Soybean Crop Quality 2018/19 – Summary of results

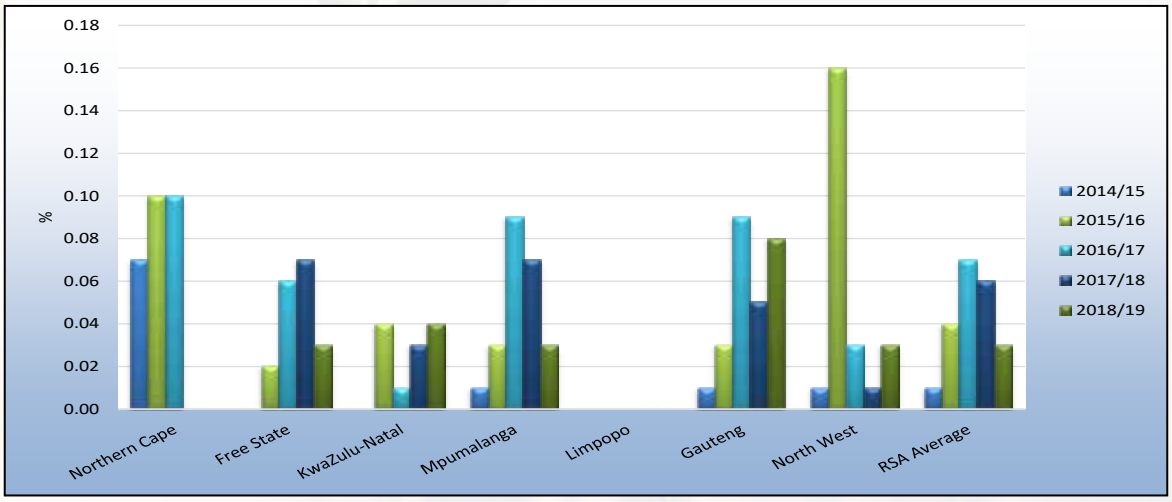
Eighty-nine percent (134) of the 150 samples analysed for the purpose of this survey were graded as Grade SB1, while 16 of the samples were downgraded to COSB (Class Other Soya Beans). During the previous two seasons, 13% (2017/18) and 12% (2016/17) of the samples were downgraded to COSB.

- One of the 16 samples was downgraded as a result of the presence of percentages foreign matter as well as collective deviations, exceeding the maximum permissible deviations of 5% and 7% respectively.
- Four of the samples were downgraded as a result of the percentage other grain present in the samples exceeding the maximum permissible deviation of 0.5%.
- Six samples were downgraded as a result of the percentage soiled soybeans present in the samples exceeding the maximum permissible deviation of 10%.
- Five samples in total were downgraded as a result of the presence of poisonous seeds. Four samples were downgraded due to the number of *Datura sp*. seeds exceeding the maximum permissible number (1 per 1000 g) and the other one as a result of the number of *Convolvulus sp*. seeds exceeding 7 per 1000 g.

Wet pods were not present in any of the 150 samples received and graded.

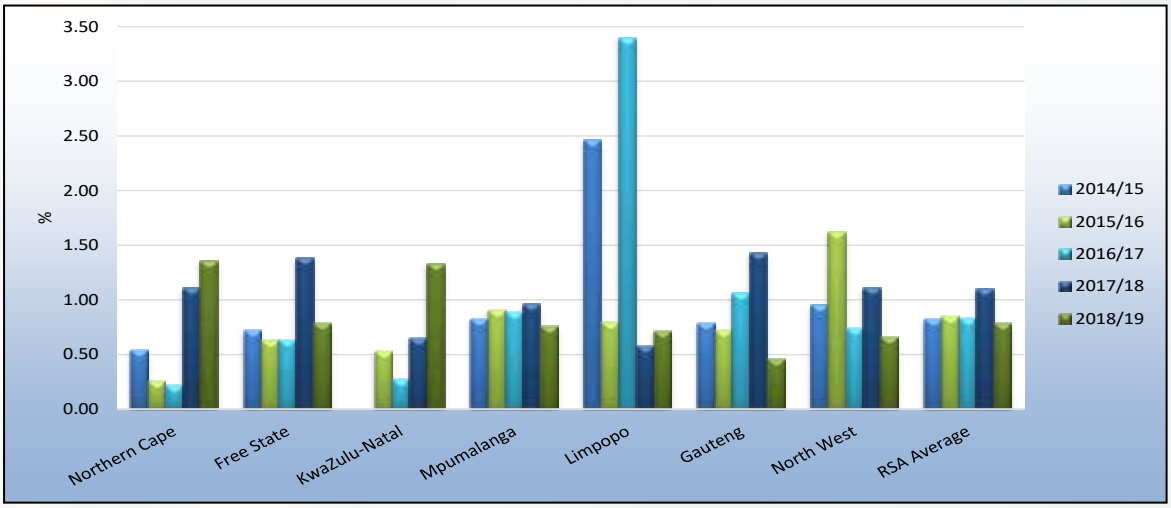
The percentage samples containing sclerotia from the fungus *Sclerotinia sclerotiorum*, decreased from 59% (88 samples) in the previous season to 27% (41 samples) this season. The five highest percentages sclerotia observed ranged from 0.44 % (sample from Gauteng) to 0.24% (samples from Mpumalanga and the Free State). These percentages are 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



