South African Soybean Crop

Quality Report

2018/2019 Season

Compiled and issued by:
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South African

COMMERCIAL SOYBEAN QUALITY FOR THE 2018/2019 SEASON

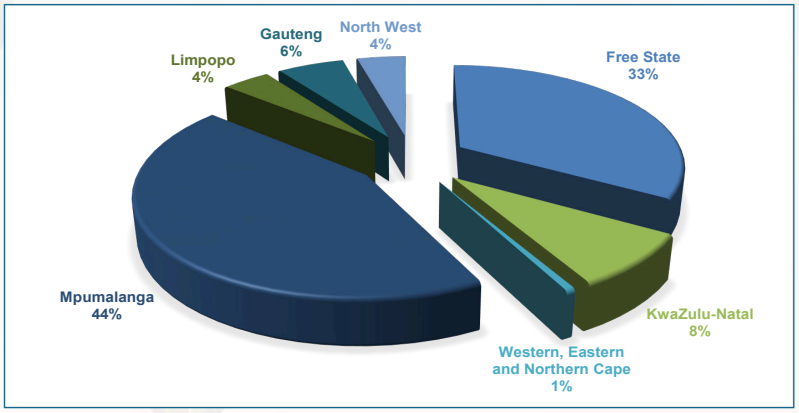
Acknowledgements
With gratitude to:

- ***The Oilseeds Advisory Committee (OAC) as well as the Oil & Protein Seed Development Trust (OPDT).***
- *Agbiz Grain and its members for their cooperation in providing the samples to make the survey possible.*
- *The Crop Estimates Committee (CEC) of the Department of Agriculture, Forestry and Fisheries (DAFF / DALRRD) for providing production related figures.*
- *South African Grain Information Service (SAGIS) for providing supply and demand figures relating to soybeans.*
- *The Bureau for Food and Agricultural Policy (BFAP) for providing research based market analysis.*
- *Precision Oil Laboratories for providing Fatty Acid Profile analyses.*

Introduction

The final figure for the commercial soybean crop of the 2018/19 season, as overseen by the National Crop Estimates Liaison Committee (CELC), is 1 170 345 tons. The crop decreased by 24% (369 655 tons) year on year. The major soybean producing provinces, namely Mpumalanga and the Free State, contributed 77% of the total crop.

Graph 1: Contribution of the provinces to the production of the 2018/19 soybean crop



Figures provided by the CEC.

During the harvesting season, a representative sample of each delivery of soybeans at the various silos was taken according to the prescribed grading regulations. The sampling procedure for the samples used in this survey is described on page 37. One hundred and fifty composite soybean samples, representing the different production regions, were analysed for quality. The samples were graded, milled and analysed for moisture, crude protein, crude fat, crude fibre and ash content. Fifteen randomly selected samples were analysed to quantitatively determine the presence of genetically modified soybeans. Twenty samples, randomly selected to represent the different production regions, were submitted to Precision Oil Laboratories for fatty acid profile analyses.

This is the eighth annual soybean crop quality survey performed by The Southern African Grain Laboratory NPC (SAGL). SAGL was established in 1997 on request of the Grain Industry. SAGL is an ISO 17025 accredited testing laboratory and participates in a number of proficiency testing schemes, both nationally and internationally, as part of our ongoing quality assurance procedures to demonstrate technical competency and international comparability.

The goal of this crop quality survey is the compilation of a detailed database, accumulating quality data collected over several seasons on the national commercial soybean crop, which is essential in assisting with decision making processes. The data reveal general tendencies, highlight quality differences in the commercial soybeans produced in different local production regions and provide important information on the quality of commercial soybeans intended for export when applicable.

The results of this survey are available on the SAGL website (www.sagl.co.za). The hard copy reports are

distributed to all Directly Affected Groups and interested parties. The report is also available for download in a PDF format from the website.

In addition to the quality information, production figures (obtained from the Crop Estimates Committee (CEC)) relating to hectares planted, tons produced and yields obtained on a national as well as provincial basis, over an eleven season period, are provided in this report. SAGIS (South African Grain Information Service) supply and demand information is provided in table and graph format. Import and export figures over several seasons as well as information on the manufacture, import and export of oil seeds products, are also included.

The 2018/19 Report of the National Soybean Cultivar Trials conducted by the ARC-Grain Crops in Potchefstroom, is included in totality and as received, in this report. The national grading regulations as published in Government Notice NO. R.370 of 21 April 2017 are also provided.

Production

Soybeans are the most important oilseed crop produced in South Africa, driven mainly by the demand for protein feed in the animal feed industry. Soybeans have benefits to producers in crop rotation programs, especially as part of conservation agriculture, but also due to lower input requirements compared to other commodities for example wheat and maize.

Table1: Soybean production overview over two seasons

Province	Type of production	2018/19			2017/18		
		Hectares planted, ha	Production, tons	Yield, t/ha	Hectares planted, ha	Production, tons	Yield, t/ha
Western Cape	Dryland	-	-	-	-	-	-
	Irrigation	100	10	0.10	800	1 200	1.50
	Total	100	10	0.10	800	1 200	1.50
Northern Cape	Dryland	-	-	-	-	-	-
	Irrigation	1 550	5 425	3.50	3 000	10 500	3.50
	Total	1 550	5 425	3.50	3 000	10 500	3.50
Free State	Dryland	292 800	368 350	1.26	330 500	508 500	1.54
	Irrigation	8 200	22 950	2.80	14 500	43 500	3.00
	Total	301 000	391 300	1.30	345 000	552 000	1.60
Eastern Cape	Dryland	1 150	1 380	1.20	2 400	2 900	1.21
	Irrigation	-	-	-	-	-	-
	Total	1 150	1 380	1.20	2 400	2 900	1.21
KwaZulu-Natal	Dryland	20 000	47 000	2.35	26 300	75 000	2.85
	Irrigation	13 000	52 000	4.00	13 700	49 000	3.58
	Total	33 000	99 000	3.00	40 000	124 000	3.10
Mpumalanga	Dryland	297 000	470 000	1.58	298 000	632 000	2.12
	Irrigation	13 000	41 500	3.19	12 000	40 700	3.39
	Total	310 000	511 500	1.65	310 000	672 700	2.17
Limpopo	Dryland	2 800	4 980	1.78	6 000	10 000	1.67
	Irrigation	13 400	42 000	3.13	14 000	44 000	3.14
	Total	16 200	46 980	2.90	20 000	54 000	2.70
Gauteng	Dryland	28 500	56 550	1.98	27 000	51 000	1.89
	Irrigation	3 000	9 600	3.20	3 000	10 500	3.50
	Total	31 500	66 150	2.10	30 000	61 500	2.05
North West	Dryland	29 200	27 500	0.94	28 000	38 000	1.36
	Irrigation	6 800	21 100	3.10	8 000	23 200	2.90
	Total	36 000	48 600	1.35	36 000	61 200	1.70
RSA	Dryland	671 450	975 760	1.45	718 200	1 317 400	1.83
	Irrigation	59 050	194 585	3.30	69 000	222 600	3.23
	Total	730 500	1 170 345	1.60	787 200	1 540 000	1.96

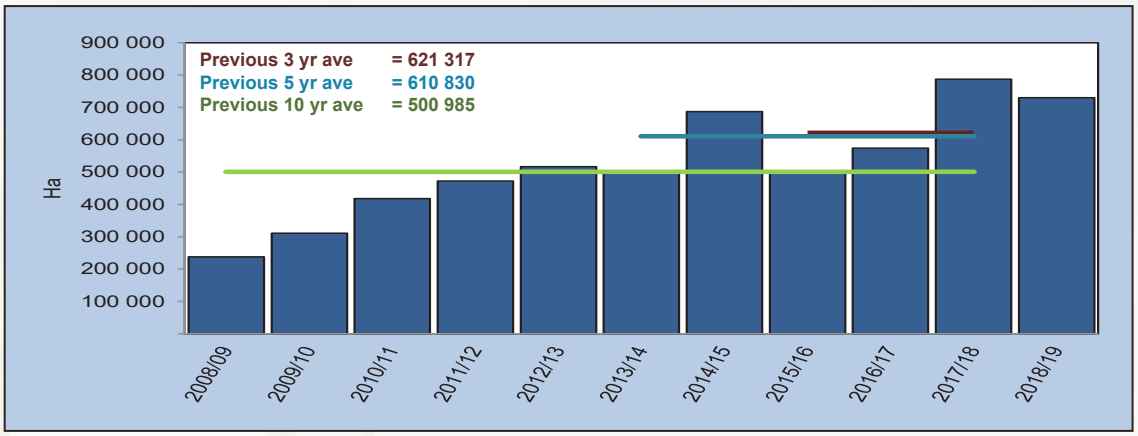
Figures provided by the CEC.

Compared to the 2017/18 production season, the commercial soybean crop production and area planted decreased by 24% and 7% respectively. Although both figures decreased, compared to the previous season, the area planted is still the second and the production figure the third highest figures on record. The average national yield decreased by 18% to 1.60 t/ha.

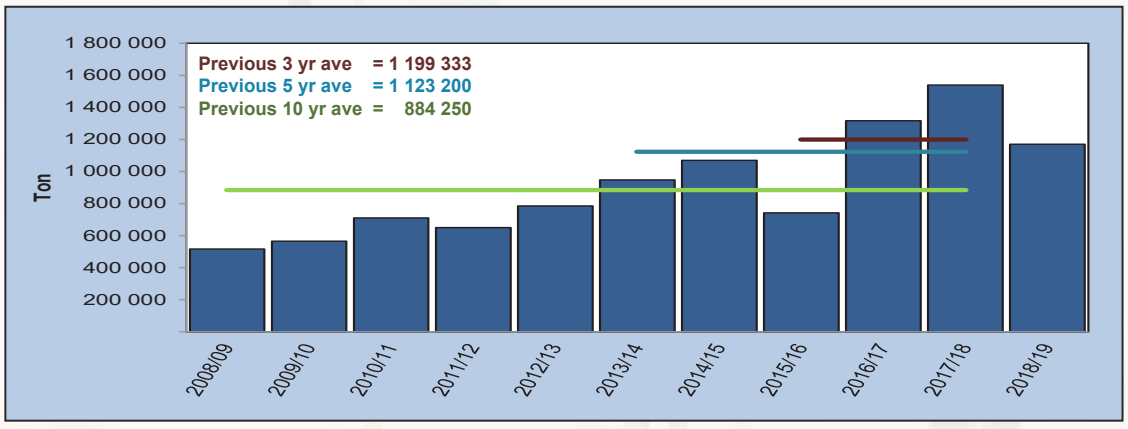
According to the BFAP Baseline, Agricultural Outlook 2019 – 2028, the area cultivated to soybeans is projected to continue increasing, expanding by 68% over the ten-year period to 2028. Where area expansion is substantial, particularly for soybeans, yield gains are less, as the expansion rate implies that some of the more marginal areas will enter production. Yield gains are based on the assumption of stable rainfall and continuously improving cultivars. The introduction of improved soybean cultivars is expected to accelerate, following the introduction of the breeding technology levy.

Soybeans account for more than half of the world oilseed production. According to the *World Agricultural Supply and Demand Estimates Report (WASDE – 598)* an estimated 358.65 million metric tons of soybeans were produced during the 2018/19 season. The United States, Brazil and Argentina are the biggest contributors to this total. The world soybean production during the 2019/20 season is projected to be 341.76 million metric tons.

