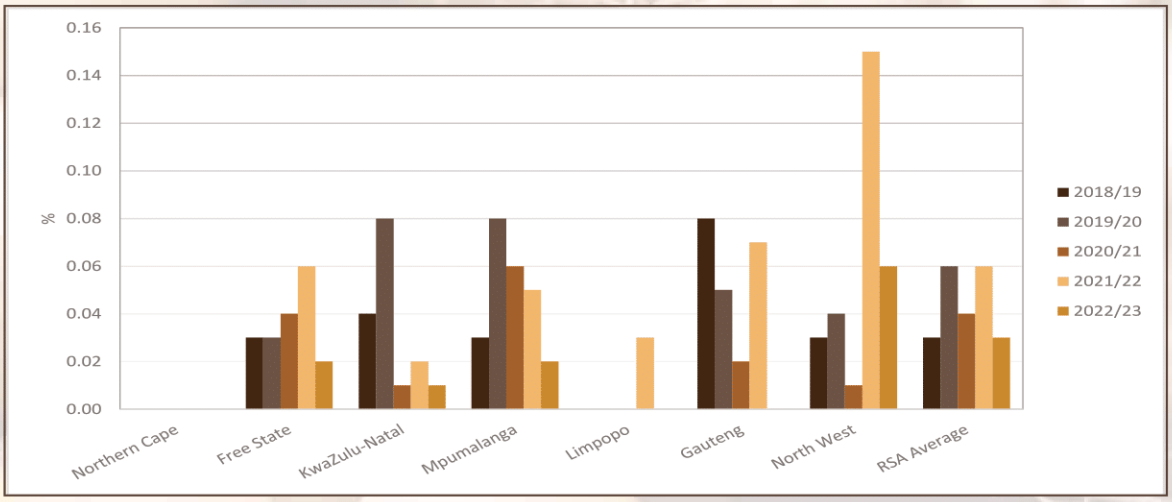
Soybean Crop Quality 2022/23 –Summary of results

Eighty-three percent (145) of the 174 samples analysed for the purpose of this survey were graded as Grade SB1, while 29 (17%) of the samples were downgraded to COSB (Class Other Soya Beans). During the previous two seasons, 19% (2021/22) and 20% (2020/21) of the samples were downgraded to COSB.

- Three of the 29 samples were downgraded as a result of the percentage other grain exceeding the maximum permissible deviation of 0.5%.
- Five samples were downgraded as a result of the percentage soiled soybeans present in the samples exceeding the maximum permissible deviation of 10%.
- Eleven samples were downgraded as a result of the number of *Crotolaria sp.* and two samples as a result of *Datura sp.* poisonous seeds present exceeding the maximum permissible number of 1 per 1000 g. A further two samples had both *Crotolaria sp.* and *Datura sp.* present.
- One sample was downgraded as a result of the number of *Ipomoea purpurea Roth.* and another as a result of *Convolvulus sp.* poisonous seeds present exceeding the maximum permissible number of 7 per 1000 g.
- The remaining four samples were downgraded as a result of a combination of two or more of the following deviations exceeding the maximum permissible deviation: foreign matter, other grain, collective deviations and the presence of poisonous seeds *(Datura sp. and Crotolaria sp.).*