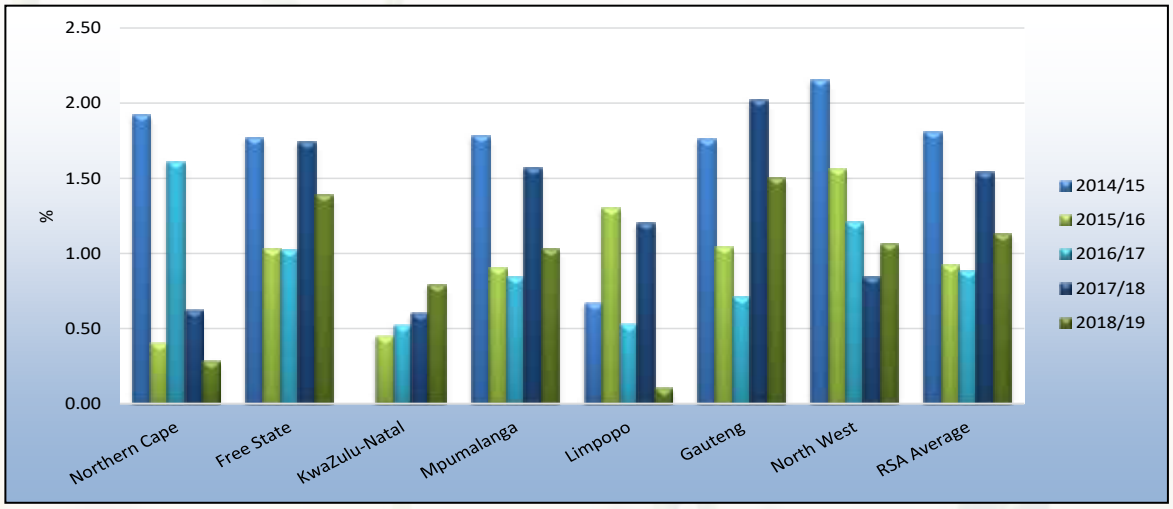
The only sample received from the Northern Cape province (region 11) had the highest percentage foreign matter (1.35%), followed closely by the 1.33% weighted average of the 12 samples from KwaZulu-Natal. The percentage foreign matter in the rest of the samples ranged from 0.46% in Gauteng (12 samples) to 0.79% in the Free State (42 samples). Please refer to Graph 17.

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



As in the previous season, Gauteng 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 1.50% and the samples from Limpopo (N=3) and the Northern Cape the lowest with 0.10% and 0.28% respectively. Mpumalanga province (73 samples) averaged 1.03% and the Free State province 1.39%. The national weighted average percentage decreased from 1.54% the previous season to 1.13% this season. Please see Graph 18.