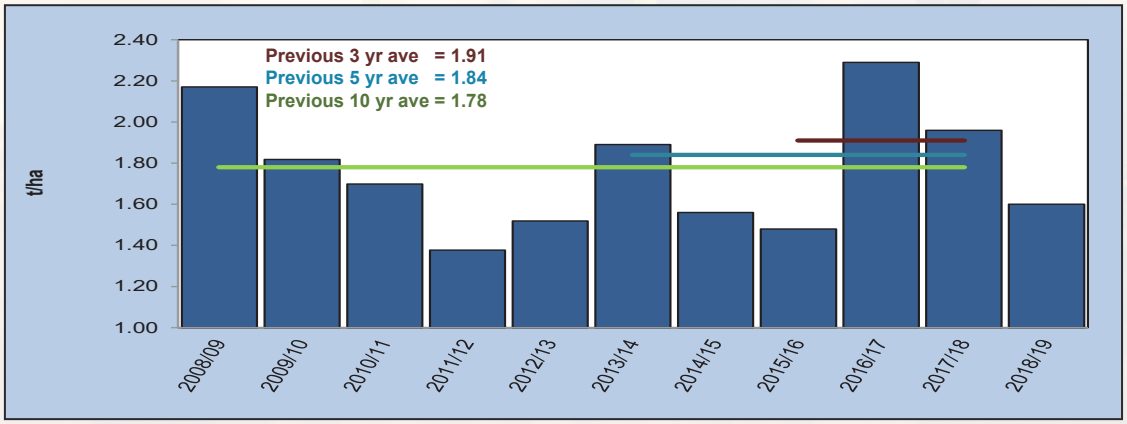
Graph 2: Total RSA area utilised for soybean production from 2008/09 to 2018/19



Graph 3: Soybean production in RSA from 2008/09 to 2018/19

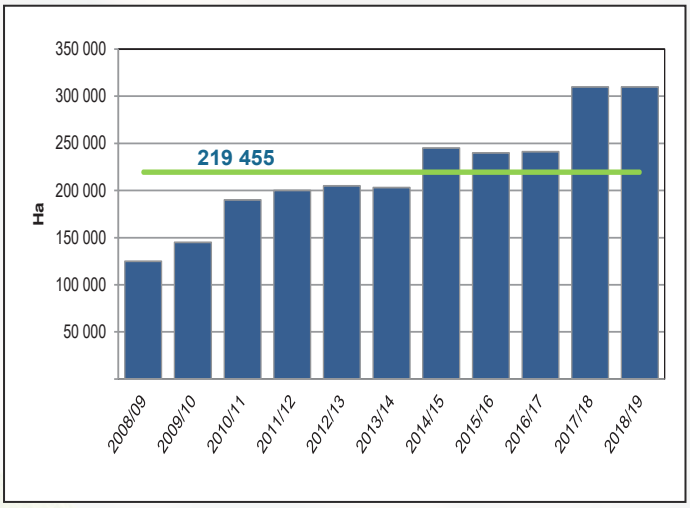


Graph 4: RSA soybean yield from 2008/09 to 2018/19

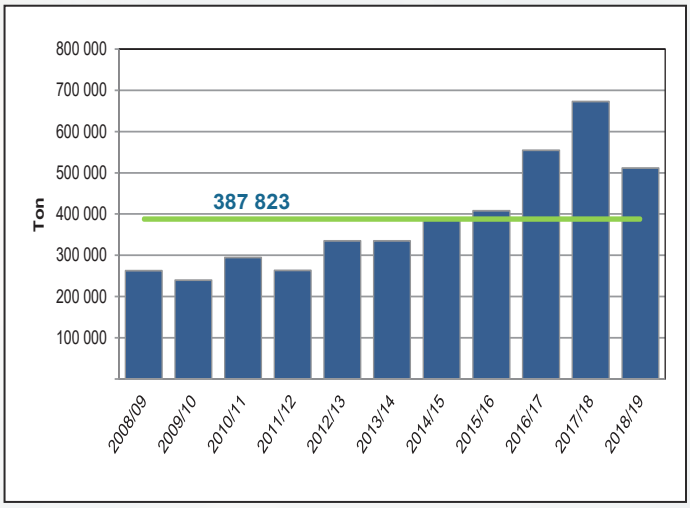


Figures provided by the CEC.

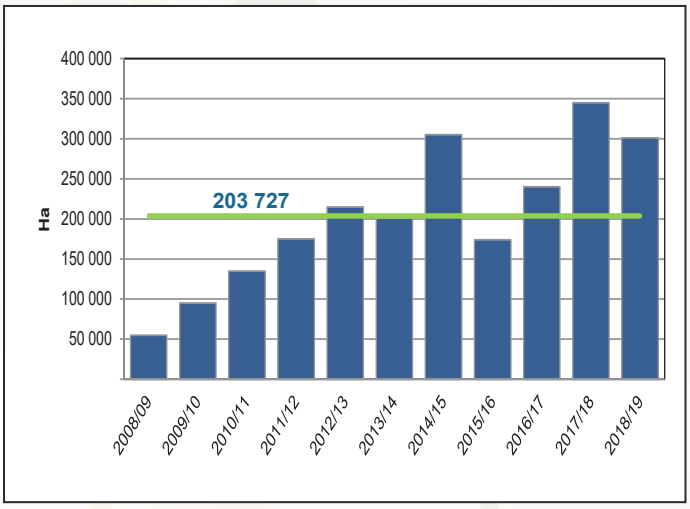
Graph 5: Area utilised for soybean production in Mpumalanga since 2008/09



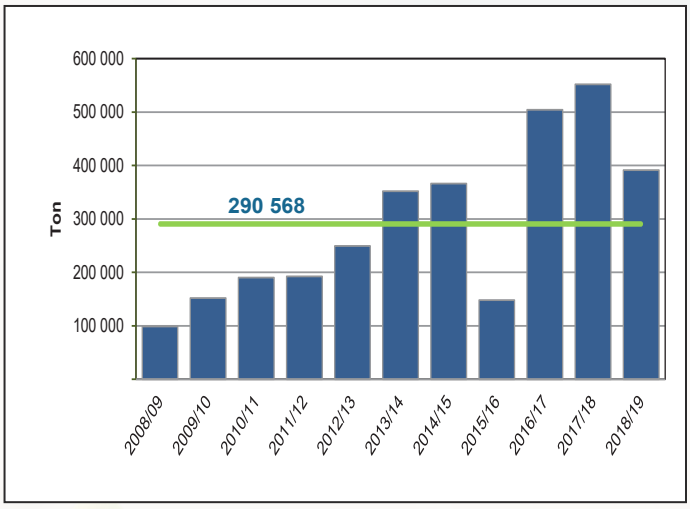
Graph 6: Soybean production in Mpumalanga since 2008/09



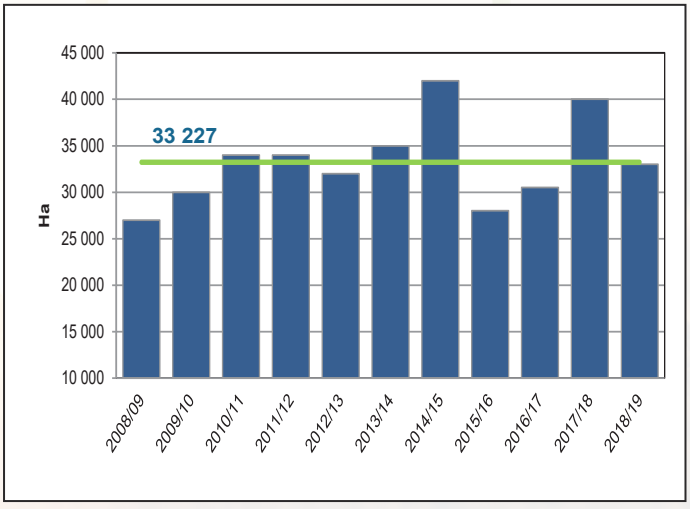
Graph 7: Area utilised for soybean production in the Free State since 2008/09



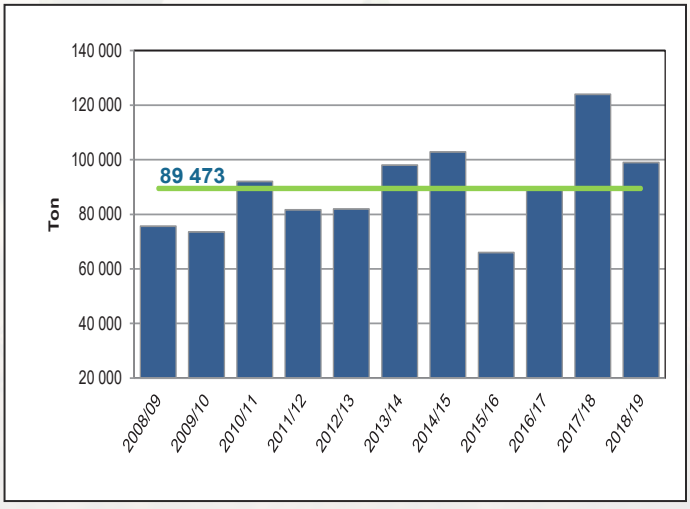
Graph 8: Soybean production in the Free State since 2008/09



Graph 9: Area utilised for soybean production in KwaZulu-Natal since 2008/09



Graph 10: Soybean production in KwaZulu-Natal since 2008/09



Figures provided by the CEC.

Eleven season average

Supply and Demand

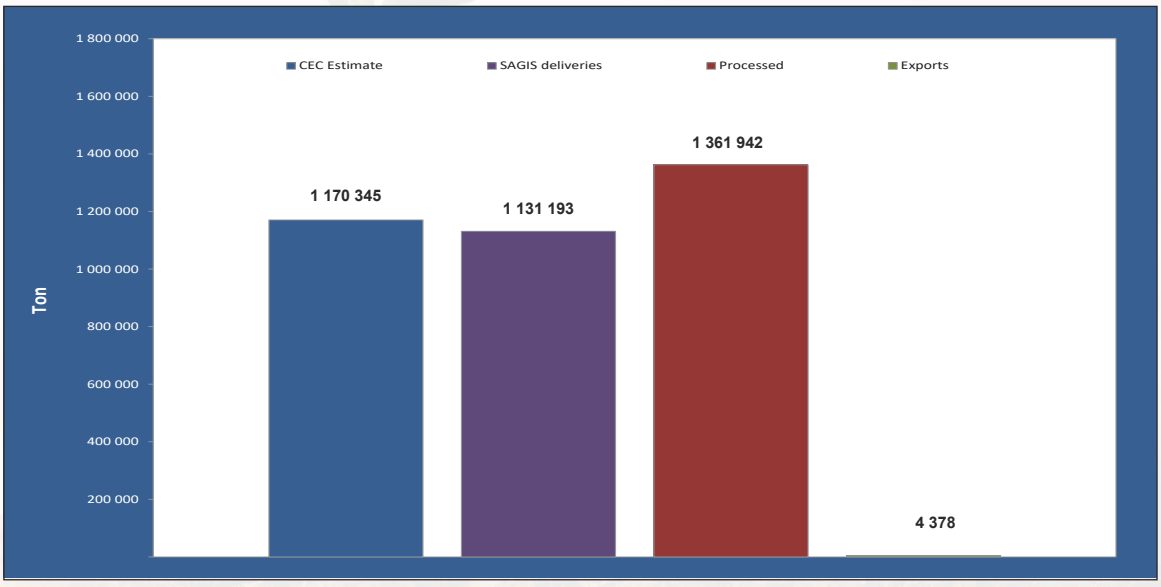
The soybean marketing season dates from March to end of February. According to SAGIS' supply and demand figures for the current marketing season to date (March 2019 to January 2020), 9 098 tons of soybeans have been imported compared to the 6 945 and 27 508 tons of the previous two seasons. China remains the largest importer of soybeans worldwide, with 82.54 million metric tons during the 2018/19 season, followed by the European Union and Southeast Asia.

Of the 1.36 million tons of soybeans processed to date, 1.6% was used for human consumption, 13.2% for animal feed as full fat soya and the bulk crushed to produce oil and oilcake. Soybean oilcake demand is primarily driven by the feed industry. The quantity of soybeans crushed so far, is 10% more than the total quantity crushed during the previous season and 86% more than the 10-year average. According to BFAP Baseline, crush volumes are expected to increase by 15% year on year.

Due to the rapid expansion over the past five years, the soybean industry is becoming more mature and further expansion is expected to occur at a much slower rate. Total soybean processing capacity (crush and full fat) in South Africa is derived from a combination of dedicated soybean processing facilities, as well as plants with the ability to switch between soybeans and sunflowers. A return to longer term yields suggest that, as early as 2020, sufficient soybeans will be produced in South Africa for dedicated soybean processing facilities to reach a benchmark utilisation rate of 80%. Total capacity, in combination with dual plants is more than 2 million tons. South Africa therefore have ample capacity to process the projected volumes (crush and full fat) until 2025, provided that crush margins are sufficient to induce switching of dual plants into soybean crushing. As a result of increased crush volumes, South Africa has replaced a substantial share of imported oilcake over the past decade. The use of soybean oilcake, dominant in the oilcake complex, is projected to expand from 1.2 million tons in 2018 to 1.6 million tons in 2028.

