>36</sup>. There are many different ways of feeding out. This includes feed troughs, feed pads, bale silage fed whole in a feeder/paddock, self feeding and windrow in the paddock<sup>36</sup>. Each has its pros and cons however feedout management aimed at reducing wastage could be the most important factor affecting silage profitability.

### Like to know more?

For further information refer to Successful Silage, A TopFodder silage manual [www.agric.nsw.gov.au](http://www.agric.nsw.gov.au)



A: Preparing silage for a pit storage system



B: Preparing silage for a baled tunnel storage system