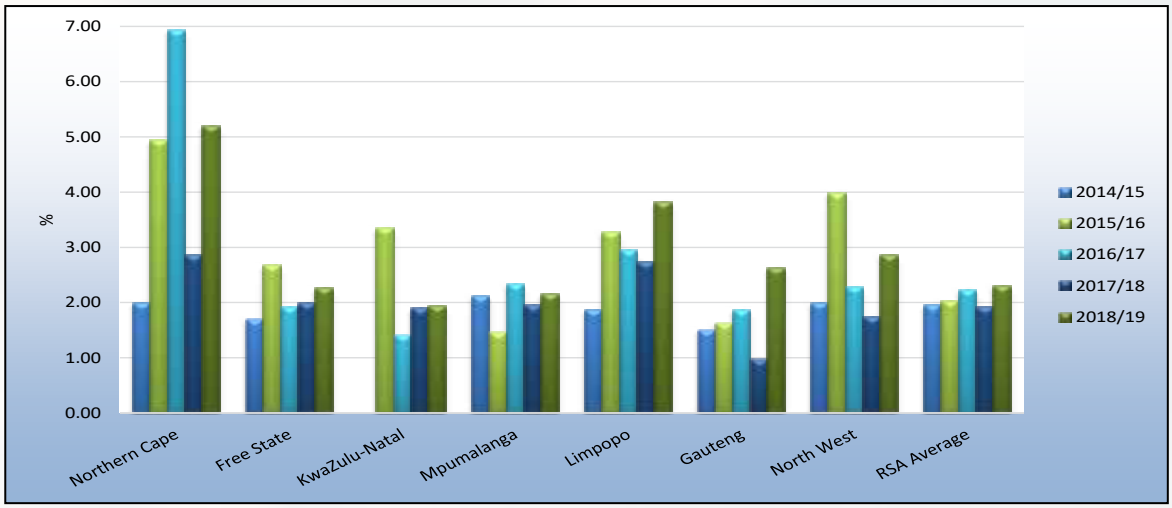
Graph 18: Average percentage soybeans and parts of soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve per province over five seasons



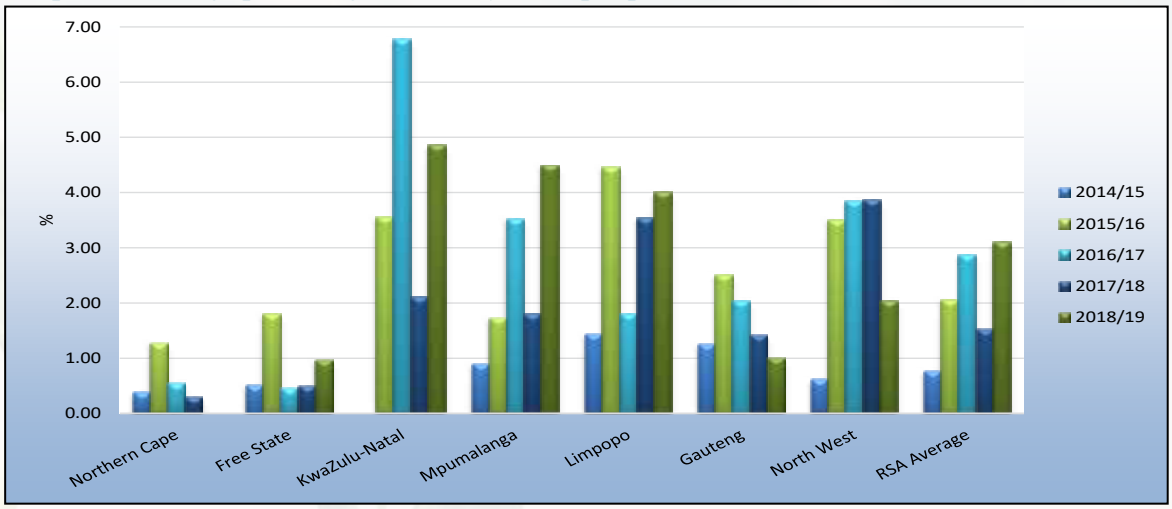
The lowest weighted average percentage defective soybeans on the 4.75 mm sieve was observed on the samples from KwaZulu-Natal, namely 1.94%. The Northern Cape province reported the highest percentage namely 5.20%, followed by Limpopo with 3.81%. The national weighted average increased from 1.91% last season to 2.30% this season. Please see Graph 19.