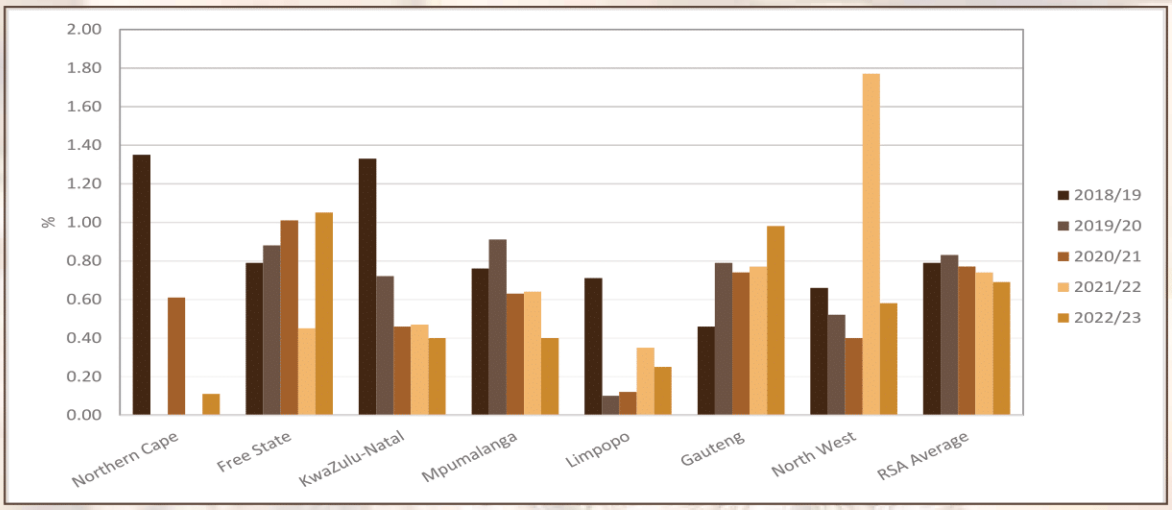
The percentage samples containing sclerotia from the fungus *Sclerotinia sclerotiorum* was 26%, compared to the 43% of the previous two seasons. 37% of the samples that contained sclerotia this season originated in Mpumalanga, 30% in the Free State, 28% in North West and one sample each in Gauteng and KwaZulu-Natal. All these percentages sclerotia found to be present in the samples were however still well below the maximum permissible level of 4%. The national weighted average percentage this season was 0.03% compared to the 0.06% of the previous season. See Graph 16.

Graph 16: Average percentage sclerotia per province over five seasons



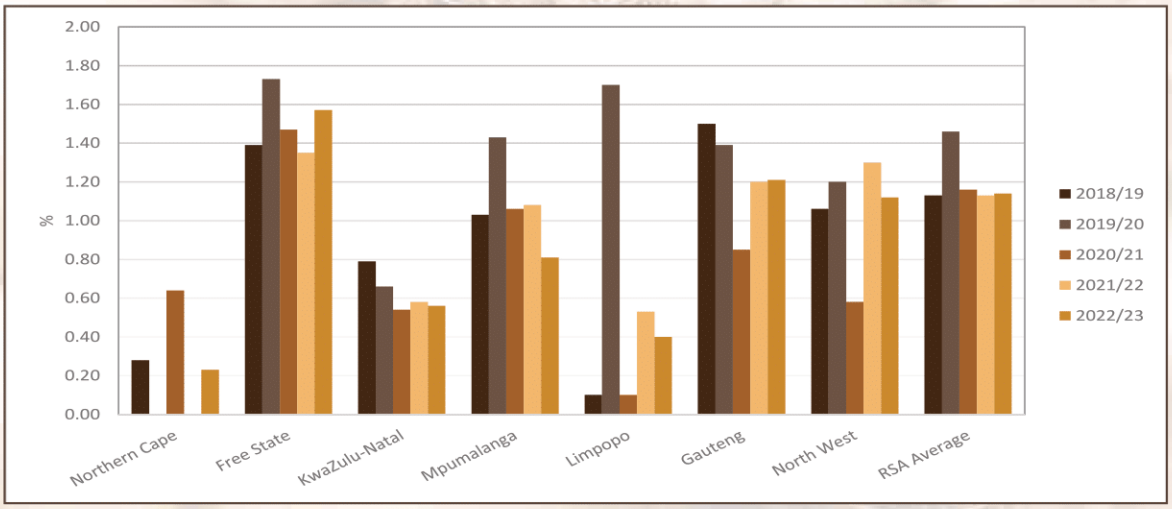
The samples received from the Free State province (66 samples) had the highest weighted average percentage foreign matter (1.05%), followed by Gauteng (3 samples) with 0.98% and North West (29 samples) with 0.58%. The lowest percentage foreign matter was observed on the two samples from the Northern Cape, namely 0.11%. The national weighted average of 0.69% was in line with previous seasons. Please refer to Graph 17.

