Sorghum Crop Quality 2024/25 – Summary of Results

The National Grading Regulations (Government Notice NO. R.15 of 08 January 2016, Regulation 4. Standards for classes) states that a consignment of sorghum shall be classified as Class GM Sorghum if it consists of malt sorghum that does not have a dark testa and complies with the standards for the grades. A consignment of sorghum shall be classified as Class GH Sorghum if it consists of malt sorghum that has a dark testa and complies with the standards for the grades.

Sixty-seven (67) percent of the 15 samples analysed for the purpose of this survey was determined to be class GM. Of these, 8 samples (80%) were graded as Grade GM1. The remaining two samples (20%) were graded GM2. All five of the samples determined to be class GH, were graded GH1.

No white sorghum samples were received this season for inclusion in the survey.

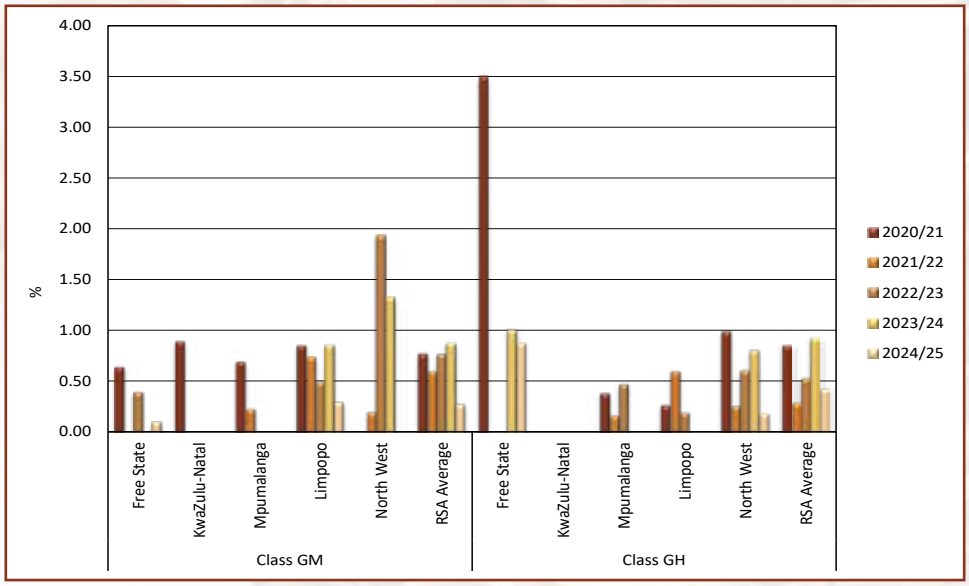
Certain varieties of sorghum contain tannins (specifically condensed tannins) in the seed coat layer beneath the pericarp (commonly referred to as the testa layer) of the grain. These varieties are variously referred to as: tannin, high-tannin, brown, bird-proof, bird-resistant, or bitter sorghums.

Varieties of sorghum not containing tannins are referred to as: non-tannin, low-tannin, condensed tannin-free, or sweet sorghums.

The detection of tannin in sorghum grain for grading purposes is done by SAGL by means of the bleach test. Please refer to the methodology followed under Methods on page 31.

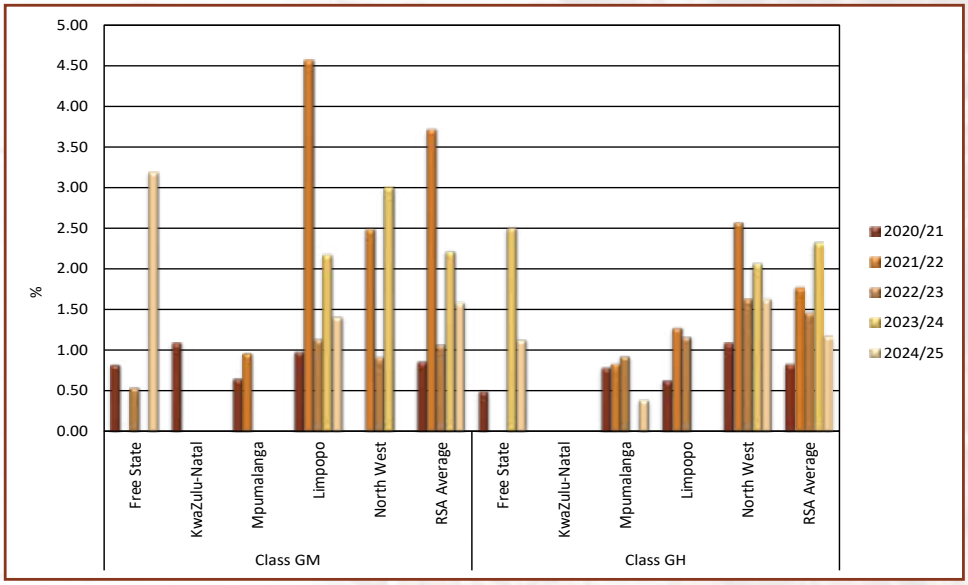
Graphs 16 to 18 present the weighted average percentages foreign matter, defective sorghum and small kernel sorghum per class per province over five seasons.