The national weighted average percentage soiled soybeans was 3.10%, compared to the 1.53% of the previous season. Average weighted percentages per province ranged from 0% in the Northern Cape to 4.86% in KwaZulu-Natal. Please see Graph 20. Six samples exceeded and one sample equaled the maximum permissible deviation of 10% according to the grading regulations. The highest percentage reported was 36.00%. All these samples originated in Mpumalanga. Last season, three samples also originating in Mpumalanga, exceeded this 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



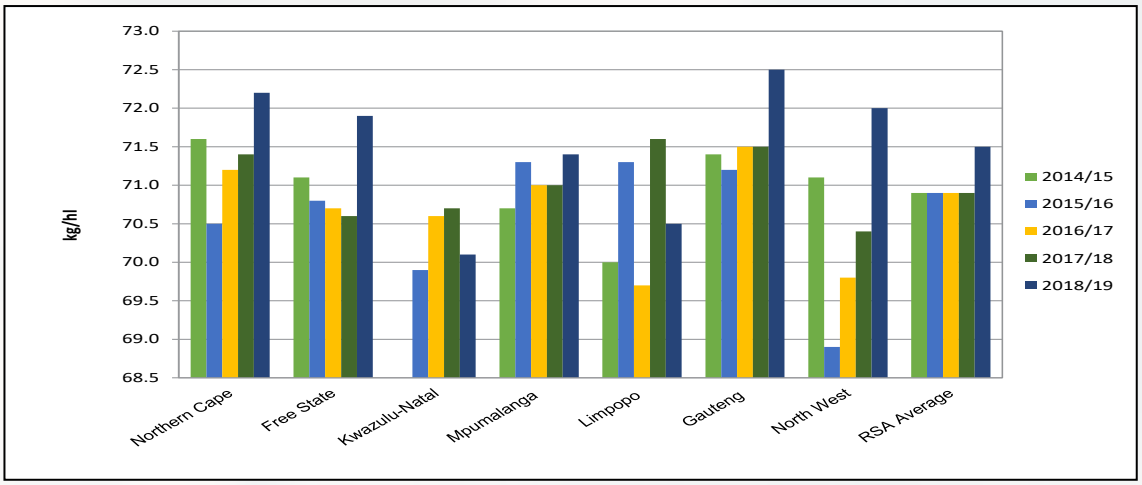
Test weight does not form part of the grading regulations for soybeans in South Africa. An approximation of the test weight of South African soybeans is provided in Table 2 for information purposes. The standard working procedure of the Kern 222 instrument, as described in ISO 7971-3:2009, was followed. 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								
	2018/19 Season			2017/18 Season			2016/17 Season		
	Weighted average	Range	No. of samples	Weighted average	Range	No. of samples	Weighted average	Range	No. of samples
Northern Cape (Regions 10 - 11)	72.2	-	1	71.4	70.2 - 72.5	2	71.2	71.1 - 71.2	2
Free State (Regions 21 - 28)	71.9	69.4 - 74.2	42	70.6	67.2 - 73.6	*44	70.7	65.8 - 72.1	33
KwaZulu-Natal (Region 36)	70.1	68.2 - 72.4	12	70.7	70.0 - 71.6	9	70.6	69.2 - 71.5	8
Mpumalanga (Regions 29 - 33)	71.4	67.8 - 74.6	73	71.0	68.2 - 72.5	71	71.0	67.6 - 72.6	86
Limpopo (Region 35)	70.5	68.9 - 73.2	3	71.6	71.4 - 72.1	4	69.7	69.1 - 70.2	2
Gauteng (Region 34)	72.5	71.7 - 73.8	12	71.5	70.3 - 74.0	11	71.5	70.8 - 73.6	11
North West (Region 12 - 20)	72.0	72.1 - 73.5	**5	70.4	69.0 - 72.5	8	69.8	67.7 - 70.9	8
RSA	***71.5***	***67.8 - 74.6***	***148***	***70.9***	***67.2 - 74.0***	***149***	***70.9***	***65.8 - 73.6***	***150***

** 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' basis results are provided in Table 3. These 'as is' averages 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 four seasons