Graph 17: Average percentage foreign matter per province over five seasons



The Free State reported the highest weighted average percentage soybeans and parts of soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, namely 1.57%, followed by the 1.21% and 1.12% from Gauteng and North West respectively. The lowest weighted average value reported were 0.23% on the samples from the Northern Cape. The national weighted average percentage of 1.14% was similar to the 1.13% and 1.16% of the previous two seasons respectively. Please see Graph 18.

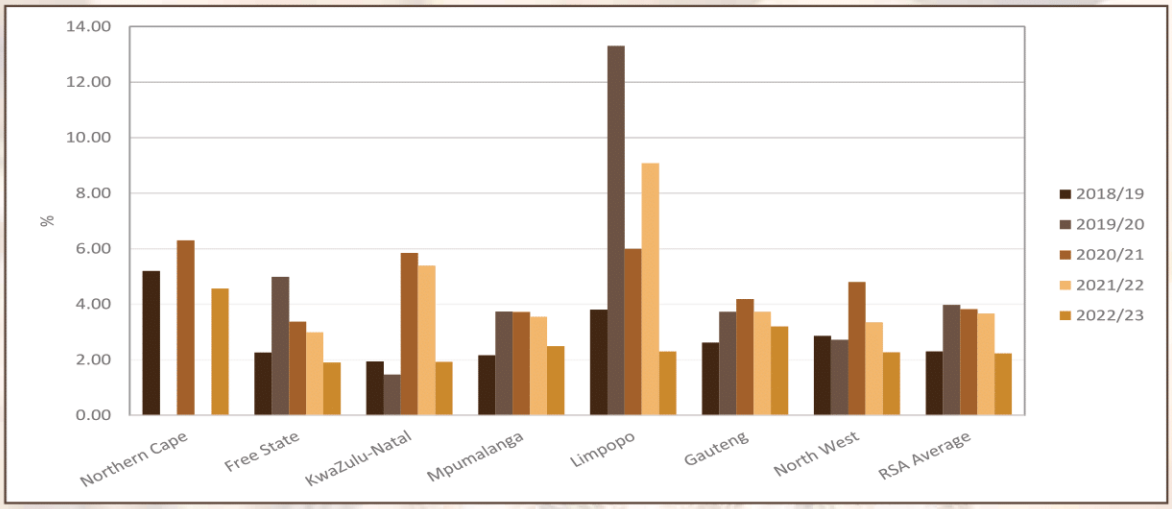
Graph 18: Average percentage soybeans and parts of soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve per province over five seasons



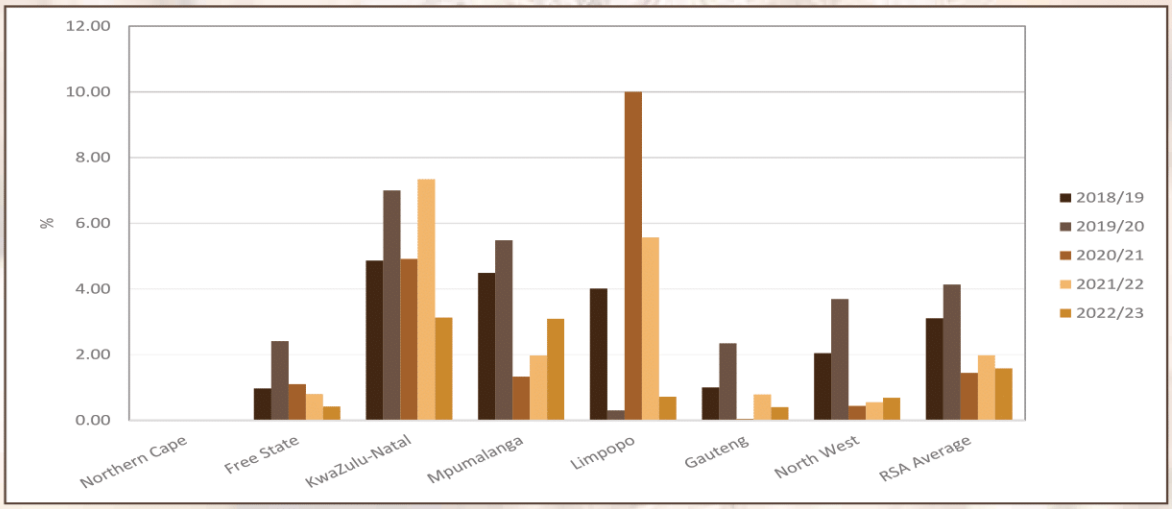
The lowest weighted average percentages defective soybeans on the 4.75 mm sieve, was reported on the Free State samples (1.90%) and the nine samples from KwaZulu-Natal (1.93%). The highest percentage, namely 4.57% was observed on the Northern Cape samples. The averages in the other provinces ranged from 2.27% to 3.20%. The national weighted average decreased from 3.67% last season to 2.23% this season. Please see Graph 19.