4 378 tons of soybeans/products have been exported so far this season compared to the 32 810 tons in the previous season. Globally, soybean exports during the 2018/19 season amounted to an estimated 148.33 million metric tons, with Brazil exporting 50% and the United States 32% of this figure. The projected world soybean exports for the 2019/20 season currently stands at 151.88 million metric tons. Argentina and Brazil are the largest exporters of soybean meal as well as soybean oil (WASDE).

Graph 11: Soybean supply and demand overview for the current marketing season (Mar 2019 - Jan 2020)



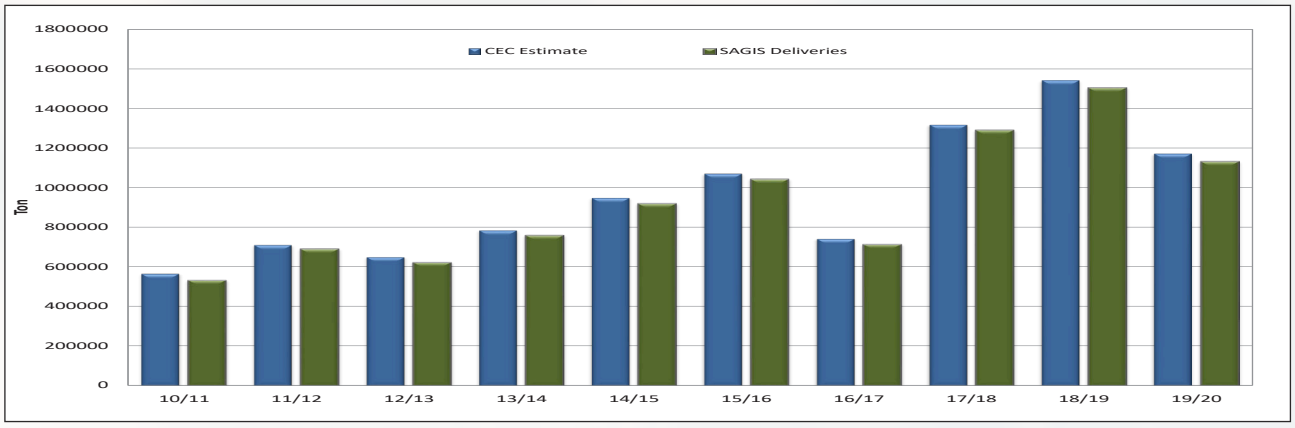
Information provided by SAGIS.

SOYBEANS: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO (TON)																	Publication date: 2020-02-25	
	Season (Mar - Feb)																Current Season Mar - Jan	10 Year average
	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	2009/10-2018/19
																	***	
																	11	
CEC (Crop Estimate)	136 500	220 000	272 500	424 000	205 000	282 000	516 000	566 000	710 000	650 000	784 500	948 000	1 070 000	742 000	1 316 000	1 540 000	1 170 345	884 250
SUPPLY																		
Opening stock (1 Mar)	77 000	34 300	77 700	49 500	86 600	57 800	48 700	56 000	46 200	225 800	68 639	61 806	63 704	89 128	84 792	330 535	502 241	107 530
Prod deliveries	126 300	217 900	265 200	419 100	185 400	264 000	508 200	531 500	690 300	621 892	759 146	919 723	1 042 129	713 660	1 290 218	1 502 976	1 131 193	857 974
Imports	24 400	23 300	9 700	5 000	132 100	4 200	3 100	600	300	300	3 256	102 977	124 981	271 098	27 508	6 945	9 098	54 107
Surplus	400	0	0	3 900	3 300	900	700	1 500	1 800	1 698	2 572	0	10 526	1 122	2 519	4 497	2 590	2 693
Total Supply	**228 100**	**275 500**	**352 600**	**477 500**	**407 400**	**326 900**	**560 700**	**589 600**	**738 600**	**849 690**	**833 613**	**1 084 506**	**1 241 340**	**1 075 008**	**1 405 037**	**1 844 953**	**1 645 122**	**1 022 305**
DEMAND																		
Processed*	180 300	184 100	285 200	380 200	341 800	260 300	337 400	406 900	451 300	615 272	742 104	1 005 548	1 134 110	974 901	1 063 783	1 298 544	1 361 942	802 986
-human	20 800	16 700	24 600	24 200	21 900	28 400	28 800	31 000	31 000	25 913	24 860	25 319	24 323	23 875	25 056	25 005	22 311	26 515
-animal feed (full fat soya)	128 500	134 500	199 600	216 600	179 900	109 300	181 800	191 800	150 200	137 407	155 654	118 598	121 763	98 718	147 302	218 973	179 588	152 222
-crush (oil/oilcake)	31 000	32 900	61 000	139 400	140 000	122 600	126 800	184 100	270 100	451 952	561 590	861 631	988 024	852 308	891 425	1 054 566	1 160 043	624 250
Withdrawn by producers	3 800	2 400	3 000	4 900	3 000	4 300	4 800	4 300	4 100	4 463	3 877	1 975	2 393	367	1 331	567	676	2 817
Released to end-consumers	1 800	2 600	3 400	1 900	900	1 200	900	3 700	3 400	2 757	2 825	2 886	2 650	1 098	608	431	348	2 126
Seed for planting purposes	2 600	2 600	2 400	2 600	1 400	3 100	5 300	4 900	5 200	5 700	5 295	5 111	7 577	5 678	8 795	10 599	7 640	6 416
Net receipts(-)/disp(+)	-200	1 100	1 500	300	1 600	1 300	3 200	1 900	1 600	0	2 316	1 924	805	1 427	- 429	- 239	1 698	1 250
Deficit	0	2 000	600	0	0	0	0	0	0	0	0	2 782	0	0				278
Exports	5 500	3 000	7 000	1 000	900	8 000	153 100	121 700	47 200	152 616	15 390	576	4 677	6 745	414	32 810	4 378	53 523
Total Demand	**193 800**	**197 800**	**303 100**	**390 900**	**349 600**	**278 200**	**504 700**	**543 400**	**512 800**	**780 808**	**771 807**	**1 020 802**	**1 152 212**	**990 216**	**1 074 502**	**1 342 712**	**1 376 682**	**869 396**
Ending Stock (28 Feb)	**34 300**	**77 700**	**49 500**	**86 600**	**57 800**	**48 700**	**56 000**	**46 200**	**225 800**	**68 882**	**61 806**	**63 704**	**89 128**	**84 792**	**330 535**	**502 241**	**268 440**	**152 909**
- processed p/month	15 000	15 300	23 800	31 700	28 500	21 700	28 100	33 900	37 600	51 300	61 842	83 796	94 509	81 242	88 649	108 212	123 813	66 915
- months' stock	2.3	5.1	2.1	2.7	2.0	2.2	2.0	1.4	6.0	1.3	1.0	0.8	0.9	1.0	3.7	4.6	2.2	2

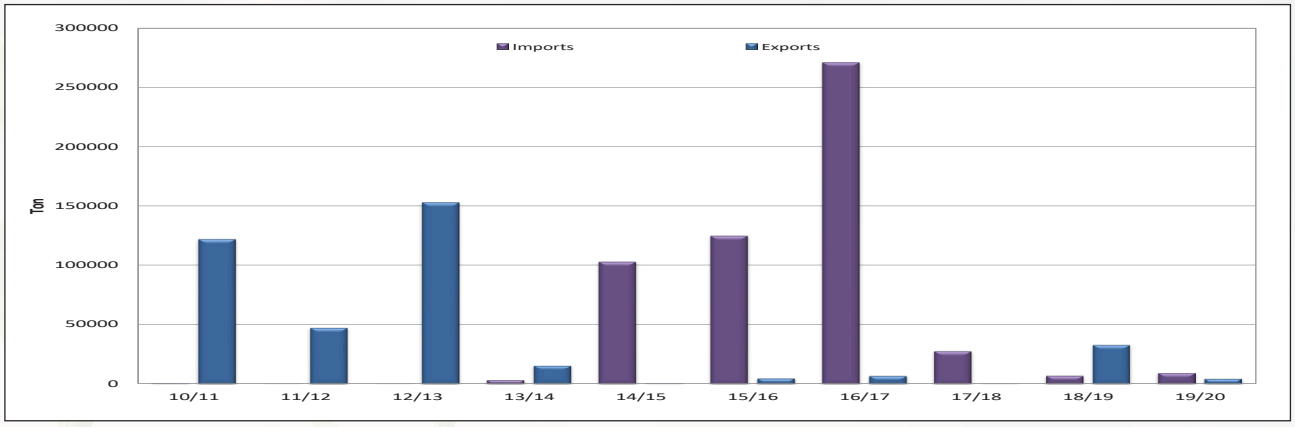
Note: * 1997/98-2007 updated May - Jul 2007

Note: *** Figures for current season up to date

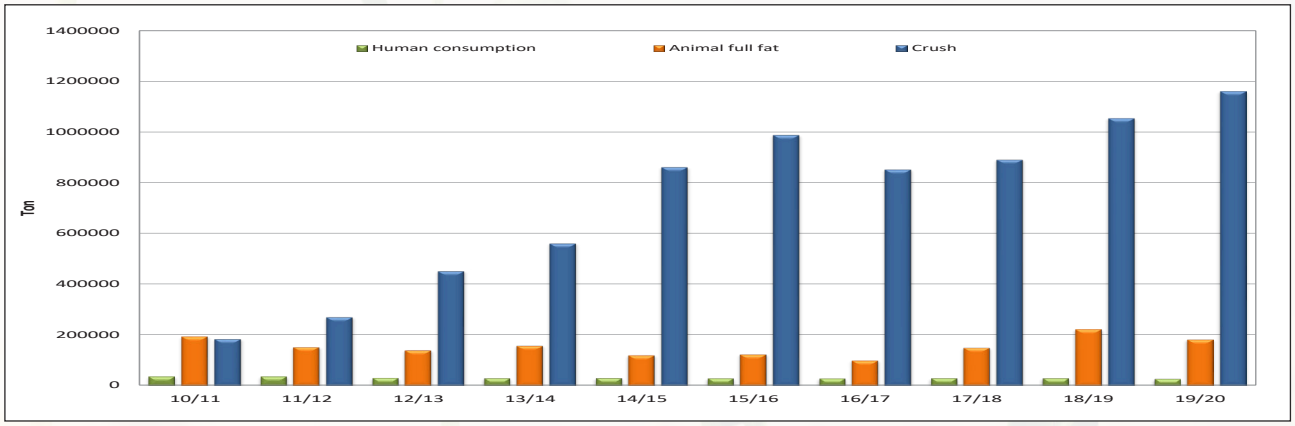
Graph 12: Soybeans: CEC Estimate vs SAGIS deliveries over 10 marketing seasons



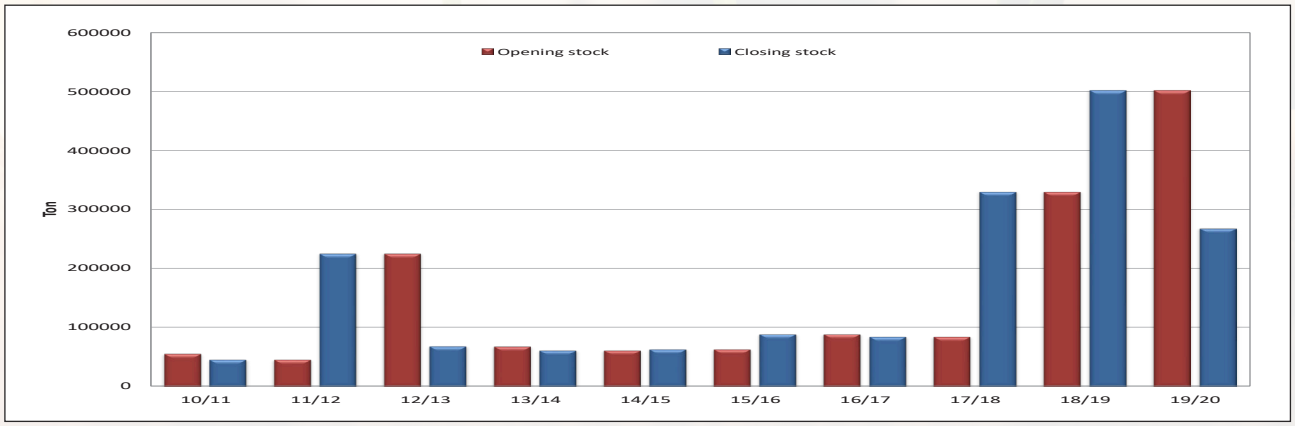
Graph 13: Soybeans: Imports and Exports over 10 marketing seasons



Graph 14: Soybeans: Consumption and Processed over 10 marketing seasons



Graph 15: Soybeans: Opening and closing stock over 10 marketing seasons



Information provided by SAGIS.