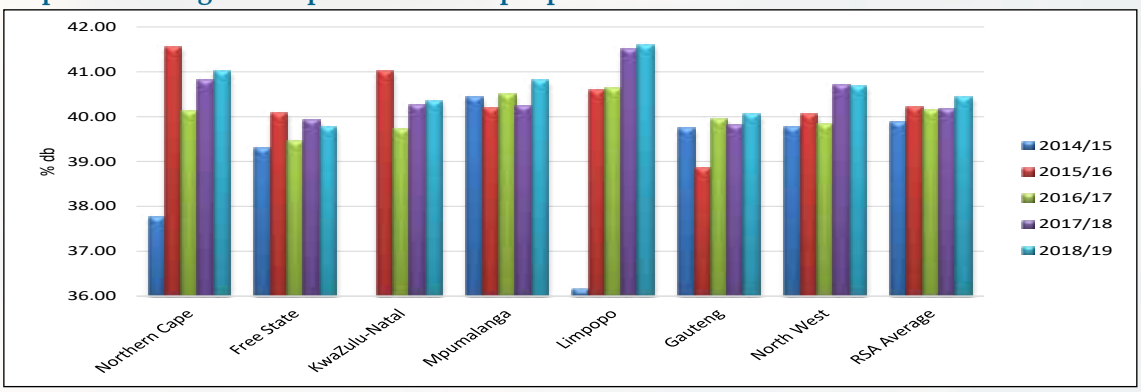
Season	2018/19		2017/18		2016/17		2015/16	
Moisture, % (17hr, 103°C)	7.0		7.4		7.4		7.4	
Moisture basis	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**
Crude protein, %	40.43	37.60	40.18	37.40	40.15	37.20	40.22	37.22
Crude fat, %	19.1	17.8	19.3	18.0	19.8	18.5	19.4	17.9
Crude fibre, %	6.8	6.3	5.9	5.5	5.9	5.4	7.3	6.8
Ash, %	4.67	4.34	4.59	4.27	4.58	4.24	4.61	4.27
No. of samples	***150***		***150***		***150***		***143***	

The weighted average crude protein content this season was 40.43% compared to the 40.18% of the previous season. As in the previous two seasons, Limpopo had the highest weighted average crude protein content (41.60%). The Free State (39.76%) and Gauteng (40.05%) again reported the lowest averages. The weighted average crude fat percentage of 19.1% was slightly lower than the 19.3% in the previous season and also the lowest of the last five seasons. The samples from KwaZulu-Natal had the highest weighted average crude fat content, namely 20.6%. The lowest average fat contents were observed in the Northern Cape and Free State provinces, both with 18.6%.

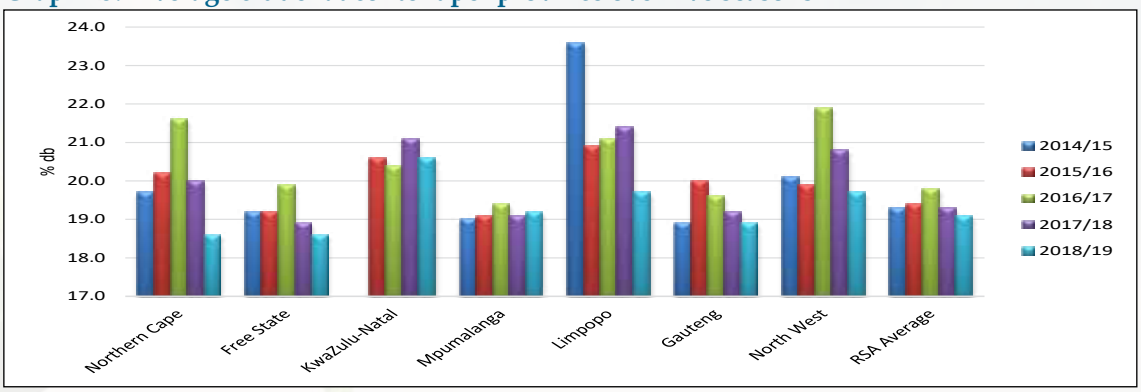
The weighted average percentage crude fibre varied from 6.3% in KwaZulu-Natal to 7.5% in the Northern Cape. The RSA weighted average, 6.8%, was the second highest of the annual surveys since the 7.3% reported in the 2015/16 season. A small variation of only 0.09% is observed with regards to the national weighted average ash content over the eight seasons that this survey has been conducted. This season, the average ash content was 4.67%, the second highest of the eight seasons and 0.08% higher than the previous season. Samples from the Northern Cape and Limpopo, as well as North West to a lesser extent, tend to show higher ash contents over seasons compared to the other provinces.

