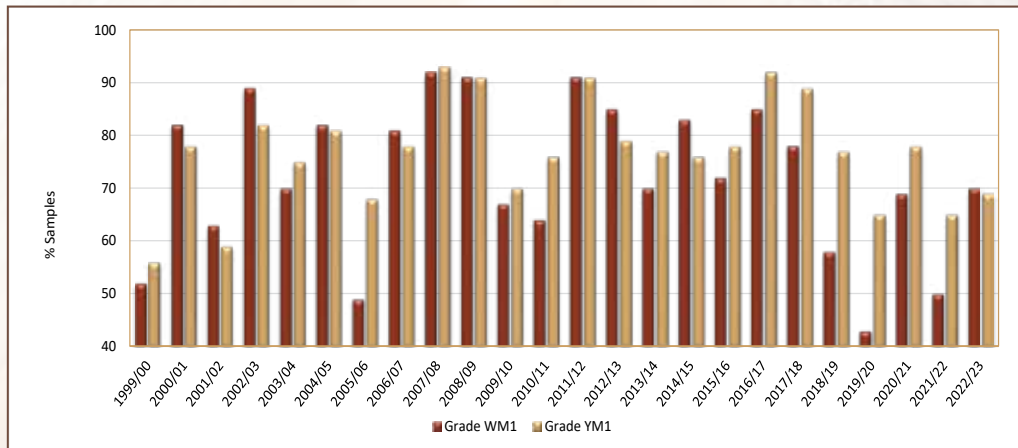


Maize Crop Quality 2022/23 ~ summary of results

RSA Grading

70% of white maize samples received for the purpose of the crop quality survey were graded as maize grade one, last season this figure was 50%. 69% of yellow maize samples received and graded were graded as grade one, compared to 65% the previous season. Please see Graph 33 for the percentages of samples (white and yellow) per season graded as grade 1, since commencement of the annual maize crop quality survey in 1998.

Graph 33: Percentage samples graded as Grade 1 over seasons



As shown in Table 2, the percentage total defective kernels above (larger than) and below (smaller than) the 6.35 mm sieve, 5.1% for both white and yellow maize, is 2.5% and 1.6% respectively lower than the previous season. Defective white maize kernels above the 6.35 mm sieve decreased by 2.4% to 3.3% and yellow maize decreased by 1.5% to 2.8%. The percentage defective kernels below the 6.35 mm sieve for white maize decreased slightly from 1.9% to 1.7% while yellow maize equaled last season's 2.3%. The average percentage Diplodia infected kernels in white and yellow maize was 0.8% and 1.4% respectively this season, the previous season's averages were 1.2% and 1.5% respectively. Fusarium infected white maize kernels were 0.4% compared to the 1.7% of 2021/22 and that of yellow maize 0.5% compared to 1.6% previously.

The percentage of white maize samples that were downgraded to class other maize as a result of the percentage foreign matter exceeding 0.75%, was 6% (31 samples) and that of yellow maize 5% (23 samples). No samples were downgraded as a result of other colour maize exceeding the 10% and 5% maximum permissible deviation for grade 3 white and yellow maize respectively. The average percentage combined deviations of white maize was 5.5% compared to the 8.0% of the 2021/22 season and that of yellow maize 5.4% compared to 6.9% previously.

Please refer to Tables 3 to 7 and Graphs 34 to 36 on pages 35 to 48.

USA Grading

Of the 1 000 maize samples graded according to USA grading regulations, 59% were graded US1, 23% US2, 7% US3, 5% US4 and both US5 and sample grade 3% each. The percentage samples graded as US1 varies substantially over seasons, varying from 27% to 62%, 30%, 41% and 51% over the previous five seasons. The percentage samples graded as US2 was lower than the 31% of the previous season. Grades 3, 4 and 5 compared to the percentages of samples in season 2020/21. The main reason for downgrading the samples was (as in previous seasons) the percentage total damaged kernels exceeding the maximum limit per grade, followed by broken corn and foreign material. Please see Tables 8 and 9 on pages 49 to 54.

Physical Quality characteristics

Bushel weight/Test weight is applied as a grading factor in the USA grading regulations and is also routinely done at most intake points locally for stock verification purposes. White maize had an average test weight of 76.3 kg/hl compared to the 76.4 kg/hl of yellow maize. The average test weights of white and yellow maize were respectively 0.8 kg/hl and 1.0 kg/hl higher than in the previous season. The test weight in total varied from 69.1 kg/hl to 82.2 kg/hl.

Of the 21 samples (2.1%) that reported Bushel weight values below the minimum requirement (56.0 lbs or 72.1 kg/hl) for USA grade 1 maize, one originated in the Eastern Cape, five were from the North West production regions, eight from the Free State, four from Mpumalanga, two from Gauteng and one from KwaZulu Natal. In the previous season, 6.8% of the samples were below the minimum requirement.

