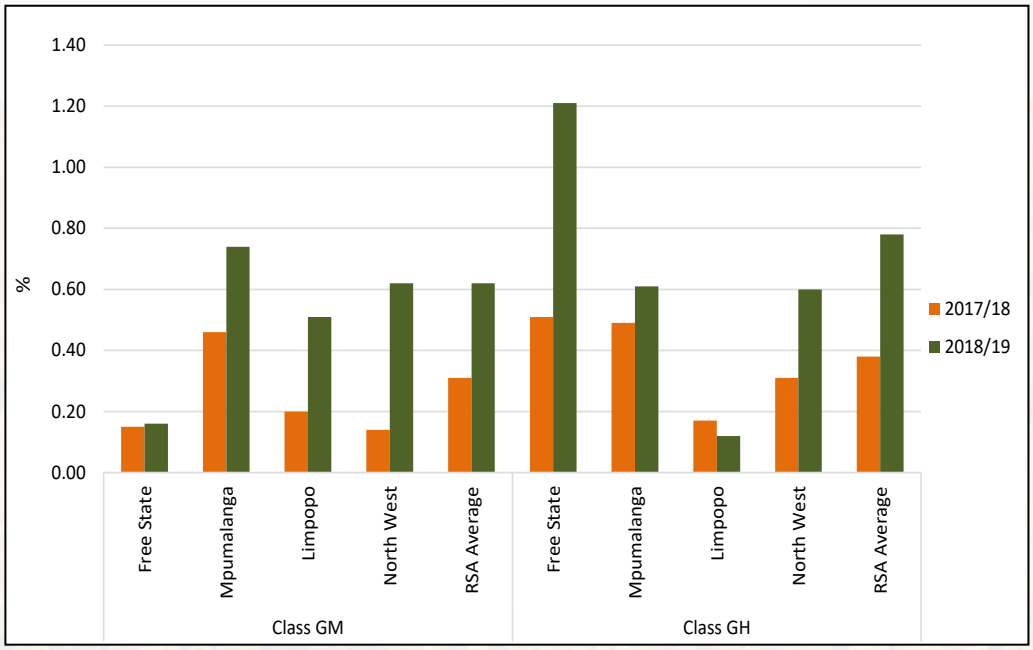
Sorghum Crop Quality 2018/19– Summary of results

Sixty-five percent (20) of the 31 samples analysed for the purpose of this survey was determined to be class GM. Of these, 18 samples (90%) were graded as Grade GM1. One sample each was graded GM2 and GM3. The remaining 11 samples were all class GH. Ten of these samples were graded GH1 and one was graded GH2.

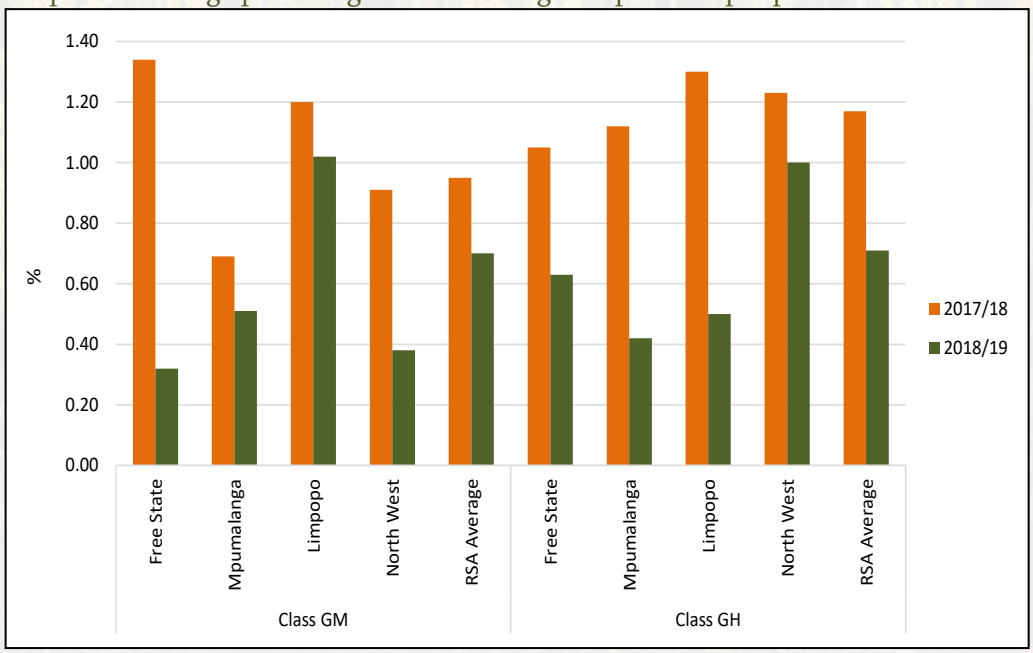
Please see Graphs 16 to 18 for the weighted average percentages foreign matter, defective sorghum and small kernel sorghum per class per province over two seasons. Mpumalanga (10 samples) had the highest percentage foreign matter (0.74%) for GM sorghum, while the Free State (4 samples) showed the highest foreign matter percentage (1.21%) for GH sorghum. The national weighted averages were 0.62% and 0.78% for GM and GH sorghum respectively.