Season	SOYBEANS: IMPORTS FOR RSA PER COUNTRY (Tons)										
	Australia	Brazil	Ethiopia	Malawi	Mozambique	Nigeria	Paraguay	Ukraine	Zambia	Zimbabwe	Total
2014/15	0	61 705	0	7 520	202	0	0	0	25 264	8 286	102 977
2015/16	0	59 998	1 648	862	0	0	59 697	0	2 776	0	124 981
2016/17	0	0	3 314	0	0	204	263 576	0	4 004	0	271 098
2017/18	0	0	371	3 153	0	0	0	0	22 912	1 072	27 508
2018/19	0	0	160	1 953	343	0	0	645	3 844	0	6 945
2019/20	343	0	0	2 492	2 151	0	0	0	4 112	0	9 098

Season	SOYBEANS IMPORTS PER HARBOUR (Tons)				
	Harbours				
	East London	Durban	Cape	Port Elizabeth	Total
2005/06	0	3 965	10 329	0	14 294
2006/07	0	0	10 374	0	10 374
2007/08	0	71 885	31 433	0	103 318
2008/09	0	12 004	0	0	12 004
2009/10	0	0	0	0	0
2010/11	0	0	0	0	0
2011/12	0	163	0	0	163
2012/13	0	344	0	0	344
2013/14	0	2 661	0	98	2 759
2014/15	0	61 705	0	0	61 705
2015/16	0	121 343	0	0	121 343
2016/17	0	267 094	0	0	267 094
2017/18	0	371	0	0	371
2018/19	0	805	0	0	805
2019/20*	0	343	0	0	343

* Progressive March 2019 - January 2020
Note: Includes Imports for RSA and Other Countries

Season	SOYBEANS: RSA EXPORTS PER COUNTRY (Tons)				
	Botswana	Mozambique	Turkey	Zimbabwe	Total
2014/15	1	575	0	0	576
2015/16	220	4 457	0	0	4 677
2016/17	0	2 614	0	4 131	6 745
2017/18	4	410	0	0	414
2018/19	17	160	27 660	4 973	32 810
2019/20	189	196	0	3 993	4 378

Season	SOYBEANS EXPORTS PER HARBOUR (Tons)				
	Harbours				
	East London	Durban	Cape	Port Elizabeth	Total
2005/06	0	2 575	0	0	2 575
2006/07	0	0	0	0	0
2007/08	0	0	0	0	0
2008/09	0	0	0	0	0
2009/10	0	151 212	0	0	151 212
2010/11	0	121 243	0	0	121 243
2011/12	0	40 633	0	0	40 633
2012/13	0	152 318	0	0	152 318
2013/14	0	15 044	0	0	15 044
2014/15	0	0	0	0	0
2015/16	0	0	0	0	0
2016/17	0	0	0	0	0
2017/18	0	0	0	0	0
2018/19	0	27 660	0	0	27 660
2019/20*	0	0	0	0	0

* Progressive March 2019 - January 2020

SAGIS South African Grain Information Service NPC
Suid Afrikaanse Graaninligtingsdiens NWM
Reg no. 1997/019186/08

	OIL SEEDS PRODUCTS PER MONTH MANUFACTURED													
	Marketing year Mar 2017 - Feb 2018 Progressive: 12 Months	**Marketing year Mar 2018 - Feb 2019** Progressive: 12 Months	**Mar 2019** Manufactured Tons	**Apr 2019** Manufactured Tons	**May 2019** Manufactured Tons	**Jun 2019** Manufactured Tons	**Jul 2019** Manufactured Tons	**Aug 2019** Manufactured Tons	**Sep 2019** Manufactured Tons	**Oct 2019** Manufactured Tons	**Nov 2019** Manufactured Tons	**Dec 2019** Manufactured Tons	**Jan 2020** Manufactured Tons	**Marketing year Mar 2019 - Feb 2020** Progressive: 11 Months
Palm Oil and Derivatives	**0**	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Soybean Oil	**152 434**	**180 325**	17 522	16 559	13 321	15 928	16 906	23 250	19 651	18 919	23 489	15 098	19 856	**200 499**
Sunflower Oil	**319 052**	**315 406**	12 506	5 329	11 476	24 545	26 173	25 047	28 379	25 257	24 697	13 445	17 203	**214 057**
Cottonseed Oil	**0**	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Coconut Oil/ Groundnut Oil/ Canola Oil/ Corn (Maize) Oil/ Blends or mixes of Oils which includes one of the above Oils/ Biodiesel	**55 278**	**51 780**	4 086	4 462	3 356	4 678	4 435	4 319	3 908	4 598	4 204	2 889	3 572	**44 507**
Cottonseed Oilcake	**0**	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Sunflower Oilcake	**369 122**	**379 395**	17 514	3 482	12 975	28 881	31 266	30 030	33 095	28 510	28 215	16 258	21 151	**251 377**
Coconut Oilcake	**0**	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Palmnut Oilcake	**0**	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Soybean Oilcake/ Canola Oilcake	**722 794**	**847 062**	81 686	75 491	60 356	79 407	85 410	106 222	89 139	88 409	106 000	69 781	93 141	**935 042**
Soybean Flours and Meals/ Textured Vegetable Protein	**35 121**	**38 779**	2 941	3 489	3 437	3 161	2 885	3 445	3 885	3 630	4 889	2 158	2 572	**36 492**
Soybean Fullfat	**155 345**	**224 233**	19 263	17 873	21 981	19 089	18 738	17 159	15 184	15 365	13 824	11 694	12 659	**182 829**
Peanut Butter and Paste	**30 422**	**29 734**	2 665	2 105	2 660	2 581	2 100	2 319	2 687	2 931	2 660	1 621	1 537	**25 866**
Total	**1 839 568**	**2 066 714**	**158 183**	**128 790**	**129 562**	**178 270**	**187 913**	**211 791**	**195 928**	**187 619**	**207 978**	**132 944**	**171 691**	**1 890 669**

SAGIS South African Grain Information Service NPC
Suid Afrikaanse Graaninligtingsdiens NWM
Reg no. 1997/019186/08

	OIL SEEDS PRODUCTS PER MONTH IMPORTED													
	Marketing year Mar 2017 - Feb 2018 Progressive: 12 Months	**Marketing year Mar 2018 - Feb 2019** Progressive: 12 Months	**Mar 2019** Manufactured Tons	**Apr 2019** Manufactured Tons	**May 2019** Manufactured Tons	**Jun 2019** Manufactured Tons	**Jul 2019** Manufactured Tons	**Aug 2019** Manufactured Tons	**Sep 2019** Manufactured Tons	**Oct 2018** Manufactured Tons	**Nov 2019** Manufactured Tons	**Dec 2019** Manufactured Tons	**Jan 2020** Manufactured Tons	**Marketing year Mar 2019 - Feb 20209** Progressive: 11 Months
Palm Oil and Derivatives	**323 198**	**536 957**	49 142	41 794	55 480	34 659	71 525	36 970	44 494	56 057	26 541	31 091	45 032	**492 785**
Soybean Oil	**50 123**	**116 828**	4 496	1 997	3 000	7 999	14 950	8 750	9 000	11 500	7 000	2 500	12 748	**83 940**
Sunflower Oil	**81 034**	**143 635**	10 956	32 884	18 066	26 956	13 500	17 095	24 500	24 748	15 135	17 054	27 061	**227 955**
Cottonseed Oil	**1 995**	**3 250**	0	2 500	0	0	0	0	2 013	0	0	0	0	**4 513**
Coconut Oil/ Groundnut Oil/ Canola Oil/ Corn (Maize) Oil/ Blends or mixes of Oils which includes one of the above Oils/ Biodiesel	**4 789**	**12 641**	740	631	433	1 156	1 249	1 033	1 155	759	1 175	603	579	**9 513**
Cottonseed Oilcake	**167**	**0**	34	0	0	0	0	297	297	0	0	0	0	**628**
Sunflower Oilcake	**24 166**	**48 777**	24 985	14 527	26 988	0	14 737	0	7 885	0	7 167	0	8 749	**105 038**
Coconut Oilcake		**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Palmnut Oilcake		**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Soybean Oilcake/ Canola Oilcake	**438 555**	**358 850**	6 408	38 510	70 380	47 027	36 026	40 169	32 456	31 863	39 407	39 556	36 225	**418 027**
Soybean Flours and Meals/ Textured Vegetable Protein		**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Soybean Fullfat		**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Peanut Butter and Paste	**1 320**	**1 035**	95	295	176	102	78	31	15	87	73	242	112	**1 306**
Total	**925 347**	**1 221 973**	**96 856**	**133 138**	**174 523**	**117 899**	**152 065**	**104 345**	**121 815**	**125 014**	**96 498**	**91 046**	**130 506**	**1 343 705**

SAGIS South African Grain Information Service NPC
Suid Afrikaanse Graaninligtingsdiens NWM
Reg no. 1997/019186/08

	OIL SEEDS PRODUCTS PER MONTH EXPORTED													
	Marketing year Mar 2017 - Feb 2018 Progressive: 12 Months	**Marketing year Mar 2018 - Feb 2019** Progressive: 12 Months	**Mar 2019** Manufactured Tons	**Apr 2019** Manufactured Tons	**May 2019** Manufactured Tons	**Jun 2019** Manufactured Tons	**Jul 2019** Manufactured Tons	**Aug 2019** Manufactured Tons	**Sep 2018** Manufactured Tons	**Oct 2019** Manufactured Tons	**Nov 2018** Manufactured Tons	**Dec 2019** Manufactured Tons	**Jan 2020** Manufactured Tons	**Marketing year Mar 2019 - Feb 2020** Progressive: 11 Months
Palm Oil and Derivatives	**23 661**	**15 771**	1 027	1 174	1 928	1 082	2 811	1 203	1 323	1 463	1 181	849	1 110	**15 151**
Soybean Oil	**33 775**	**29 459**	1 676	1 622	2 125	994	2 956	1 767	430	697	319	556	471	**13 613**
Sunflower Oil	**2 151**	**2 169**	307	263	394	210	92	124	206	52	327	549	245	**2 769**
Cottonseed Oil	**0**	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Coconut Oil/ Groundnut Oil/ Canola Oil/ Corn (Maize) Oil/ Blends or mixes of Oils which includes one of the above Oils/ Biodiesel	**2 308**	**977**	30	54	136	32	37	31	107	5	133	102	96	**763**
Cottonseed Oilcake	**0**	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Sunflower Oilcake	**2 343**	**3 464**	571	593	602	678	135	34	69	0	64	113	80	**2 939**
Coconut Oilcake	**0**	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Palmnut Oilcake	**0**	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Soybean Oilcake/ Canola Oilcake	**13 141**	**11 420**	1 398	491	1 017	812	739	1 270	734	696	1 046	810	890	**9 903**
Soybean Flours and Meals/ Textured Vegetable Protein		**1 802**	264	372	365	277	671	431	304	709	373	274	0	**4 040**
Soybean Fullfat	**4 904**	**7 120**	448	462	332	102	200	302	408	161	171	0	0	**2 586**
Peanut Butter and Paste	**345**	**821**	35	51	30	7	23	18	20	19	19	21	20	**263**
Total	**82 628**	**73 003**	**5 756**	**5 082**	**6 929**	**4 194**	**7 664**	**5 180**	**3 601**	**3 802**	**3 633**	**3 274**	**2 912**	**52 027**

RSA Production Regions

The RSA is divided into 9 provinces as illustrated in Figure 1.

Figure 1: RSA Provinces

Provincial map with gratitude to SIQ.