The national weighted average percentage soiled soybeans was 1.58%. The previous two seasons averaged 1.98% and 1.44% respectively. The highest weighted average percentages were observed in KwaZulu-Natal (3.13%) and Mpumalanga (64 samples) with 3.09%. The remaining weighted averages ranged between 0% and 0.72%. Please see Graph 20. Eighty-six of the samples analysed contained soiled soybeans. Five samples exceeded the maximum permissible deviation of 10% according to the grading regulations. The highest percentage reported was 27.05% on a sample from Mpumalanga. The rest of these samples originated in Mpumalanga and North West. Last season, eight samples exceeded the grading limit.

Graph 19: Average percentage defective soybeans on the 4.75 mm round hole sieve per province over five seasons



Graph 20: Average percentage soiled soybeans per province over five seasons



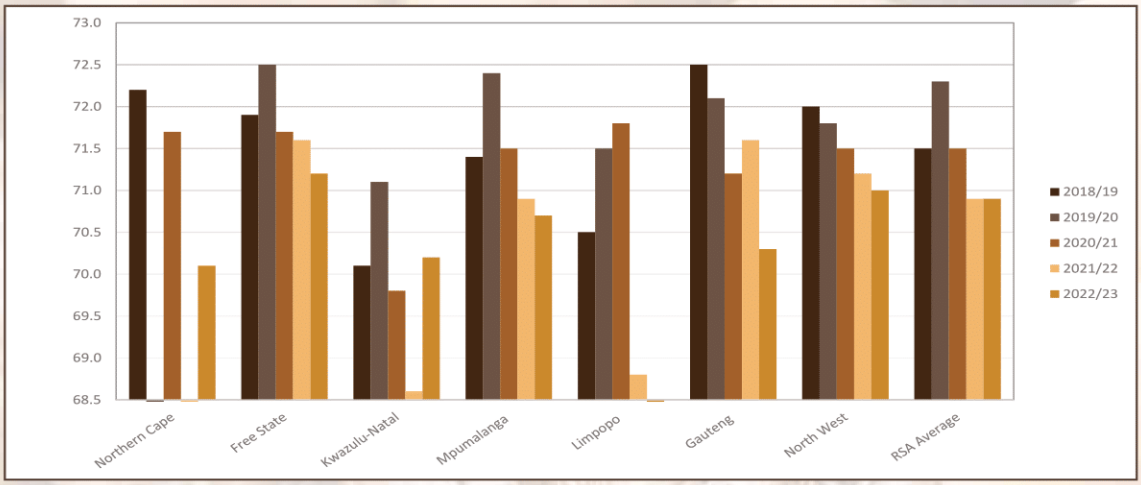
Test weight does not form part of the grading regulations for soybeans in South Africa. An approximation of the test weight of South African soybeans is provided in Table 2 for information purposes. The standard working procedure of the Kern 222 instrument, as described in ISO 7971-3:2019, was followed. The g/1 L filling mass of the soybean samples was determined and divided by two. The test weight was then extrapolated by means of the following formulas obtained from the Test Weight Conversion Chart for Soybean of the Canadian Grain Commission: $y = 0.1898x + 2.2988$ (291 to 350 g/0.5 L) and $y = 0.1895x + 2.3964$ (351 to 410 g/0.5 L). Please see Graph 21 for a comparison of the test weight per province over the last five seasons.