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

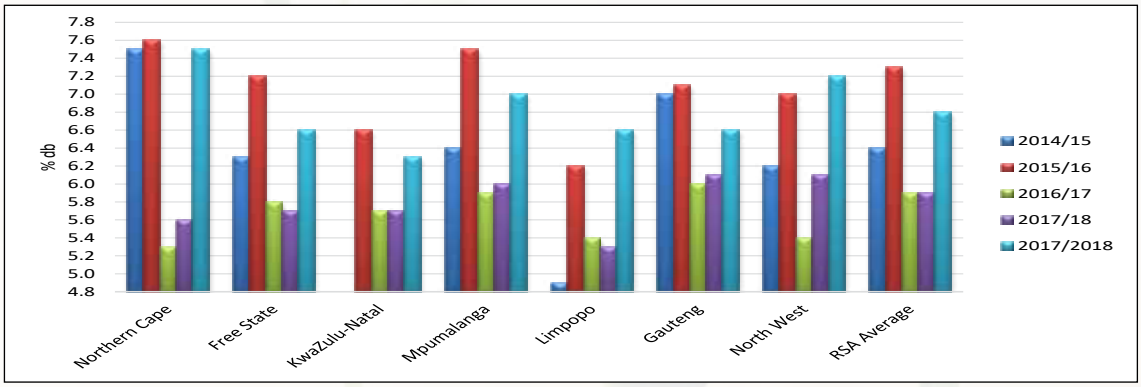
Graph 22: Average crude protein content per province over five seasons



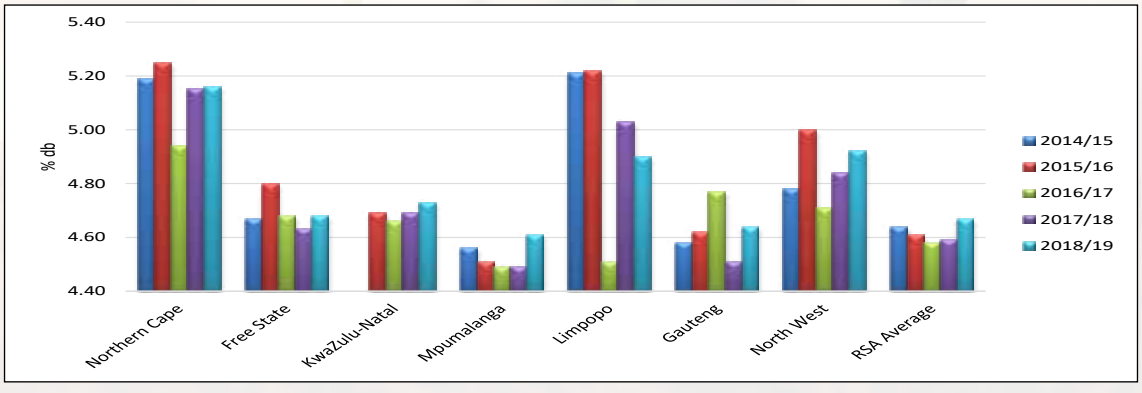
Graph 23: Average crude fat content per province over five seasons



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



Graph 25: Average ash content per province over five seasons



The 2018/19 season is the first season that the SAGL conducted the moisture, crude protein and crude fat analyses on the ARC Grain Crops soybean cultivar trials's 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 2018/19 season

Analysis	Moisture, % (17hr, 103°C)	Crude Protein, % (db)	Crude Fat, % (db)	Crude Protein, % (as is)	Crude Fat, % (as is)
Soybean Crop Quality Survey results					
Avearge	**7.0**	**40.43**	**19.1**	**37.60**	**17.8**
Minimum	6.0	35.43	16.5	33.13	15.3
Maximum	11.4	45.09	22.0	41.84	20.4
Standard deviation	0.67	1.30	1.24	1.20	1.16
No. of samples	*150*	*150*	*150*	*150*	*150*
ARC Grain Crops Cultivar trial sample results					
Avearge	**8.0**	**40.54**	**20.5**	**37.32**	**18.9**
Minimum	7.3	36.01	17.4	33.08	16.1
Maximum	8.5	46.05	23.8	42.24	21.9
Standard deviation	0.29	1.55	1.34	1.40	1.23
No. of samples	*180*	*180*	*180*	*180*	*180*
% Difference between crop and cultivar samples	***-1.0***	***-0.1***	***-1.4***	***0.3***	***-1.1***

All fifteen samples tested for genetic modification (GM), tested positive for the presence of the CP4 EPSPS trait (Roundup Ready®). Please refer to the results in Table 5 on page 20 of this report.

A summary of the RSA Soybean Crop Quality averages of the 2018/19 season compared to those of the 2017/18 season, is provided in Table 6 on page 21.

Please see pages 25 to 30 for the average soybean quality per region.