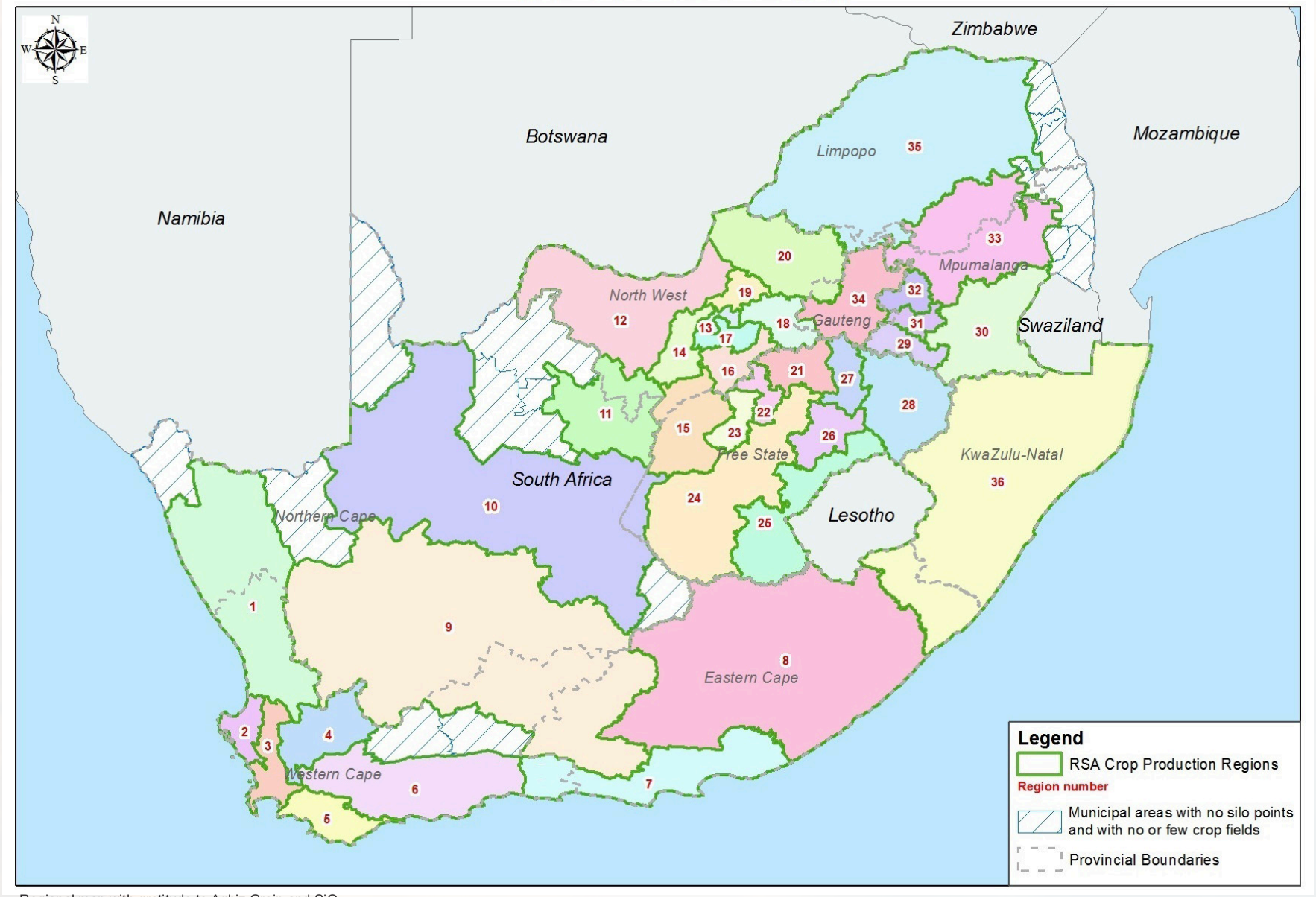
The 9 provinces are divided into 36 grain production regions.

The regions are distributed as follows:
Region 1: Namakwaland
Regions 2 to 4: Swartland
Regions 5 and 6: Rûens
Regions 7 and 8: Eastern Cape
Region 9: Karoo
Region 10: Griqualand West
Region 11: Vaalharts
Regions 12 to 20: North West
Regions 21 to 28: Free State
Regions 29 to 33: Mpumalanga
Region 34: Gauteng
Region 35: Limpopo
Region 36: KwaZulu-Natal

Please see the Crop Production Regions map on the next page.

The production regions from which soybeans have been received for the crop quality survey of the 2018/19 production season, are named and described on pages 22 to 24. All the silo/intake stands as well as the type of storage structure, situated in a particular region, are provided.

Figure 2: RSA Crop Production Regions



Regional map with gratitude to Agbiz Grain and SiQ.

Soybean Crop Quality 2018/19 – Summary of results

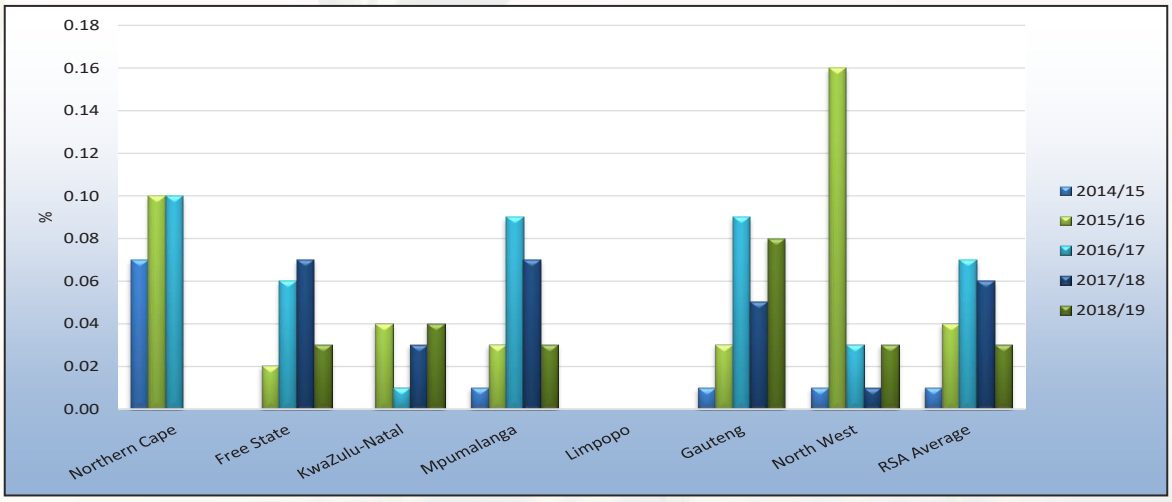
Eighty-nine percent (134) of the 150 samples analysed for the purpose of this survey were graded as Grade SB1, while 16 of the samples were downgraded to COSB (Class Other Soya Beans). During the previous two seasons, 13% (2017/18) and 12% (2016/17) of the samples were downgraded to COSB.

- 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.

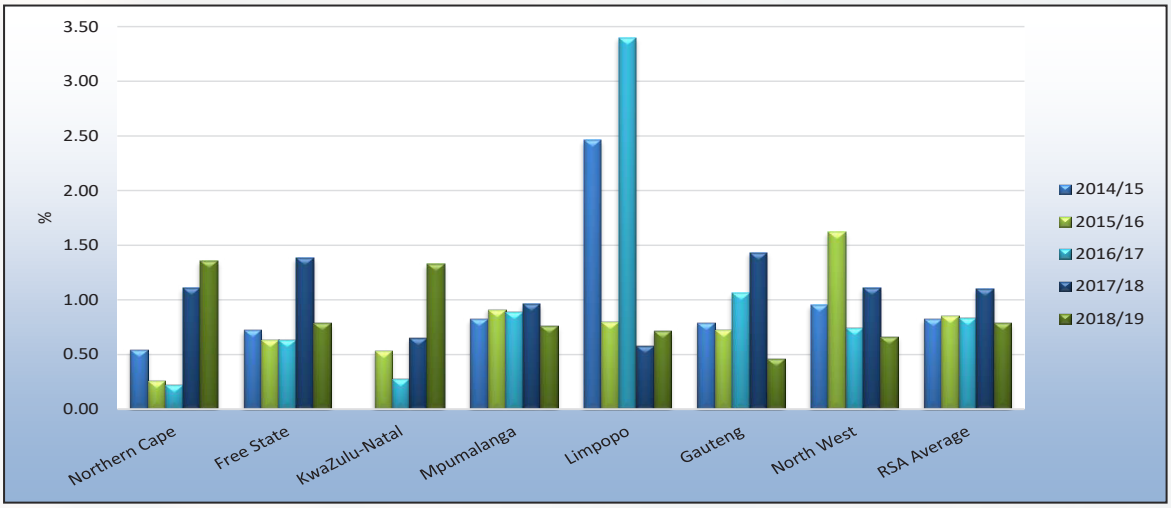
The percentage samples containing sclerotia from the fungus *Sclerotinia sclerotiorum*, decreased from 59% (88 samples) in the previous season to 27% (41 samples) this season. The five highest percentages sclerotia observed ranged from 0.44 % (sample from Gauteng) to 0.24% (samples from Mpumalanga and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



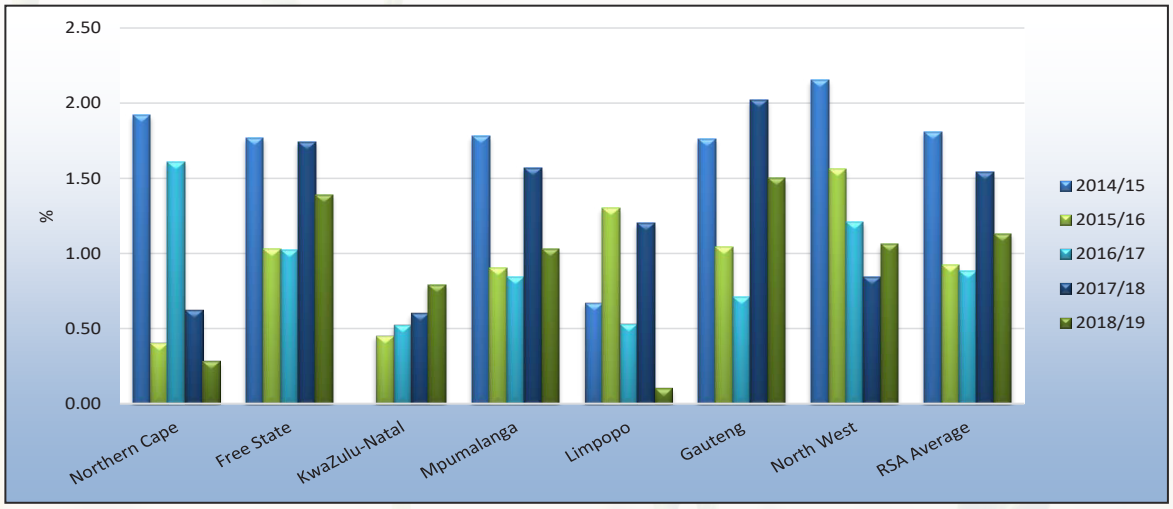
The only sample received from the Northern Cape province (region 11) had the highest percentage foreign matter (1.35%), followed closely by the 1.33% weighted average of the 12 samples from KwaZulu-Natal. The percentage foreign matter in the rest of the samples ranged from 0.46% in Gauteng (12 samples)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

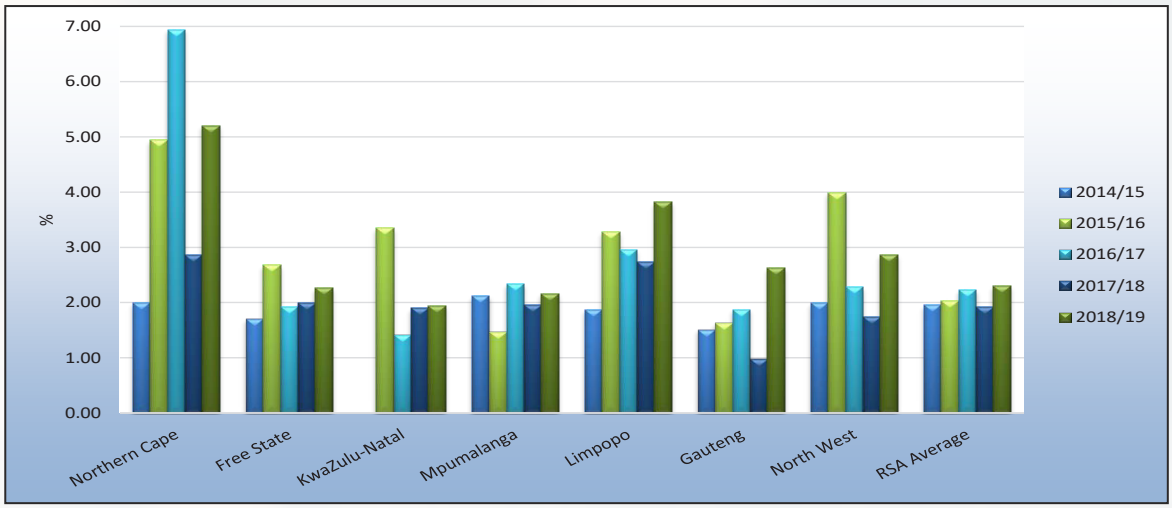
Graph 18: Average percentage soybeans and parts of soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve per province over five seasons