Table 2: Approximation of test weight per province over three seasons

Province	Test weight, kg/hl								
	2022/23 Season			2021/22 Season			2020/21 Season		
	Weighted average	Range	No. of samples	Weighted average	Range	No. of samples	Weighted average	Range	No. of samples
Northern Cape (Regions 10 - 11)	70.1	70.0 - 70.2	2	-	-	-	71.7	71.6 - 71.7	2
Free State (Regions 21 - 28)	71.2	64.3 - 73.2	*65	71.6	69.8 - 73.3	**36	71.7	68.9 - 75.0	**59
KwaZulu-Natal (Region 36)	70.2	69.0 - 72.1	9	68.6	65.7 - 71.1	14	69.8	67.7 - 71.2	10
Mpumalanga (Regions 29 - 33)	70.7	68.3 - 73.4	64	70.9	67.4 - 73.1	65	71.5	66.5 - 73.2	*65
Limpopo (Region 35)	67.4	-	1	68.8	63.7 - 72.7	3	71.8	-	1
Gauteng (Region 34)	70.3	68.7 - 71.3	3	71.6	70.7 - 72.3	9	71.2	70.3 - 71.8	5
North West (Region 12 - 20)	71.0	68.6 - 72.8	29	71.2	68.7 - 74.2	21	71.5	70.8 - 71.9	5
RSA	***70.9***	***64.3 - 73.4***	***173***	***70.9***	***63.7 - 74.2***	***148***	***71.5***	***66.5 - 75.0***	***147***

** One sample with an outlier value was not taken into account for calculation purposes.*
***Two samples with outlier values were not taken into account for calculation purposes.*

Graph 21: Comparison of the test weight per province over five seasons



The nutritional component analyses, namely crude protein, - fat, - fibre and ash are reported on a dry/moisture-free basis (db) for the current as well as the previous surveys. For comparison purposes the national average 'as is' or wet basis results for the last five seasons are provided in Table 3. These 'as is' average values were calculated by converting each individual value from dry basis to 'as is'.

Table 3: Comparison of weighted average nutritional component values on a dry and 'as is' basis over five seasons

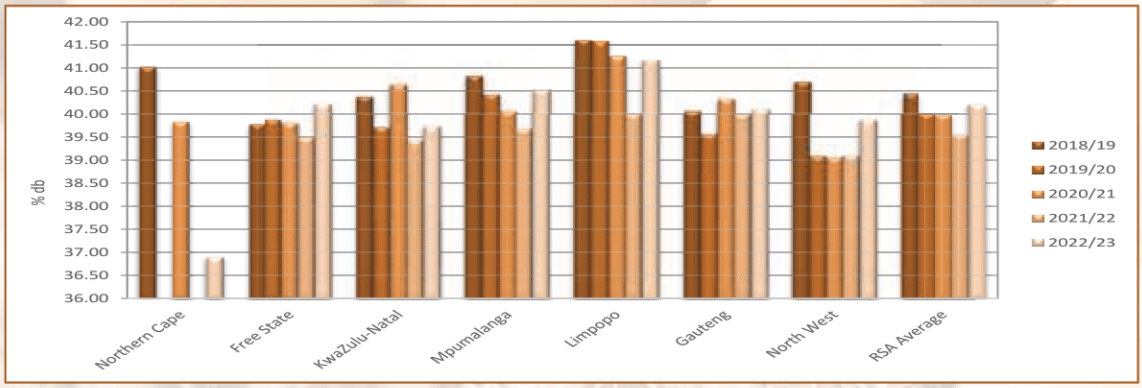
Season	2022/23		2021/22		2020/21		2019/20		2018/19	
Moisture, % (17hr, 103°C)	8.2		8.2		7.5		7.2		7.0	
Moisture basis	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**
Crude protein, %	40.19	36.90	39.54	36.31	39.96	36.95	39.99	37.12	40.43	37.60
Crude fat, %	19.9	18.3	19.6	18.0	19.5	18.0	18.0	16.7	19.1	17.8
Crude fibre, %	7.1	6.5	7.2	6.6	6.8	6.3	7.0	6.5	6.8	6.3
Ash, %	4.54	4.17	4.63	4.25	4.55	4.21	4.63	4.19	4.67	4.34
No. of samples	***174***		***150***		***150***		***150***		***150***	