The 100 kernel mass ("as is" basis) of white maize was 35.3 g (35.1 g in 2021/22) and averaged higher than yellow maize's 31.6 g (last season 31.1 g). This trend is also observed in previous seasons. The percentage white maize kernels above the 10 mm sieve (24.5%) decreased by 3.7% compared to the previous season. The percentage yellow maize kernels above the 10 mm sieve (7.0%) was 2.4% lower than last season. The percentage yellow maize kernels above the 10 mm sieve was on average 17.5% lower than white kernels and the percentage yellow kernels below the 8 mm sieve 18.4% higher than that of white maize. Overall, yellow maize kernels remain smaller than white maize kernels as observed over previous seasons.

The percentages maize below the 6.35 mm and 4.75 mm sieves provides an indication of the breakage susceptibility. White maize was slightly less susceptible to breakage than during the previous season, while yellow maize was equal to the previous season. The percentage stress cracks observed varied overall from 0 to 63% and averaged 8%. White and yellow maize both averaged 8%, the previous season both averaged 11%.

Refer to Tables 12 to 16 on pages 56 to 66 and Graphs 37 to 40 on pages 66 and 67.

The milling index obtained from the SAGL Milling Index 2023 model, varied from an average of 71 (68 in 2021/22) for white maize to an average of 72 (equal to 2021/22) for yellow maize. Grit Yield All (GYA) values averaged 63 for both white and yellow maize, 62 and 63 respectively in the previous season.

Roff milling and whiteness index (WI)

The average % extraction of total meal in white maize obtained with the Roff mill, averaged 76.9% (0.7% higher than the previous season) and varied from 71.1% to 81.0%. Please see Graphs 41 to 46 on page 73 for a comparison of the different fractions' percentages as well as the percentage total meal extraction obtained on the Roff mill since 2013/14. The development of the new model for Milling Index was commenced in the 2012/13 season. Please refer to pages 104 and 105, Milling Index, in the Methods section of the report.

The whiteness index averaged 40.4 for unsifted and 36.8 for sifted maize meal. Sieving the sample eliminates differences in the readings as a result of particle size. The whiteness index of the previous season averaged 38.9 and 35.7 for unsifted and sifted maize meal respectively.

The higher the WI value, the whiter the meal sample. The main contributing factors causing differences in WI values are the presence of other colour maize like yellow maize, the presence of defective kernels, the type of cultivar as well as the soil composition. Please see Tables 17 and 18 on pages 68 to 72.

Nutritional Values

The maize industry requested that crude fibre be added to the scope of analysis performed on the annual maize crop quality survey. With the assistance of FOSS, a calibration was developed on the Infratec 1241 Grain Analyser (NIT) during the 2017/18 season. The calibration is updated annually with the latest season's results.

The average fat content of white maize equaled the 4.0% of the previous four seasons. Yellow maize also averaged 4.0%, 0.1% higher than the previous season. The 10-year average fat content of white maize is 4.1% and that of yellow maize 4.0%. The average protein content of yellow maize was 8.6%, while white maize averaged 8.2%. The 10-year average for yellow and white maize respectively is 9.0% and 8.7%.

The average starch contents of both white maize (75.1%) and yellow maize (73.9%) were lower than in the previous season (0.9% and 1.2% respectively). Ten-year averages for white and yellow maize are 74.0% and 73.3%. The average crude fibre content of white maize was 2.1% and that of yellow maize 2.2%, similar to the previous season.

The fat, starch, protein and crude fibre nutritional components are reported as % (g/100 g) on a dry base. Please refer to Tables 19 to 22 on pages 74 to 81 and Graphs 47 to 50 on page 82.

Mycotoxins

None of the 350 samples analysed this season, tested positive for Aflatoxin, Ochratoxin A, T-2 toxin or HT-2 toxin residues.

The average Fumonisin level (Sum of B₁, B₂ and B₃) on all 350 samples tested was 38 µg/kg (ppb), compared to the previous season's average of 111 µg/kg. Levels ranged from not detected (ND) to 3 127 µg/kg. Of the 350 samples tested, 48 samples (14%) tested positive for fumonisin levels and the average of these positive results was 283 µg/kg. The previous season, 16% of the samples tested positive, with an average of 709 µg/kg.

The highest Deoxynivalenol (DON) level detected this season was 2 205 µg/kg, compared to the 6 879 µg/kg of last season. The average level of all samples tested this season was 116 µg/kg, 621 µg/kg the previous season. Both the percentage of positive results as well as the average of the positive results decreased this season and compared to the previous five seasons. 83% of the samples tested positive for DON last season with the average of the positive results 749 µg/kg. This season, 36% of the samples tested positive with an average of 320 µg/kg.

Only 4% of the samples tested positive for 15-acetyl-deoxynivalenol (15-ADON) residues, compared to 31% the previous season. The average of the positive results was 176 µg/kg compared to 211 µg/kg in the previous season.

Zearalenone residues were found in 3% of the samples, 16% during the previous season. Values ranged from ND to 328 µg/kg. The average of the positive samples was 78 µg/kg compared to the 58 µg/kg of the previous season.

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 and reported as not detected (ND). Please see mycotoxin results in Table 23 on pages 89 to 100.

