

Quality silage production: Don't drop the ball early on

By Sjoerd ten Cate (Pr.Sci.Nat.), Feedtek

According to Muck *et al.* (2020) forage preservation by way of ensiling has been practiced for at least 3 000 years. Egyptian murals dating from 1 000 to 1 500 BCE suggest that whole-plant cereal crops were preserved using ensiling. Silos dating to 1 200 BCE were found in the ruins of Carthage. Ensiling appears to have been a relatively localised phenomenon until the 1800s.

In 1842, Grieswald published the first recommendations for making fresh grass silage. Even today, his recommendations are still recognised as important: filling the silo rapidly; compacting the crop well; and effectively sealing out air.

Several very important (read critical) basic truths apply to the production of quality silage across different types of forages, such as the three aforementioned recommendations. One such reality is the importance of the plant's developmental stage upon the date of harvest.

The trick is finding a balance between quality and volume, which can differ from year to year or even from one field to the next or one forage type to the next. If the ball is dropped in this regard, you must live with the consequences for a year. This article focusses on grassy types of forage

and legumes, which requires a different approach compared to maize silage.

The correct ensiling stage

The first factor to consider when deciding on the harvesting stage is how much starch the forage produces. The more starch, the more the quality of the silage will depend on the percentage of grain, compared to the quality of the fibre component.

The second factor is fibre quality. The rule of thumb is the older the plant, the lower the fibre quality. This is due to an increase in fibre and lignin components as the plant matures. Fibre is only partly digestible, whereas lignin (wood) is totally indigestible, bringing about lower energy levels. When the plant matures, protein levels will also be reduced (*Figure 1*).

Crop type differences

The quality of **maize** silage is entirely dependent on the percentage of kernels in the silage. This is due to the crop's potential to produce 15t/ha (plus) of grain under irrigation. The plant material itself is not worth much and the kernels need to be given the opportunity to develop optimally. In short, if you are unsure about the harvesting date, rather wait one more week.

Mature **sorghum** with a 3 to 4t/ha seed potential is dependent on the fibre

component's quality, which is basically impossible. In practice, this means that sorghum is a dry cow silage rather than an early lactation cow silage. On the other hand, young sorghum, or sorghum/Sudan grass crosses between knee and hip height tend to produce high-quality silage as only young digestible roughage can be harvested.

Grasses produce minimal starch. In this instance, quality depends on age of maturity (*Figures 1 and 2*). *Figure 2* illustrates that for grasses, the ideal balance between digestible dry matter (DM) and maximum production is usually around the late boot stage. A lot of undigestible material is produced once the seed formation stage has been reached.

Small grains slot in somewhere between the sorghum and maize approach. Like maize, small grains can produce a high percentage of grain relative to the potential silage tonnage it can produce. However, unlike maize, the quality of its stem and leafy material is more like that of grass. This combination of features complicates the decision as to the optimal ensiling date, and a range of factors need to be considered. The most important rule of thumb for small grains is to harvest a week earlier if you are unsure.

Figure 1: Changes in legumes and grasses with advancing maturity.