Graph 16: Average percentage foreign matter per class per province

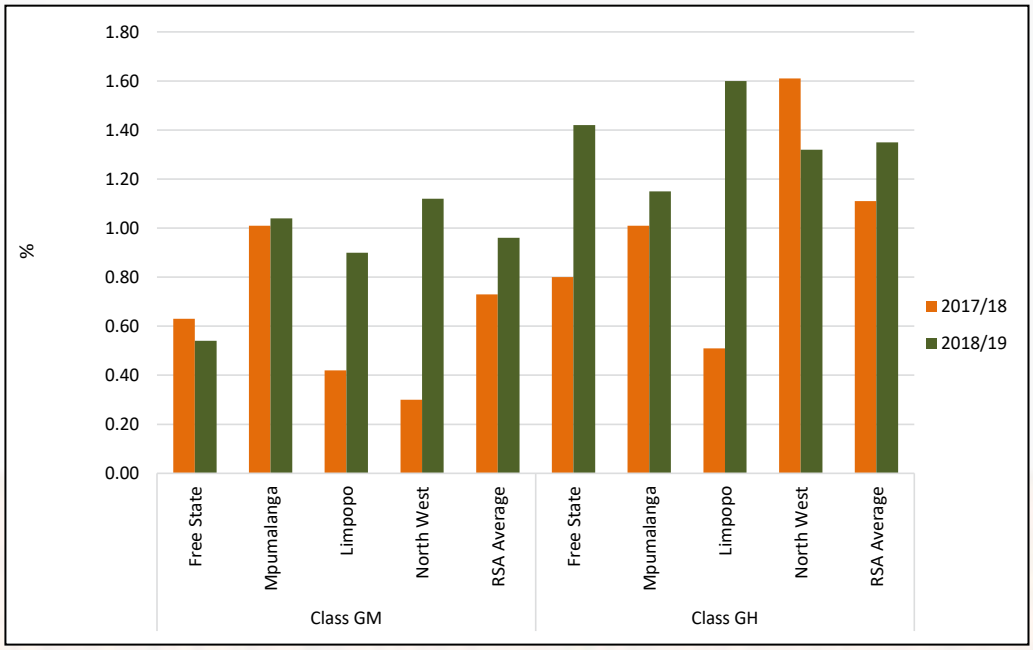


The percentage defective GM sorghum was the highest (1.02%) in the eight samples from Limpopo, North West (4 samples) had the highest percentage defective GH sorghum (1%). The national averages were very similar, 0.70% for GM and 0.71% for GH. As in the previous season, GH sorghum showed the highest percentages small kernels (national average 1.35%), with the sample from Limpopo having the highest percentage namely 1.60%. GM sorghum had the lowest percentage small kernels in the Free State (0.54%) and averaged 0.96%.