The weighted average crude protein content this season was 40.19% compared to the 39.54% of the previous season. Limpopo (one sample) reported the highest value (41.16%) and the Northern Cape the lowest average (36.90%). The Free State and Mpumalanga averaged 40.19% and 40.50% respectively. The weighted average crude fat percentage of 19.9% was the highest since the 2011/12 season when this survey commenced. The samples from the Northern Cape had the highest weighted average crude fat content, namely 21.3%. The lowest fat average was observed in Gauteng province with 18.6%.

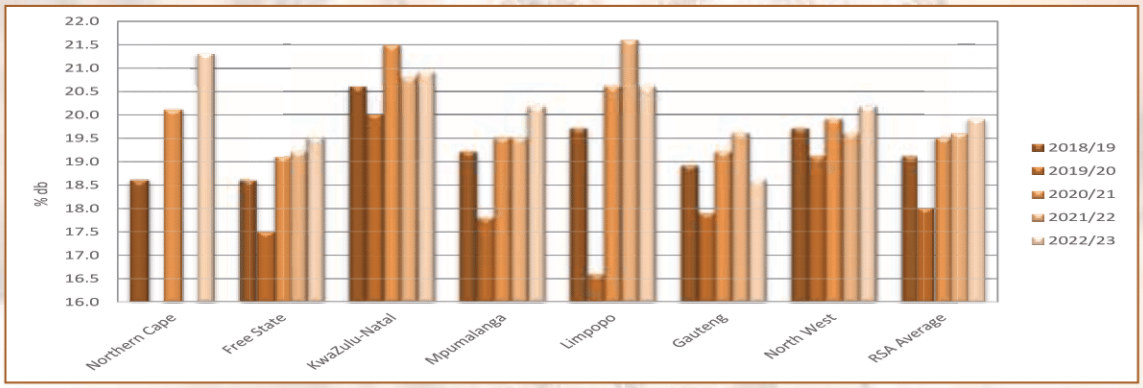
The weighted average percentage crude fibre varied from 6.1% in KwaZulu-Natal to 7.5% in Gauteng. The RSA weighted average was 7.1% compared to the 7.2% of the previous season. This season, the average ash content was 4.54%, the lowest average value of the twelve seasons that this survey has been conducted. Averages ranged from 5.24% in the Northern Cape to 4.70% in KwaZulu-Natal.

Graphs 22 to 25 on page 18 provide comparisons between provinces over seasons for the nutritional components mentioned above.

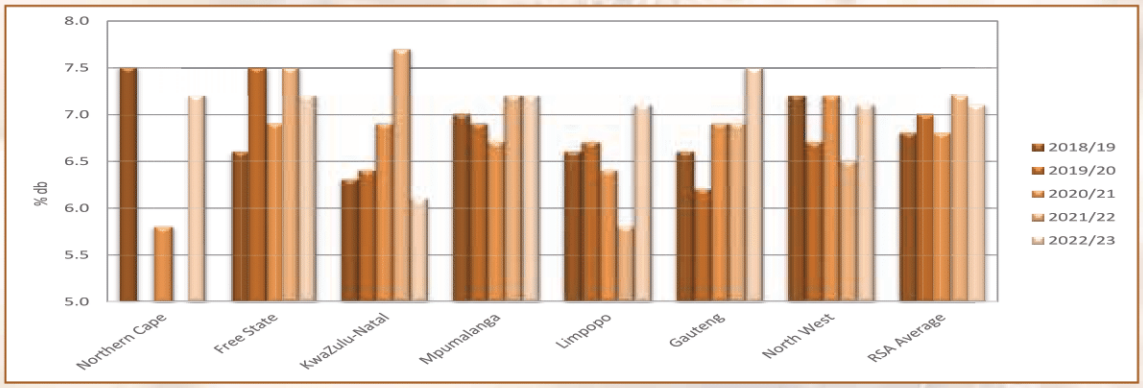
Graph 22: Average crude protein content per province over five seasons