GM sorghum's foreign matter varied between 0.11% for the single sample from the Free State and 0.30% for Limpopo (9 samples). GH sorghum's foreign matter varied between 0% for the single sample from Mpumalanga to 0.88% for the two samples of the Free State. North West's two samples averaged 0.19%. The national weighted averages for GM and GH sorghum were 0.28% and 0.43% respectively.



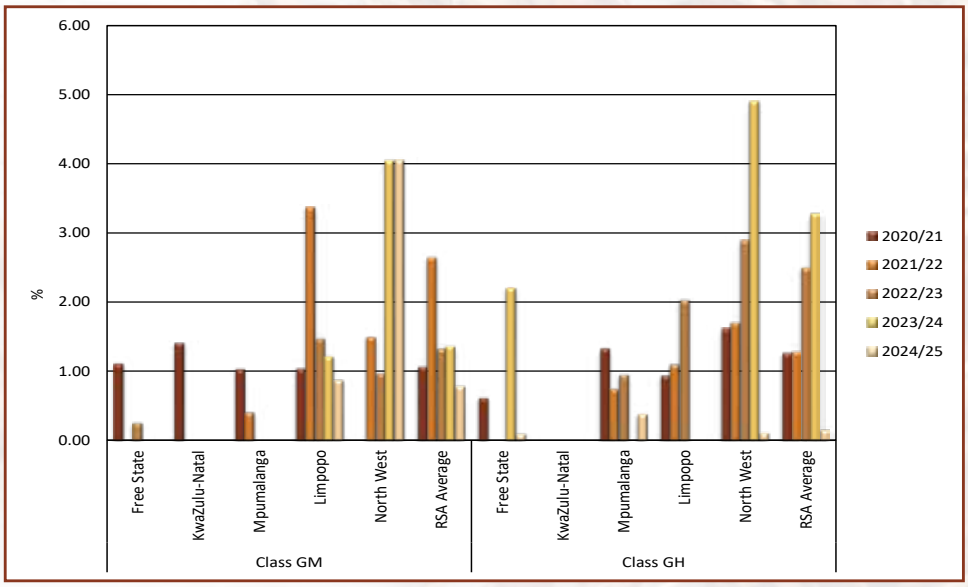
Graph 16: Average percentage foreign matter per class per province over five seasons

The percentage defective GM sorghum averaged 1.41% for Limpopo and was 3.19% on the single sample from the Free State. The average defective GH sorghum varied from 0.39% in the sample from Mpumalanga, to 1.13% and 1.63% on the two samples each from the Free State and North West respectively. The national weighted averages were 1.59% for GM and 1.18% for GH sorghum.