Graph 17: Average percentage defective sorghum per class per province

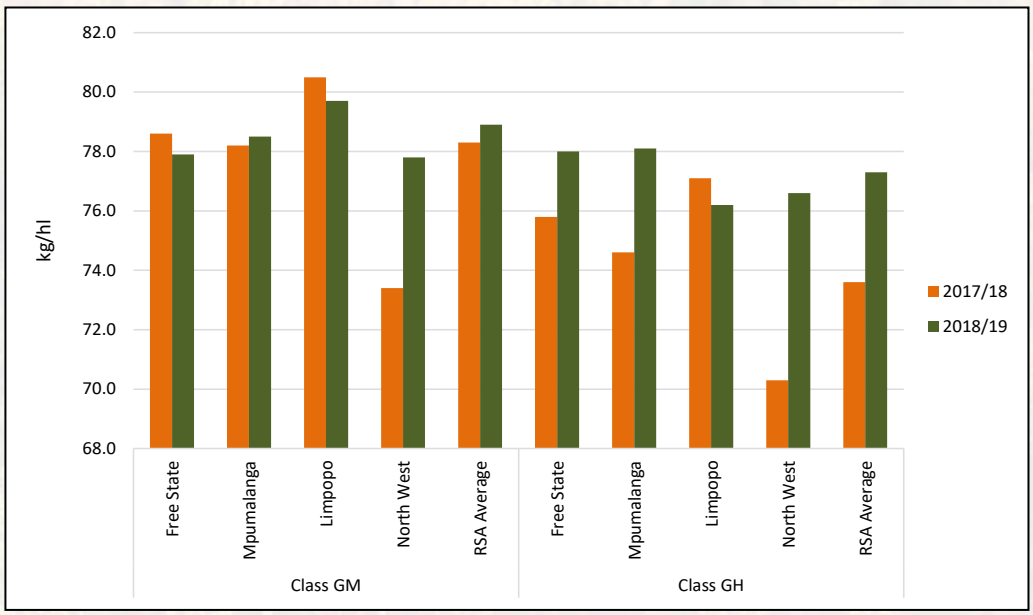


Graph 18: Average percentage small kernel sorghum per class per province



GM sorghum had the highest weighted average test weight, namely 78.9 kg/hl, while GH sorghum averaged 77.3 kg/hl. Please refer to Graph 19. Test weight values for GM sorghum ranged between 74.0 and 81.2 kg/hl, GH values varied from 76.2 kg/hl to 78.9 kg/hl. Test weight was determined on unscreened samples.

Graph 19: Average test weight per class per province

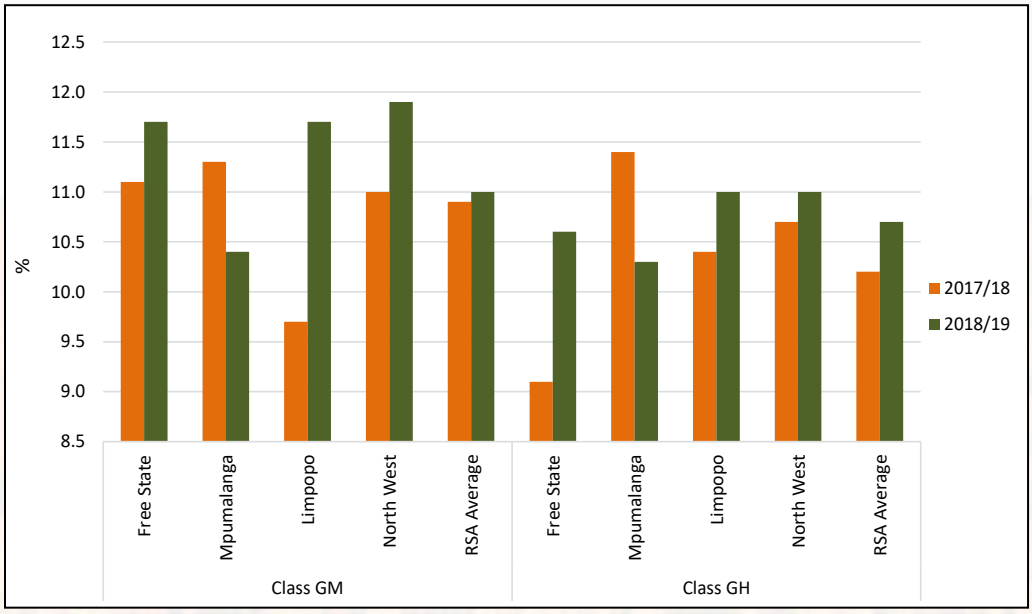


GM sorghum also had the highest 1 000 kernel mass values, ranging between 19.4 and 30.0 g (14% moisture basis) and averaging 25.5 g. GH sorghum averaged 24.4 g and varied between 19.8 and 29.4 g.

