

Producing quality grass silage

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The two vital components of silage quality are (1) the feed value of crop at harvest and (2) the efficiency with which the crop is ensiled, preserved and fed. Regarding the feed value of the crop at cutting, this depends on:

- crop maturity at harvest; e.g. stemmier, more mature crops have lower feed value;
- sward type: e.g. many old pasture swards dominated by poor grasses have lower feed value than swards of perennial ryegrass; and,
- sward conditions: lodged, wet crops can rapidly lose quality and therefore have a lower feed value at harvest. Similarly, swards that were not grazed sufficiently short in autumn or spring can have a stemmy decaying butt that can reduce feed value at harvest.

The efficiency of crop ensilement, preservation and feeding out depends on:

- only attempting to wilt the crop if it can genuinely dry rapidly;
- ensiling it free of contamination from soil, manure etc;
- even and adequate application of appropriate additive if required;
- fast filling followed by immediate good sealing to ensure the ensiled forage is stored in an air-free environment;
- protection of this seal throughout storage; and,
- management at feed-out that

minimises the duration of exposure of silage to air.

The basic process in silage-making is the conversion of plant sugars to fermentation acids, which preserves the silage from attack by spoilage organisms. An essential part of this is the exclusion of air, firstly, to allow fermentation to occur and, secondly, to prevent mould growth during storage. Therefore, for good preservation there are two essentials: adequate sugars and airtight conditions. Sugars are adequate when there is about 3 per cent soluble sugar in the grass juice. However, this is a variable figure depending on other conditions. Good silage can be made even at a sugar level of 2 per cent, but below this is very risky. Dry matter has a huge effect on sugar concentration, which is why weather at harvesting is so crucial. Sugar levels increase in fine sunny weather and with increasing grass maturity. Sugar levels can be up to 50 per cent higher in ryegrasses than old pasture grasses. Mowing the crop when dry, followed by rapid wilting, gives a higher sugar concentration. The estimation of sugar levels in grass juice gives a useful guide to the capacity of a crop to preserve. This can be done by sending samples to a lab or by measurement with a sugar refractometer at local advisory offices. If sugar levels are too low the addition of a sugar source such as molasses is a convenient solution. Apply between 9 and 18L per tonne of fresh forage, depending on its condition. Another

advantage of using molasses in ensiling is the stickiness of the molasses, which helps bind the forage in the silo tightly together. This reduces the air available in the clamp, raising hygiene and increasing the amount of forage able to be held in the clamp.

The bacteria that turn sugar into acid only grow in the absence of air. Therefore, rapid and sustained exclusion of air is necessary for preservation. The faster air is excluded the greater the amount of the original sugar that is available for production of acids. Fast filling and good compaction quickly establishes air-free conditions in the pit. Effective sealing is essential to maintain air-free conditions during the storage period. Heating in the top two feet of the clamp after opening is fairly common and is very difficult to control, especially in smaller operations where the rate of usage of the clamp is slow. It is necessary to give the top of the clamp plenty of rolling before covering and then to weigh down well.

High nitrate levels in the grass interfere with the fermentation process. Sugar levels are lower when nitrates are high and high nitrates are also related to high buffering capacity which resists acidification. With this year's excellent growing conditions, nitrate levels in grass may be an issue for early crops. A rough guide is to allow a day's growth for every two units of nitrogen applied. Wilting or additive use is recommended where nitrates are estimated to be high. As the season progresses, nitrates should fall and sugar increase.