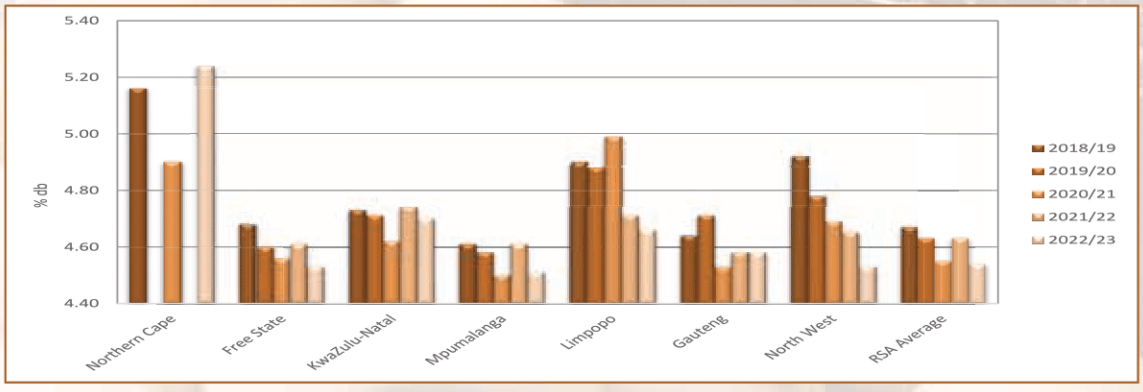
Graph 23: Average crude fat content per province over five seasons



Graph 24: Average crude fibre content per province over five seasons



Graph 25: Average ash content per province over five seasons



The 2022/23 season is the fifth season that the SAGL conducted the moisture, crude protein and crude fat analyses on the ARC Grain Crops soybean cultivar trials' samples. Please see a comparison of the results between the crop survey and cultivar samples in Table 4.

Table 4: Comparison between the moisture, crude protein and crude fat results of the soybean crop quality and ARC cultivar trial samples of the 2022/23 season

Analysis	Moisture, % (17hr, 103°C)	Crude Protein, % (db)	Crude Protein, % (as is)	Crude Fat, % (db)	Crude Fat, % (as is)
Soybean Crop Quality Survey results					
Average	**8.2**	**40.19**	**36.90**	**19.9**	**18.3**
Minimum	6.4	34.62	30.67	16.6	15.1
Maximum	11.5	44.28	40.91	40.5	36.0
Standard Deviation	1.11	1.51	1.49	2.01	1.80
No. of samples	*174*	*174*	*174*	*174*	*174*
ARC Grain Crops Cultivar trial sample results					
Average	**8.8**	**40.68**	**37.10**	**20.3**	**18.5**
Minimum	8.4	36.74	33.65	16.5	15.1
Maximum	9.4	43.69	39.58	23.4	21.2
Standard Deviation	0.19	1.38	1.38	1.57	1.57
No. of samples	*96*	*96*	*96*	*96*	*96*
% Difference between crop and cultivar samples	***-0.6***	***-0.5***	***-0.2***	***-0.4***	***-0.2***

A summary of the RSA Soybean Crop Quality averages of the 2022/23 season compared to those of the 2021/22 season, is provided in Table 5 on page 20.

Please see pages 25 to 33 for the average soybean quality per region.