



MAIZE SILAGE

THE EVALUATION OF DIFFERENT HYBRIDS

The expectations placed on a good silage hybrid can differ greatly because of the producer's needs for use (for animal feeding it can be milk production), but the biggest need or expectation lies with the producers, animal nutritionist and contractors that are involved in the production of silage. The opinions of quantity versus quality when it comes to silage, are discussed regularly, but a good rule of thumb is the following:

1. High yield per hectare
2. High starch yield per Kg DM
3. High Total Digestible Nutrients (TDN)*

Protein value are measured and mentioned, but in our maize silage observations it is of less importance. Proteins in maize silage are mainly influenced by harvest time and the physiological phase of the maize plant.

***Total Digestible Nutrients (TDN)** of silage are measured from the digestibility of crude protein, fat and fiber (thus NDF and all fiber fractions), and non-structural carbohydrates (including starches). A good (high) TDN value are found with low fiber, high digestibility of all fiber fractions and a high starch content.

Methods and Analytics

A sample representing each hybrid was taken over the trials of three seasons. Sampling was conducted by following a protocol outlined by **AgSci Unlimited Silage Consultancy**. The protocol indicated the decision of cut stage, by cutting and drying the maize material, to determining the dry matter (DM)** , using measures and parameters during harvesting, taking of samples, ensiling and analyzing of fermented samples.

****Dry Matter (DM)** is shown as a percentage. Dry matter is the content of the sample that is free of moisture. Because moisture is the biggest component, it influences the amount fed and physical quantity of nutrients available to the animal, and it is important to always balance and evaluate the rations/ diets on a dry matter base.

Laboratory

All analysis was done in the laboratory **Labworld (Pty) Ltd in Isando, Johannesburg**; an affiliate of CVAS (Cumberland Valley Analytical Services) in the USA. NIR technology is used to measure the nutrition parameters of fermented silage.

Statistics

The "One-way analysis of variance" (ANOVA) procedure was used to show meaningful differences between the nutritional parameters, through the Tukey's Studentized Range test (HSD). The nutritional parameters are:

1. Dry Matter (DM)
2. Neutral Detergent Fiber (NDF)
3. NDF 30-hour digestibility
4. Starch
5. Total Digestible Nutrients (TDN)
6. Milk per ton

Meaningful differences were measured by ANOVA for the above six parameters. P-values were declared for < 0.0001.

Fermentation

All plants were cut at the R5 physiological stage. All silage trial samples fermented well. Therefor no comments can be made on ensiling ability of the different hybrids that were ensiled. By following and correctly applying the protocol, good ensilage was obtained.

Results and feedback

NDF digestibility:

Die NDF-fraction of crude fiber and the digestibility thereof (in this case the prediction after 30 hours in the rumen), are used as an indication of the type and usefulness of the fiber in the plant. Ruminants are masters in the use of fiber through microbial fermentation in the rumen, and it is because of this that ruminants are able to use these components so effectively, which leads to the point where we can make silage from the whole plant.

Milk per ton:

This is a specific calculation and is based on certain parameters from the laboratory used for the analysis (CVAS). This is an indication of how the silage can be used by dairy farmers.

Are yellow or white maize better for silage? There are mostly no differences between nutritional values, such as fiber levels or starch yields. What we need to do in silage production is to optimize the quantity and quality. If a white hybrid shows better quantity and quality than a yellow hybrid on a specific farm, it will be a good hybrid for silage.

Norms of the different parameters measured in the laboratory:

Measured Objectives	Under Norm	On Norm	Above Norm
Neutral Detergent Fiber (NDF)	<37%	37 - 42%	> 43%
NDF at 30 hours digestibility	<54%	54 - 58%	>59%
Starch	<27%	27 - 39%	>39%
Crude Protein (CP)	<6.5%	6.5 - 9.2%	>9.2%
Total Digestible Nutrients (TDN)	<65%	65 - 72%	>72%

● Concern ● Acceptable ● Strength



Quality Results of Silage Trials over 3 years

Cultivar	NDF	NDF at 30hrs digestibility	Starch	Crude Protein (CP)	TDN	Milk per ha (kilo-liter)
P1197 Platform	S	S	S	S	S	31,7
P1257 Platform	S	S	S	S	S	32,2
P1788 Platform	S	S	S	S	S	30,1
P1975 Platform	S	S	S	S	S	33,9
P2432 Platform	S	S	S	S	S	28,4
P2927 Platform	S	A	S	S	S	33,9

● Concern ● Acceptable ● Strength

- Pioneer conducts silage trials annually to compare cultivars with the already known cultivars from the Pioneer package.
- All the cultivars tested in the above table showed good silage characteristics, however, how each one will be applied will differ, like the needs of the farmer or producer differs.
- Plant population plays a big role in the bulk ability of each cultivar, higher plant populations from the trials do not always produce higher yields.
- Speak to your Pioneer agronomist in the area to make sure that the selected cultivar is planted at the right plant population.

Note: For more information on the agronomical qualities of each hybrid, refer to the product tables in the brochure

Terms and Conditions:

- The beforementioned information are only for informative purposes. Contact your Pioneer sales agent for more information and recommendations regarding your specific farming practices.
- The performance of products is erratic and depends on a lot of different factors such as moisture stress, heat stress, soil type, environmental stresses as well as diseases and plagues.
- Individual results can vary.
- Recommendations in this report are made with good intentions and are based on the samples that were analyzed. No responsibility will be accepted for loss of production or otherwise, related to a possible negative aspect of any chosen hybrid, or any cultivation practices or abilities on the farm.

Acknowledgments and collaboration

- Data collection and analysis of the trials were done in collaboration with AgSci Unlimited Silage Consultancy, www.agsci.co.za, unlimited@agsci.co.za
- Farmers and contractors.