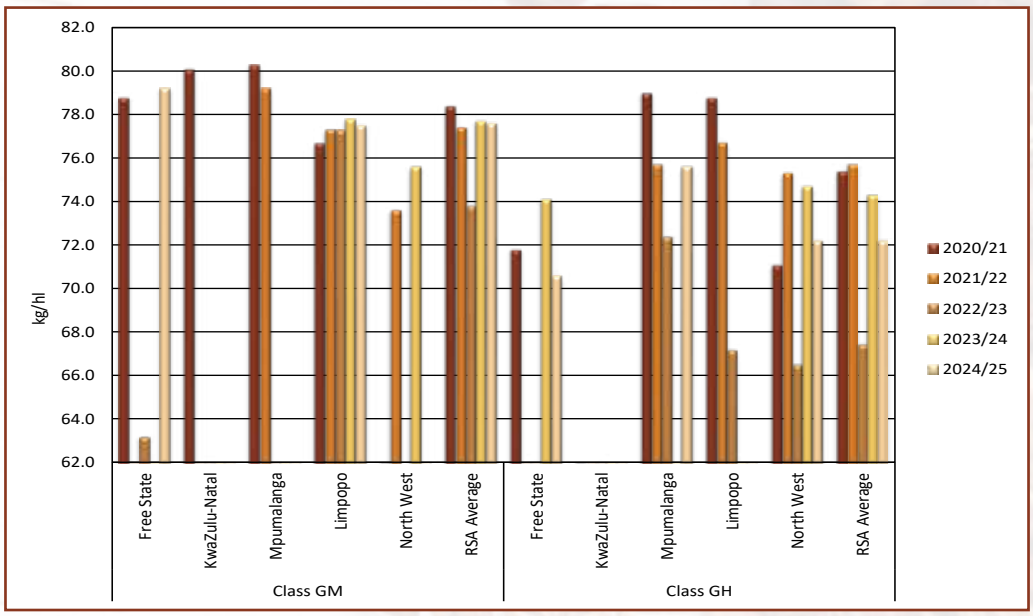
Graph 17: Average percentage defective sorghum per class per province over five seasons

This season, GH sorghum showed the lowest percentage small kernels (class average 0.16%), ranging from 0.10% in the two samples from the Free State to 0.39% in the sample from Mpumalanga. Small kernels in GM sorghum varied between 0% in the Free State sample to an average of 0.88% in Limpopo. The weighted average for class GM was 0.79%.



Graph 18: Average percentage small kernel sorghum per class per province over five seasons

As shown in Graph 19, GM sorghum had the highest weighted average test weight, namely 77.6 kg/hl, while GH sorghum averaged 72.2 kg/hl. This trend continues from previous seasons. Test weight values for GM sorghum ranged between the Limpopo average of 77.5 kg/hl to 79.2 kg/hl on the Free State sample. GH values varied from 70.6 kg/hl on the two Free State samples to 72.2 kg/hl on the two North West samples and 75.6 kg/hl on the Mpumalanga sample. Test weight was determined on unscreened samples.

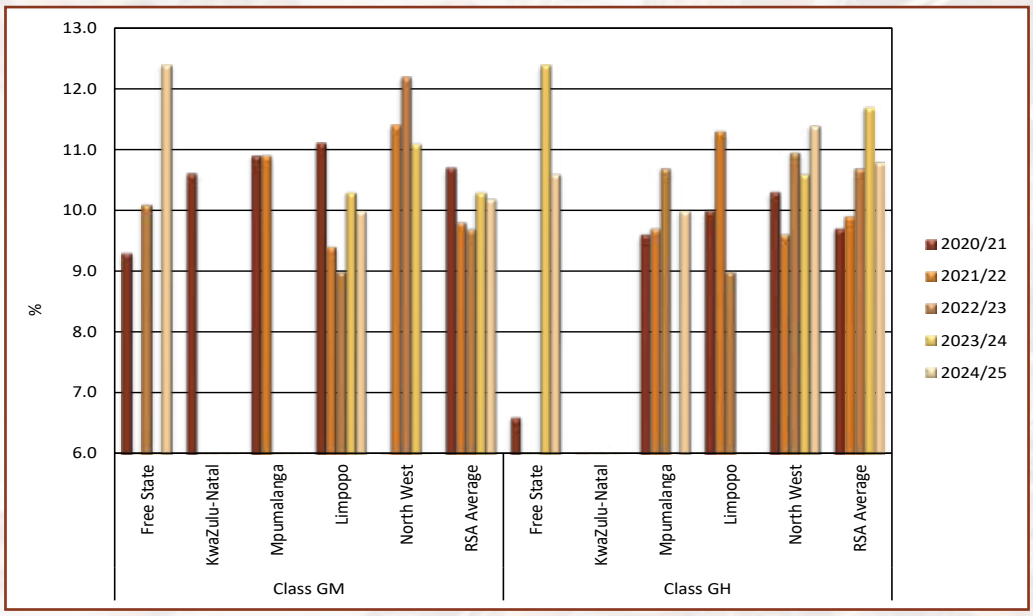


Graph 19: Average test weight per class per province over five seasons

GM sorghum also had the highest 1 000 kernel mass values, ranging between 22.2 g and 27.8 g (14% moisture basis) and averaging 24.2 g. GH sorghum averaged 22.4 g and varied between 20.7 g and 25.5 g. Last season these averages were 23.9 g and 19.0 g respectively.