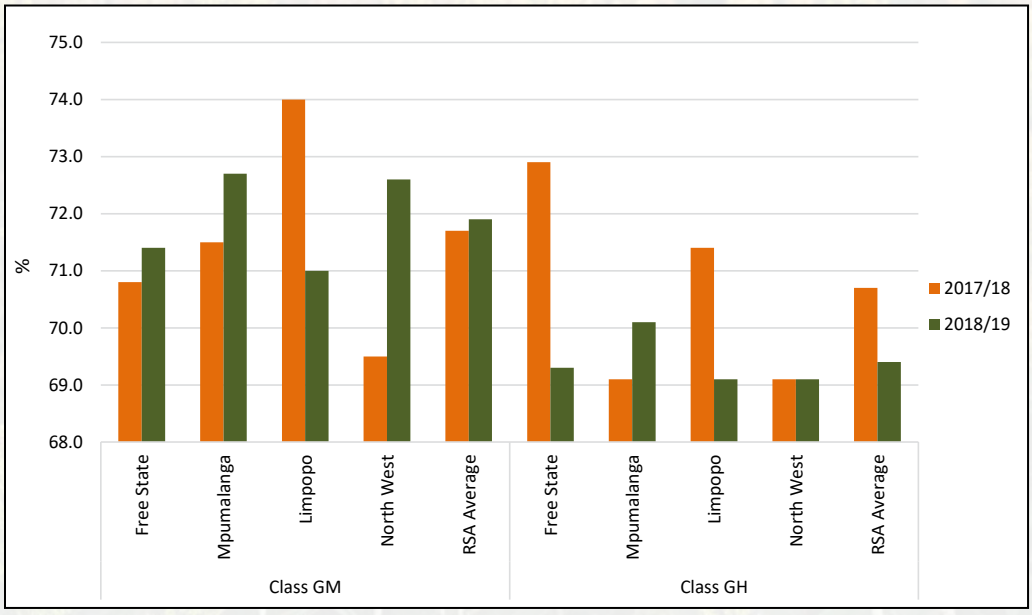
The image analysis results showed that the GM sorghum on average had longer and slightly wider kernels than the GH sorghum. The variation (indicated by the standard deviation) in these parameters is similar for both GM and GH sorghum. Kernel roundness, defined as W/L% (width divided by length, expressed as a percentage) showed a wider variation as can be expected, with a standard deviation of 4.6% for GM and 4.9% for GH sorghum. A totally round kernel will have a W/L% of 100.

The crude protein and total starch contents of the samples were calculated and reported on a dry basis. North West had the highest protein average of 11.9% for GM sorghum, while Mpumalanga averaged the lowest with 10.4%. North West and Limpopo both averaged the highest (11.0%) for GH sorghum, Mpumalanga averaged the lowest at 10.3%. Nationally, GM and GH sorghum averaged 11.0% and 10.7% respectively. The highest total starch content for GM sorghum was reported in Mpumalanga (72.7%), followed closely by North West with 72.6%. Mpumalanga also reported the highest total starch content for GH sorghum, namely 70.1%. The weighted total starch content of GM sorghum was 71.9% and that of GH sorghum 69.4%. Please see Graphs 20 and 21.

Graph 20: Average percentage crude protein per class per province



Graph 21: Average percentage total starch per class per province



Hunterlab colour determinations were done on a milled fraction of dehulled sample above the 1.8 mm slotted sieve. Please see a summary of the Hunter L a b values obtained below, the average and range (in brackets) are provided. For comparison purposes the values obtained in the 2017/18 season indicated in italics are also included.

GM sorghum: L 73.48 (69.86 – 76.27), a 4.51 (3.86 – 5.47) and b 10.53 (9.73 – 11.65)
GH sorghum: L 68.88 (67.28 – 69.89), a 4.76 (4.04 – 5.97) and b 9.57 (7.63 – 10.20)
GM sorghum: L 73.81 (67.49 – 83.08), a 4.43 (1.68 – 5.62) and b 10.17 (8.00 – 11.52)
GH sorghum: L 70.00 (66.17 – 73.93), a 4.71 (3.78 – 5.47) and b 9.16 (7.91 – 10.49)

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 determines the end product colour.

Mycotoxin analyses were performed on all 31 sorghum crop samples. The samples were tested by means of a SANAS ISO/IEC 17025 accredited multi-mycotoxin screening 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.

The average Fumonisin level (Sum of B_1, B_2 and B_3) on all 31 samples tested, was below the limit of quantitation (LOQ = 20 µg/kg) and ranged from not detected (ND) to 213 µg/kg. Of the 31 samples tested, 4 samples (13%) tested positive for fumonisins and the average of these positive results was 98 µg/kg.

The highest Deoxynivalenol (DON) level detected was 199 µg/kg. The average level of all samples tested this season was below the limit of detection (<LOD = ND). 13% of the samples tested positive for DON and the average of these positive results was 147 µg/kg.

Zearalenone residues were found in two (6%) of the samples, with values of 55 µg/kg and 78 µg/kg each. The average of these positive samples was 67 µg/kg.

Mycotoxin levels lower than the limit of quantitation (<LOQ) as well as limit of detection (<LOD) were seen as having tested negative for calculation purposes.

Last season, none of the samples tested positive for any of these mycotoxins. Please see mycotoxin results in Table 10 on pages 28 and 29.

The Methods section of this report on pages 32 to 33 provide a description of the procedures and methodologies followed.