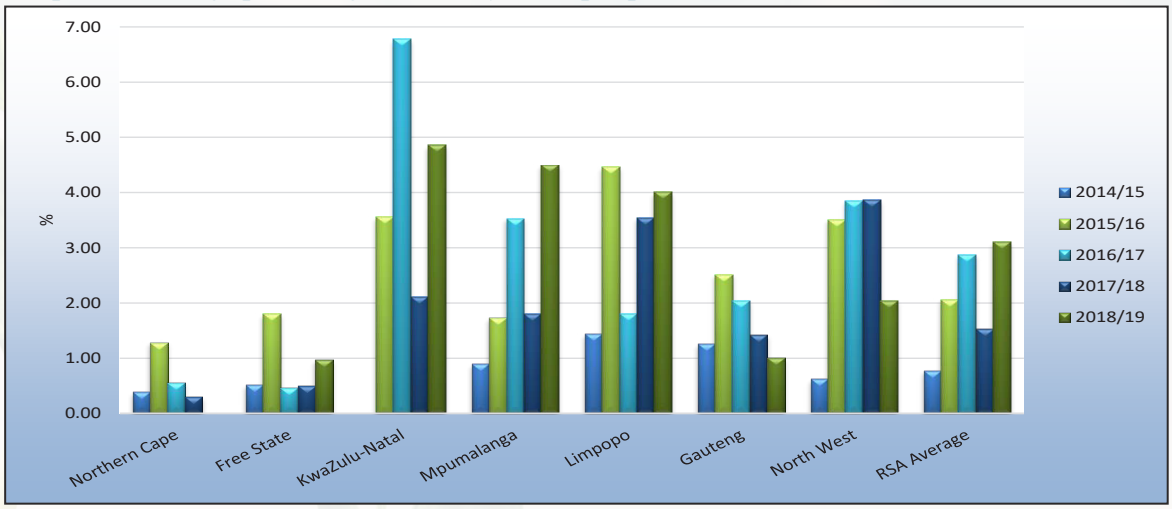
The lowest weighted average percentage defective soybeans on the 4.75 mm sieve was observed on the samples from KwaZulu-Natal, namely 1.94%. The Northern Cape province reported the highest percentage namely 5.20%, followed by Limpopo with 3.81%. The national weighted average increased from 1.91% last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



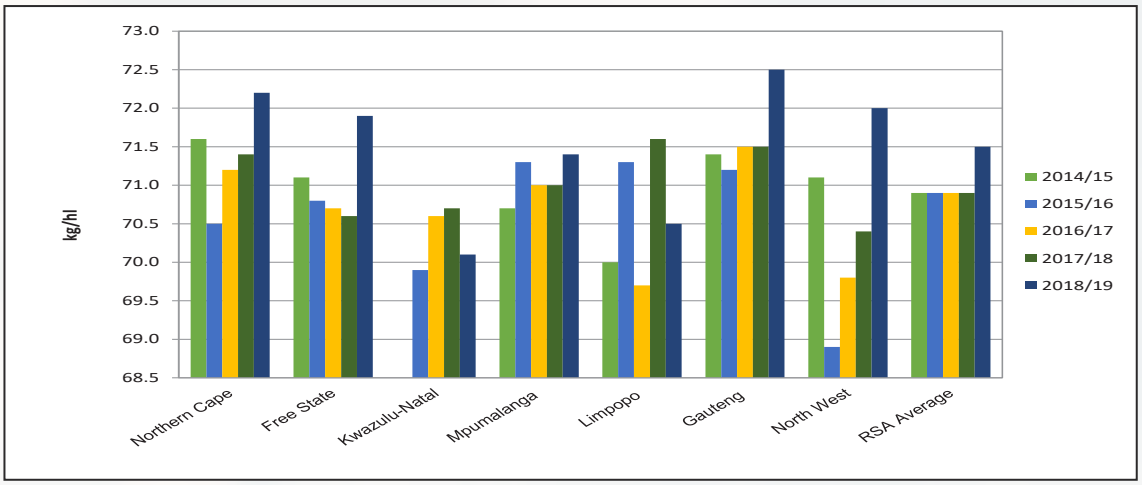
Test weight does not form part of the grading regulations for soybeans in South Africa. An approximation of the test weight of South African soybeans is provided in Table 2 for information purposes. The standard working procedure of the Kern 222 instrument, as described in ISO 7971-3:2009, was followed. 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

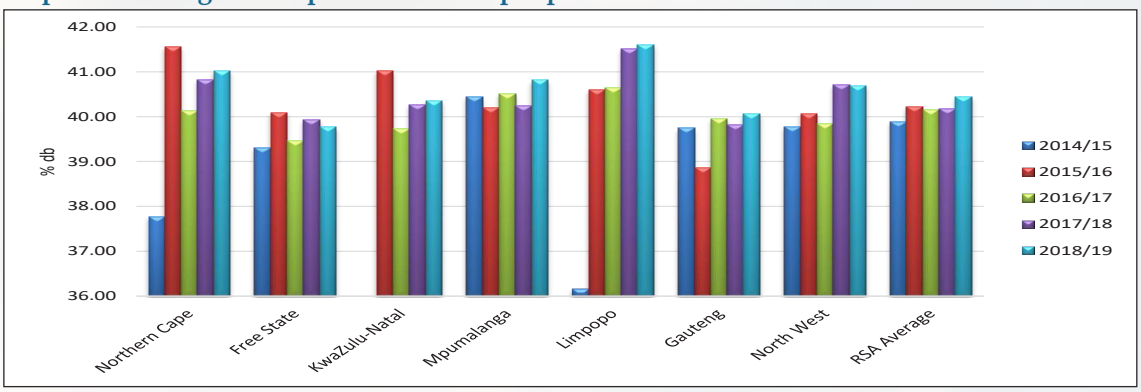
Season	2018/19		2017/18		2016/17		2015/16	
Moisture, % (17hr, 103°C)	7.0		7.4		7.4		7.4	
Moisture basis	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**
Crude protein, %	40.43	37.60	40.18	37.40	40.15	37.20	40.22	37.22
Crude fat, %	19.1	17.8	19.3	18.0	19.8	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 six 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%.

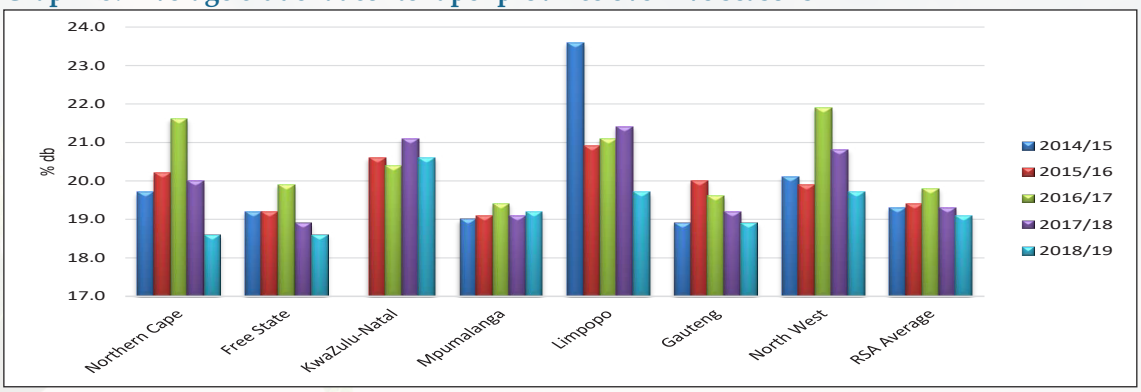
The weighted average percentage crude fibre varied from 6.3% in KwaZulu-Natal to 7.5% in the Northern Cape. The RSA weighted average, 6.8%, was the second highest of the annual surveys since the 7.3% reported in the 2015/16 season. A small variation of only 0.09% is observed with regards to the national weighted average ash content over the eight seasons that this survey has been conducted. This season, the average ash content was 4.67%, the 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.

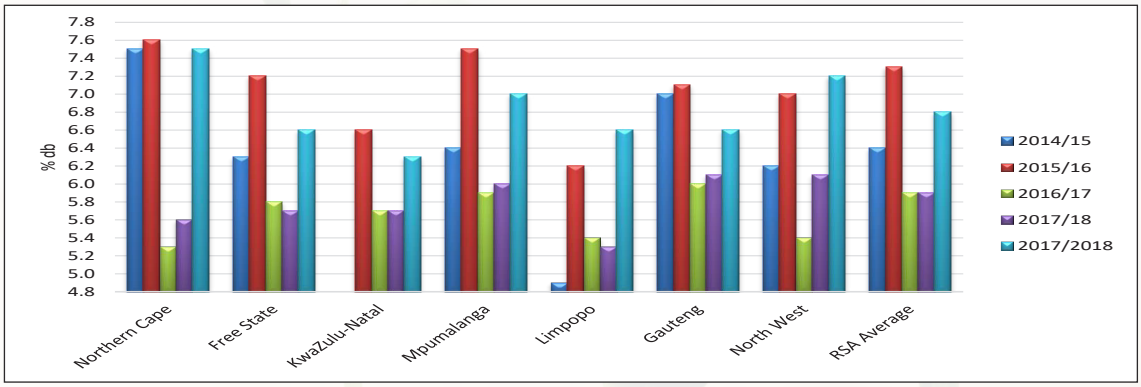
Graph 22: Average crude protein content per province over five seasons



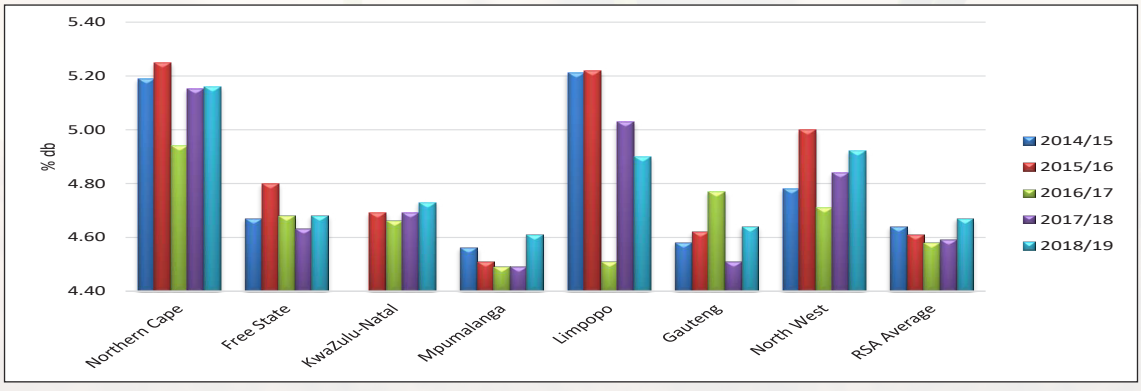
Graph 23: Average crude fat content per province over five seasons



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' 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.

Genetic Modification (GM)

The majority of soybeans produced/grown in South Africa is genetically modified, an estimated 95% of the area planted to soybeans in South Africa was GM. These soybeans have tolerance to herbicides (chemical products used to destroy weeds, but not the crop plants). Globally, GM soybeans occupy approximately 80% of the total soybean area planted.

The SAGL screened 15 of the crop samples to test for the presence of CP4 EPSPS (Roundup Ready®).

The crop quality samples received by the SAGL are composite samples per class and grade, made up of individual deliveries to grain silos.