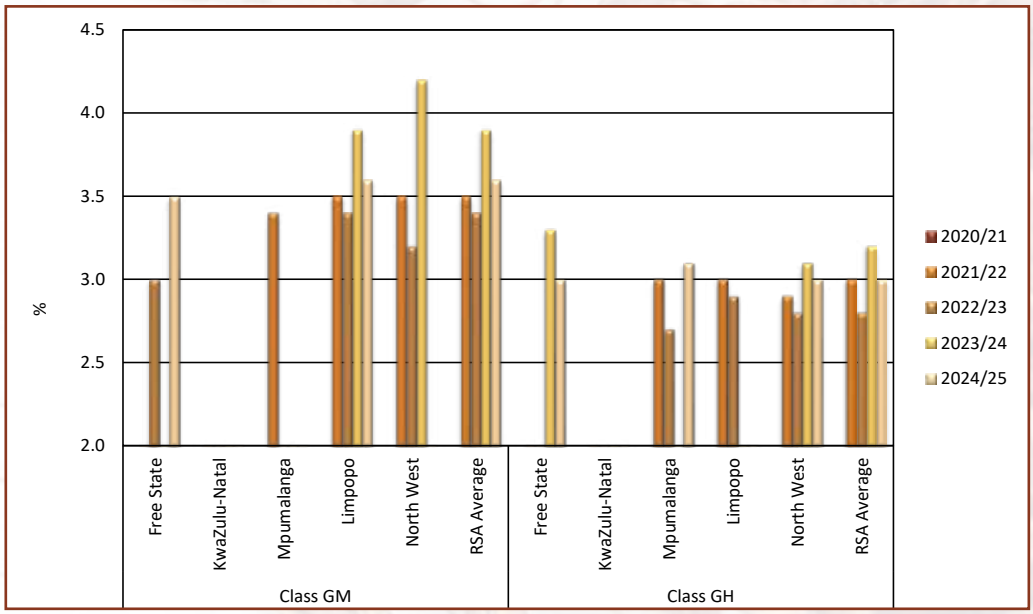
The image analysis results showed that the GM sorghum on average had slightly longer kernels, while the kernel width was similar for GM and GH sorghum. The variation (indicated by the standard deviation) in these parameters is similar for both GM and GH sorghum. Kernel elongation, defined as % Width/Length, showed a wider variation as the individual length and width parameters as can be expected, with average standard deviations of 5.8% for GM and 5.1% for GH sorghum. A totally round kernel will have a % Width/Length of 100. GM sorghum's Volume / surface area percentage was on average over the last six seasons 4% higher than that of GH sorghum.

As shown in Graph 20, the crude protein content for GM sorghum varied between an average of 10.0% in Limpopo to 12.4% on the sample from the Free State. GH sorghum's average crude protein content ranged from 10.0% on the sample from Mpumalanga to averages of 10.6% and 11.4% on the two Free State and two North West samples respectively. Nationally, GM and GH sorghum averaged 10.2% and 10.8% respectively.