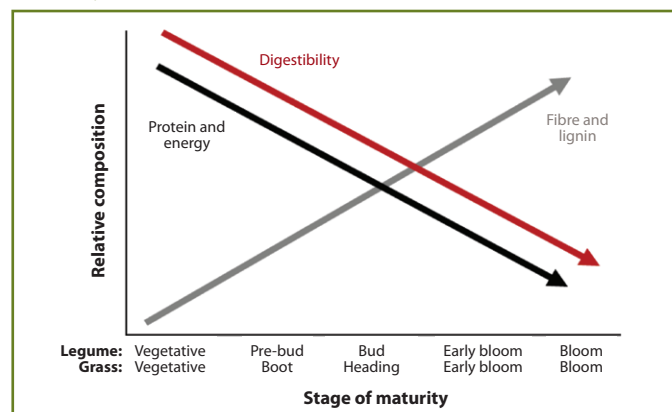
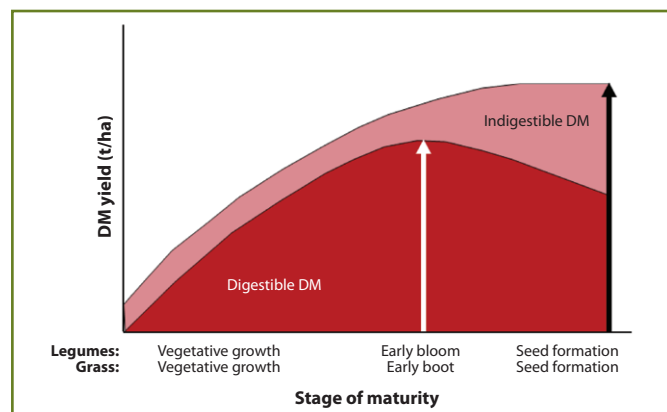


Figure 2: Dry matter yield of legumes and grasses as maturity advances.



Relative composition

This rule is even more applicable to oats than wheat and barley, as oats produce more vegetation than grain. When vegetative growth is particularly good, for example in an excellent dryland year or under irrigation, the plant stems are thicker with more lignin forming to help keep the plants upright. As seed production does not negate the digestibility of the plant material, ensiling should occur between the late boot and end of bloom stages.

In an average production year, the ensiling date can extend to the milk stage and even the soft dough stage. This is because of lower lignin formation due to the lower growth height, which translates into thinner stems. In poor years ensiling can extend to the soft dough stage or even later. Sub-standard vegetative growth implies that lignin formation played a lesser role. In these circumstances, improved seed formation will promote quality and production per hectare. Be aware of moisture levels in these situations, especially when using bunkers – compaction can become problematic if moisture levels were to drop below 66%.

Be sure not to get caught up in how excellent a production year was. Some cultivars do not require exceptional circumstances to perform. Once you have decided on an ensiling date, start with vegetative growth and stem thickness as the benchmark.

Legumes are much like grasses. The figures used here are based on American data; therefore, legumes imply lucerne in South African terms. Since lucerne does not produce starch, logic dictates that its quality will depend on the growth stage. The white arrow in *Figure 2* confirms the old viewpoint that the optimal time to cut lucerne is during the 10% bloom stage.

Seed-producing legumes such as soya beans and faba beans require a different approach. Given the nutritional value of the beans in the pods, and its contribution towards production per hectare, the optimal cutting stage should theoretically aim towards full seed (the R6 stage) when the beans are large but the pods and leaves are still green. In practice, however, this will almost never happen.

The plants will tell you that they are losing too much value when they start

losing their lower leaves. When that happens, it means you should have started ensiling yesterday and that the last sets of pods are not yet fully developed. The optimal harvesting stage, therefore, will be any time from before the last flowers have dropped until the youngest pods are barely formed.

Knowledge is power

The harvesting date for ensiling is a gut feel decision that is based on experience and knowledge. The better your knowledge, the better your gut feel. This applies to the entire silage production process. Ask and read as much as possible to avoid unnecessary traps during this important undertaking. **SF**

Follow these two links for valuable information on producing quality silage: www.extension.psu.edu/from-harvest-to-feed-understanding-silage-management; www.researchgate.net/publication/341953498_Silage_Production. Contact the author on 086 111 5362 or info@feedtek.co.za.



**SPECIALIST
ANIMAL FEED
CONCENTRATES**

**GROW WITH
FEEDTEK!**

Easily **home mix** high quality cost effective feeds and lick supplements with **Feedtek specialist concentrates** for optimal utilisation of **silage** and **locally produced feed ingredients**.



086 111 5362

info@feedtek.co.za

www.feedtek.co.za

Feedtek Animal Feed Solutions

[feedtek_animal_feed_solutions](#)

Your nearest agent