SAGL used the EnviroLogix QuickComb kit for bulk soybeans to quantitatively determine the presence of genetically modified soybeans.

All the screened samples tested positive for the presence of the CP4 EPSPS (RR1/RR2) protein.

The sensitivity of the measurements using the above-mentioned kit is 0.25%, i.e. one Roundup Ready soybean in 400 conventional soybeans. The limit of detection (LOD) for measurements of the CP4 EPSPS protein is 0.125%. The highest measurement that can be quantified is 3%. Values higher than 3% is reported as >3.0%.

Table 5: GM results for the 2018/19 season

Region	Class and grade	CP4 EPSPS, %
11	COSB	>3.0
14	SB1	>3.0
20	SB1	>3.0
21	COSB	>3.0
25	SB1	>3.0
26	SB1	>3.0
28	SB1	>3.0
29	SB1	>3.0
30	SB1	>3.0
31	SB1	>3.0
32	SB1	>3.0
33	SB1	>3.0
34	SB1	>3.0
35	SB1	>3.0
36	SB1	>3.0
Average of samples		***>3.0***
Number of samples		***15***

Table 6: South African Soybean Crop Quality Averages 2018/19 vs 2017/18						
Class and Grade Soya	**2018/19**			**2017/18**		
	SB1	**COSB**	**Average**	**SB1**	**COSB**	**Average**
Grading:						
(A) Wet pods, %	0.00	0.00	0.00	0.00	0.00	0.00
(B) Foreign matter, including stones, other grains and sunflower seeds: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.70	1.50	0.79	0.80	3.08	1.10
(C) Other grain, %	0.07	0.29	0.09	0.06	1.48	0.25
(D) Sunflower seed, %	0.01	0.01	0.01	0.01	0.00	0.01
(E) Stones, %	0.00	0.01	0.00	0.02	0.00	0.01
(F) Sclerotia, %	0.03	0.04	0.03	0.06	0.05	0.06
(G) Soybeans and parts of soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	1.12	1.18	1.13	1.47	1.95	1.54
(H) Defective soybeans on the 4.75 mm round hole sieve, %	2.20	3.13	2.30	1.89	2.07	1.91
(I) Soiled soybeans, %	2.36	9.33	3.10	1.32	2.89	1.53
(J) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.73	1.54	0.82	0.86	3.12	1.16
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	2	0	0	1	0
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	1	0	0	1	0
Undesirable odour	No	No	No	No	No	No
Live insects	No	No	No	No	No	No
Number of samples	***134***	***16***	***150***	***130***	***20***	***150***
Nutritional analysis:						
Moisture, % (17 hr, 103 °C)	7.0	7.2	7.0	6.9	6.9	6.9
Crude Protein, % (db)	40.45	40.30	40.43	40.08	40.81	40.18
Crude Fat, % (db)	19.1	19.1	19.1	19.3	19.4	19.3
Crude Fibre, % (db)	6.8	6.9	6.8	5.9	5.7	5.9
Ash, % (db)	4.66	4.71	4.67	4.59	4.54	4.59
Number of samples	***134***	***16***	***150***	***130***	***20***	***150***

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 11: Vaalharts Region			
GWK	Barkly-Wes (Bins/Bulk)	Senwes	Jan Kempdorp (Bins)
GWK	Jan Kempdorp (Bags/Bunkers)	Senwes	Magogong (Bins)
Senwes	Hartswater (Bins)		

Region 14: North West Southern Region			
NWK	Barberspan (Bins)	NWK	Taaibospan (Bins)
NWK	Delareyville (Bins)	Suidwes	Amalia (Bins)
NWK	Excelsior (Bins)	Suidwes	Hallatshope (Bins)
NWK	Geysdorp (Bins)	Suidwes	Migdol (Bins)
NWK	Migdol (Bins)	Suidwes	Schweizer-Reneke (Bins)
NWK	Nooitgedacht (Bins)		

Region 20: North-West Eastern Region			
Afgri	Battery (Bins)	NWK	Koster (Bins)
Afgri	Brits (Bins)	NWK	Swartruggens (Bins)
NWK	Boons (Bins)	NWK	Syferbult (Bins)
NWK	Derby (Bins)		

Region 21: Free State North-Western Region (Viljoenskroon)			
Senwes	Attie (Bins)	Senwes	Vierfontein (Bins)
Senwes	Groenebloem (Bins)	Senwes	Viljoenskroon (Bins)
Senwes	Heuningspruit (Bins)	Senwes	Vredefort (Bins)
Senwes	Koppies (Bins)	Senwes	Weiveld (Bins)
Senwes	Rooiwal (Bins)		

Region 23: Free State North-Western Region (Bultfontein)			
Senwes	Bultfontein (Bins)	Senwes	Tierfontein (Bins)
Senwes	Losdoorns (Bins)	Senwes	Wesselsbron (Bins)
Senwes	Protespan (Bins)	Senwes	Willemsrus (Bins)

Region 24: Free State Central Region			
Senwes	Bloemfontein (Bins)	Senwes	Petrusburg (Bins)
Senwes	Brandfort (Bins)	Senwes	Theunissen (Bins)
Senwes	De Brug (Bins)	Senwes	Van Tonder (Bins)
Senwes	Geneva (Bins)	Senwes	Welgeleë (Bins)
Senwes	Hennenman (Bins)	Senwes	Winburg (Bins)
Senwes	Kroonstad (Bins)		

Region 25: Free State South-Western Region			
Afgri	Bethlehem (Bins)	OVK	Marseilles (Bins)
Afgri	Slabberts (Bins)	OVK	Modderpoort (Bins)
OVK	Clocolan (Bins)	OVK	Tweespruit (Bins)
OVK	Ficksburg (Bins)	OVK	Westminster (Bins)
OVK	Fouriesburg (Bins)		

Region 26: Free State South-Eastern Region			
Afgri	Kaallaagte (Bins)	Afgri	Monte Video (Bins)
Afgri	Libertas (Bins)	Afgri	Senekal (Bins)
Afgri	Marquard (Bins)	Senwes	Arlington (Bins)
Afgri	Meets (Bins)	Senwes	Steynsrus (Bins)

Region 27: Free State Northern Region			
Senwes	Gottenburg (Bins)	Senwes	Mooigeleë (Bins)
Senwes	Heilbron (Bins)	Senwes	Wolwehoek (Bins)
Senwes	Hoogte Grainlink (Bins)	VKB	Petrus Steyn (Bins)

Region 28: Free State Eastern Region			
Afgri	Afrikaskop (Bins/Bunkers)	VKB	Jim Fouché (Bins)
Afgri	Eeram (Bins)	VKB	Memel (Bins)
Afgri	Harrismith (Bins)	VKB	Reitz (Bins)
Afgri	Kransfontein (Bins/Bunkers)	VKB	Tweeling (Bins)
VKB	Ascent (Bins)	VKB	Villiers (Bins/Bulk)
VKB	Cornelia (Bins)	VKB	Vrede (Bins)
VKB	Daniëlsrus (Bins)	VKB	Warden (Bins)
VKB	Frankfort (Bins)	VKB	Windfield (Bins)

Region 29: Mpumalanga Southern Region			
Afgri	Balfour (Bins)	Afgri	Leeuspruit (Bins)
Afgri	Greylingstad (Bins)	Afgri	Platrand (Bins)
Afgri	Grootvlei (Bins)	Afgri	Standerton (Bins)
Afgri	Harvard (Bins)	Afgri	Val (Bins)
Afgri	Holmdene (Bins)		

Region 30: Mpumalanga Eastern Region			
Afgri	Amersfoort (Bins)	Afgri	Lothair (Bins)
Afgri	Carolina (Bins)	Afgri	Maizefield (Bins)
Afgri	Davel (Bins)	Afgri	Morgenzon (Bins)
Afgri	Eerstelingsfontein (Bunkers)	Afgri	Overvaal (Bins)
Afgri	Ermelo (Bins)	Afgri	Sandspruit (Bunkers)
Afgri	Estancia (Bins)	TWK	Mkondo (Bins)
Afgri	Hendriksvallei (Bunkers)	TWK	Panbult (Bins)

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 31: Mpumalanga Central Region			
Afgri	Bakenlaagte (Bunkers)	Afgri	Leslie (Bins)
Afgri	Bethal (Bins)	Afgri	Palmietfontein (Bunkers)
Afgri	Brakfontein (Bunkers)	Afgri	Trichardt (Bins)
Afgri	Devon (Bins)	Afgri	Vaalkrantz (Bunkers)
Afgri	Kinross (Bins/Bunkers)		

Region 32: Mpumalanga Western Region			
Afgri	Argent (Bins/Bunkers)	Afgri	Hawerklip (Bins)
Afgri	Dryden (Bins)	Afgri	Kendal (Bins)
Afgri	Eloff (Bins)	Afgri	Ogies (Bins)
Afgri	Endicott (Bins)		

Region 33: Mpumalanga Northern Region			
Afgri	Arnot (Bins)	Afgri	Middelburg (Bins)
Afgri	Driefontein (Bins)	Afgri	Pan (Bins)
Afgri	Lydenburg (Bins)	Afgri	Stoffberg (Bins)
Afgri	Marble Hall (Bins)	Afgri	Wonderfontein (Bins)

Region 34: Gauteng Region			
Afgri	Bloekomspruit (Bins)	Afgri	Nigel (Bins)
Afgri	Bronkhorstspruit (Bins)	Afgri	Pretoria Wes (Bins)
Afgri	Glenroy (Bins)	Afgri	Vogelvallei (Bunkers)
Afgri	Goeie Hoek (Bins)	Senwes	Middelvlei (Bins)
Afgri	Kaalfontein (Bins)	Senwes	Oberholzer (Bins)
Afgri	Kliprivier (Bunkers)	Senwes	Raathsvlei (Bins)
Afgri	Meyerton (Bunkers)		

Region 35: Limpopo Region			
Afgri	Northam (Bins)	VKB	Nylstroom (Modimolle) (Bins)
VKB	Alma (Bins)	VKB	Potgietersrus (Mokopane) (Bins)
VKB	Lehau (Bins)	VKB	Roedtan (Bins)
VKB	Naboomspruit (Mookgophong) (Bins)	VKB	Settlers (Bins)
VKB	Nutfield (Bins)	VKB	Warmbad Bela-Bela (Bins)

Region 36: KwaZulu-Natal Region			
Afgri	Bergville (Bins/Bunkers)	Afgri	Paulpietersburg (Bins)
Afgri	Bloedrivier (Bins)	Afgri	Pietermaritzburg (Bins)
Afgri	Dannhauser (Bins)	Afgri	Vryheid (Bins)
Afgri	Dundee (Bins)	Afgri	Winterton (Bins/Bunkers)
Afgri	Mizpah (Bins)		