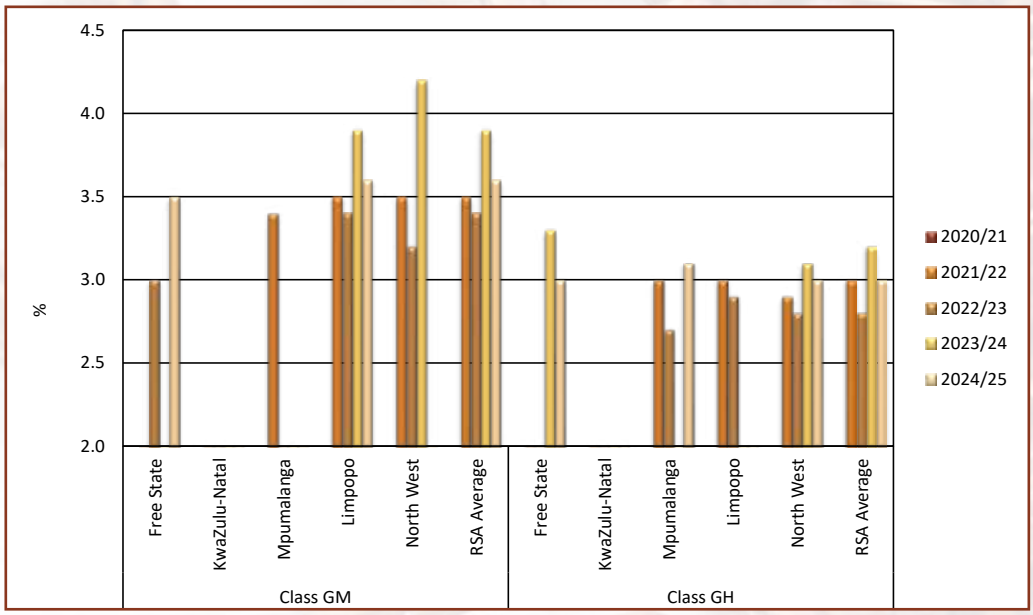
Graph 20: Average percentage crude protein per class per province over five seasons

Graph 21 shows that the average total starch content for GM sorghum ranged from 71.3% in the Free State sample to a Limpopo average of 72.9%. GH sorghum starch, varied from an average of 70.2% on the two samples from North West, to 70.5% on the sample from Mpumalanga, to an average of 70.7% on the two Free State samples. The weighted total starch content of GM sorghum was 72.7% and that of GH sorghum 70.4%.



Graph 21: Average percentage total starch per class per province over five seasons

The crude fat content of the crop samples was determined for the fourth consecutive season, see Graph 22. The national average for GM sorghum was 3.6% and that for GH sorghum 3.0%. The previous season's averages were 3.9% for GM sorghum and 3.2% for GH sorghum.



Graph 22: Average percentage total fat per class per province

The crude protein, total starch and crude fat contents of the samples were calculated and reported on a dry basis.

Hunterlab colour determinations were done on a milled fraction of dehulled sample above the 1.8 mm slotted sieve. The Hunterlab spectrophotometer separates the components of reflected colour into a threedimensional colour scale, namely the Hunter L, a, b scale where L represents lightness (100 being white and 0 being black), a represents green to red variation and b represents variation from blue to yellow.

See Graphs 23 to 28 for a comparison of the ranges in the L, a, b values obtained on GM and GH sorghum over the eight seasons since the commencement of this project. The minimum and maximum values are based on a single composite grading sample's result in a specific season.

Although there are currently no acceptable ranges for these parameters defined, the colour must be within the consumer-acceptable range, which traditionally are products with a slightly pink hue. Not only the dehulling process, but also other traits such as pigmentation differences determine the end product colour.

Mycotoxins

Mycotoxin analyses were performed on all 15 sorghum crop samples. The samples were tested by means of a SANAS ISO/IEC 17025 accredited multi-mycotoxin method using UPLC-MS/MS. With this technique simultaneous quantification and confirmation of Aflatoxin B_1; B_2; G_1; G_2, Fumonisin B_1; B_2; B_3, Deoxynivalenol, 15-ADON, HT-2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A is possible in one run.

None of the samples tested positive for any of these mycotoxins in seasons 2017/18, 2019/20, 2020/21 or 2022/23.

Fumonisin, Deoxynivalenol (DON) and Zearalenone residues were found on some of the samples in the 2018/19 season.

One sample from Limpopo tested positive for Fumonisin B_1 residues in the 2021/22 season.

This season, one sample from the Free State tested positive for Zearalenone residues, while two samples from Limpopo tested positive for Aflatoxin B_1 and Fumonisin B_1 residues respectively. Refer to Table 11 on page 29.

None of the levels however raised any concerns.

The Methods section of this report on pages 31 to 33 provides a description of the procedures and methodologies followed.