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(11) Vaalharts Region				(14) North-West Southern Region				(20) North-West Eastern Region			
Grading:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
(a) Wet pods, %	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(b) Foreign matter, including stones, other grains and sunflower seeds: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	1.35	-	-	-	0.25	0.18	0.32	0.10	0.82	0.12	2.18	0.85
(c) Other grain, %	1.25	-	-	-	0.00	0.00	0.00	0.00	0.07	0.00	0.34	0.15
(d) Sunflower seed, %	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(e) Stones, %	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(f) Sclerotia, %	0.00	-	-	-	0.00	0.00	0.00	0.00	0.04	0.00	0.12	0.06
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	0.28	-	-	-	0.80	0.78	0.82	0.03	1.16	0.54	2.14	0.69
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	5.20	-	-	-	2.82	2.54	3.10	0.40	2.88	1.46	5.42	1.78
(i) Soiled Soybeans, %	0.00	-	-	-	0.20	0.18	0.22	0.03	2.77	0.32	4.92	1.76
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	1.35	-	-	-	0.25	0.18	0.32	0.10	0.86	0.20	2.30	0.88
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	-	-	-	0	0	0	0	0	0	0	0
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	-	-	-	0	0	0	0	4	0	6	2.45
Number of samples	***1***				***2***				***5***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	6.2	-	-	-	6.8	6.6	6.9	0.21	6.2	6.0	6.4	0.16
Crude protein, % (db)	41.02	-	-	-	39.65	39.08	40.22	0.81	41.09	40.35	41.78	0.54
Crude fat, % (db)	18.6	-	-	-	17.9	17.8	17.9	0.07	20.4	17.4	21.6	1.70
Crude Fibre, % (db)	7.5	-	-	-	7.7	7.2	8.2	0.71	7.0	6.1	7.6	0.56
Ash, % (db)	5.16	-	-	-	4.86	4.72	4.99	0.19	4.94	4.71	5.05	0.14
Number of samples	***1***				***2***				***5***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(21) Free State North-Western Region (Viljoenskroon)				(23) Free State North-Western Region (Bultfontein)				(24) Free State Central Region (Viljoenskroon)			
Grading:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
(a) Wet pods, %	0.00	0.00	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00
(b) Foreign matter, including stones, other grains and sunflower seeds: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	1.60	0.42	4.40	1.62	1.30	-	-	-	0.94	0.54	1.34	0.57
(c) Other grain, %	0.22	0.00	0.96	0.42	0.08	-	-	-	0.00	0.00	0.00	0.00
(d) Sunflower seed, %	0.03	0.00	0.08	0.04	0.04	-	-	-	0.09	0.08	0.10	0.01
(e) Stones, %	0.00	0.00	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00
(f) Sclerotia, %	0.02	0.00	0.10	0.04	0.00	-	-	-	0.04	0.00	0.08	0.06
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	1.93	0.64	3.82	1.39	6.00	-	-	-	0.89	0.62	1.16	0.38
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	3.35	2.40	4.20	0.67	5.60	-	-	-	2.91	2.62	3.20	0.41
(i) Soiled Soybeans, %	1.48	0.00	2.94	1.33	1.40	-	-	-	0.09	0.00	0.18	0.13
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	1.62	0.42	4.50	1.67	1.30	-	-	-	0.98	0.62	1.34	0.51
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	0	0	0	0	-	-	-	0	0	0	0
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	0	0	0	0	-	-	-	0	0	0	0
Number of samples	***5***				***1***				***2***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	7.2	6.3	8.5	0.82	7.0	-	-	-	6.8	6.3	7.2	0.64
Crude protein, % (db)	39.12	36.55	40.87	1.78	39.04	-	-	-	38.32	36.53	40.10	2.52
Crude fat, % (db)	19.0	17.3	20.3	1.17	20.1	-	-	-	19.9	19.4	20.4	0.71
Crude Fibre, % (db)	6.5	5.2	7.3	0.85	6.4	-	-	-	5.3	4.6	6.0	0.99
Ash, % (db)	4.77	4.65	4.90	0.10	4.72	-	-	-	4.89	4.71	5.07	0.25
Number of samples	***5***				***1***				***2***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(25) Free State South-Western Region				(26) Free State South-Eastern Region				(27) Free State Northern Region			
Grading:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
(a) Wet pods, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-
(b) Foreign matter, including stones, other grains and sunflower seeds: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	1.04	0.02	3.16	1.00	0.67	0.32	1.02	0.29	0.72	-	-	-
(c) Other grain, %	0.18	0.00	0.44	0.18	0.17	0.00	0.88	0.35	0.00	-	-	-
(d) Sunflower seed, %	0.00	0.00	0.00	0.00	0.04	0.00	0.10	0.04	0.08	-	-	-
(e) Stones, %	0.00	0.00	0.00	0.00	0.02	0.00	0.10	0.04	0.00	-	-	-
-(f) Sclerotia, %	0.08	0.00	0.30	0.13	0.00	0.00	0.00	0.00	0.00	-	-	-
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	1.46	0.02	3.90	1.22	0.77	0.08	1.80	0.70	2.50	-	-	-
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	2.27	0.80	4.02	1.01	1.57	0.80	2.96	1.01	2.78	-	-	-
(i) Soiled Soybeans, %	0.63	0.00	2.10	0.64	1.45	0.00	2.76	1.03	0.28	-	-	-
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	1.12	0.02	3.46	1.09	0.67	0.32	1.02	0.29	0.72	-	-	-
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	0	0	0	2	0	10	4.08	0	-	-	-
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	0	0	0	0	0	0	0	0	-	-	-
Number of samples	***9***				***6***				***1***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	7.7	7.0	9.8	1.12	7.0	6.6	7.4	0.34	6.6	-	-	-
Crude protein, % (db)	40.57	37.52	44.09	1.69	39.27	37.53	41.81	1.69	38.48	-	-	-
Crude fat, % (db)	17.6	16.5	18.7	0.79	18.6	17.1	20.3	1.21	16.9	-	-	-
Crude Fibre, % (db)	6.9	5.7	8.2	0.81	6.8	6.1	7.7	0.63	5.9	-	-	-
Ash, % (db)	4.64	4.13	4.88	0.21	4.70	4.60	4.84	0.08	4.81	-	-	-
Number of samples	***9***				***6***				***1***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(28) Free State Eastern Region				(29) Mpumalanga Southern Region				(30) Mpumalanga Eastern Region			
Grading:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
(a) Wet pods, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(b) Foreign matter, including stones, other grains and sunflower seeds: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.43	0.10	1.98	0.43	1.33	0.08	3.10	1.11	0.79	0.04	3.38	0.98
(c) Other grain, %	0.08	0.00	0.40	0.12	0.04	0.00	0.26	0.08	0.05	0.00	0.26	0.08
(d) Sunflower seed, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(e) Stones, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(f) Sclerotia, %	0.01	0.00	0.12	0.03	0.00	0.00	0.00	0.00	0.04	0.00	0.34	0.07
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	1.15	0.14	2.74	0.78	1.62	0.70	2.86	0.64	1.05	0.00	1.96	0.50
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	1.90	0.94	3.76	0.96	2.03	1.18	3.26	0.58	2.21	0.44	8.12	1.54
(i) Soiled Soybeans, %	0.96	0.00	2.96	0.97	2.46	0.00	6.32	1.51	3.33	0.38	10.48	2.65
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.44	0.10	1.98	0.43	1.33	0.08	3.10	1.11	0.83	0.04	3.38	0.98
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	0	0	0	0	0	0	0	0	0	0	0
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	0	0	0	0	0	0	0	0	0	5	1.21
Number of samples	***18***				***13***				***33***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	7.1	6.8	7.9	0.31	6.6	6.4	7.1	0.21	7.2	6.5	11.4	0.98
Crude protein, % (db)	39.97	39.00	42.60	0.89	40.41	38.38	42.14	1.04	40.89	39.08	43.46	1.01
Crude fat, % (db)	18.8	16.7	21.7	1.23	19.3	17.7	20.3	0.91	18.9	17.1	21.3	1.10
Crude Fibre, % (db)	6.5	5.4	7.6	0.61	7.2	6.4	7.9	0.57	6.9	5.2	8.1	0.74
Ash, % (db)	4.63	4.46	5.06	0.13	4.60	4.36	4.73	0.09	4.57	4.26	4.77	0.12
Number of samples	***18***				***13***				***33***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(31) Mpumalanga Central Region				(32) Mpumalanga Western Region				(33) Mpumalanga Northern Region			
Grading:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
(a) Wet pods, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(b) Foreign matter, including stones, other grains and sunflower seeds: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.30	0.12	0.76	0.31	0.67	0.20	1.36	0.61	0.44	0.10	0.98	0.30
(c) Other grain, %	0.09	0.00	0.34	0.17	0.06	0.00	0.12	0.06	0.08	0.00	0.34	0.10
(d) Sunflower seed, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(e) Stones, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.10	0.02
(f) Sclerotia, %	0.07	0.06	0.08	0.01	0.07	0.00	0.10	0.06	0.02	0.00	0.08	0.04
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	0.56	0.24	1.24	0.46	0.63	0.28	1.00	0.36	0.77	0.28	2.20	0.48
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	1.40	0.90	2.60	0.81	1.63	1.00	2.20	0.60	2.41	0.36	8.22	2.26
(i) Soiled Soybeans, %	0.96	0.60	1.88	0.62	13.78	0.54	36.00	19.36	7.03	0.00	31.50	7.45
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.37	0.18	0.84	0.32	0.74	0.20	1.46	0.65	0.46	0.10	0.98	0.31
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	0	0	0	2	0	5	2.89	0	0	5	1.12
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	1	0	5	2.50	0	0	0	0	1	0	5	1.54
Number of samples	***4***				***3***				***20***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	7.1	6.9	7.3	0.18	6.9	6.7	7.3	0.32	7.1	6.8	7.3	0.15
Crude protein, % (db)	42.75	39.92	45.09	2.13	40.13	39.60	40.50	0.47	40.65	38.68	42.26	0.79
Crude fat, % (db)	19.3	18.5	20.1	0.75	18.7	17.7	20.0	1.17	19.8	17.3	22.0	1.20
Crude Fibre, % (db)	7.6	6.4	8.1	0.79	7.3	7.0	7.5	0.25	7.0	5.5	8.9	0.72
Ash, % (db)	4.51	4.42	4.60	0.07	4.80	4.74	4.83	0.05	4.68	4.43	5.09	0.20
Number of samples	***4***				***3***				***20***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(34) Gauteng				(35) Limpopo				(36) KwaZulu-Natal			
Grading:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
(a) Wet pods, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(b) Foreign matter, including stones, other grains and sunflower seeds: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.46	0.18	0.96	0.26	0.71	0.12	1.12	0.52	1.33	0.10	9.28	2.64
(c) Other grain, %	0.11	0.00	0.24	0.10	0.53	0.12	0.98	0.43	0.03	0.00	0.20	0.06
(d) Sunflower seed, %	0.01	0.00	0.08	0.03	0.03	0.00	0.10	0.06	0.00	0.00	0.00	0.00
(e) Stones, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(f) Sclerotia, %	0.08	0.00	0.44	0.12	0.00	0.00	0.00	0.00	0.04	0.00	0.12	0.05
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	1.50	0.62	5.00	1.32	0.10	0.00	0.18	0.09	0.79	0.18	2.40	0.65
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	2.62	0.72	7.40	1.76	3.81	1.12	6.18	2.54	1.94	0.76	4.28	1.01
(i) Soiled Soybeans, %	1.00	0.00	2.60	0.88	4.01	1.22	8.24	3.72	4.86	3.00	9.36	1.78
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.55	0.28	1.28	0.31	0.71	0.12	1.12	0.52	1.36	0.10	9.40	2.68
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	0	5	1.44	0	0	0	0	0	0	0	0
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	1	0	10	2.89	0	0	0	0	0	0	0	0
Number of samples	***12***				***3***				***12***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	6.6	6.2	7.2	0.34	6.9	6.1	8.3	1.22	6.9	6.6	7.1	0.18
Crude protein, % (db)	40.05	35.43	41.67	1.58	41.60	40.94	42.67	0.93	40.36	39.53	41.33	0.60
Crude fat, % (db)	18.9	17.0	19.6	0.69	19.7	18.8	20.3	0.79	20.6	19.2	21.9	0.79
Crude Fibre, % (db)	6.6	5.4	7.4	0.61	6.6	6.0	7.6	0.87	6.3	5.4	7.6	0.54
Ash, % (db)	4.64	4.52	4.95	0.11	4.90	4.74	5.08	0.17	4.73	4.45	4.83	0.11
Number of samples	***12***				***3***				***12***			

Fatty acid Profile

Fatty acid profiles are the most important tool for identification of authenticity of vegetable fats and oils. All types of oil have their own specific fatty acid profile which is unique to that product. Fatty acids are typically esterified to a glycerol backbone to form triglycerides (also called fats or oils). Fatty acids are either described as saturated or unsaturated, with saturated fatty acids being solid at room temperature and unsaturated fatty acids being liquid at room temperature. Unsaturated fatty acids are further subdivided into mono-unsaturated (one double bond in the carbon chain) or poly-unsaturated (more than one double bond in the carbon chain). The unique fatty acid profile of each product/crop is a combination of saturated, mono-unsaturated and poly-unsaturated oils and is specific to that type of oil.

Fatty acid profiles of every crop, however, are subject to variation. The variation or typical pattern of fatty acids in a specific oil not only influences the stability and physical properties of the oil but also aids in distinguishing one type of oil from another. Variation of fatty acids within the same product depend on climate, latitude, soil type, cultivar, rainfall as well as seasonal variation. These variations should be included when ranges for identification of authenticity are determined.

It is imperative to include ranges wherein fatty acids vary, in order to successfully validate the authenticity of a specific vegetable oil. Building of a database requires gathering of information over different seasons, areas and cultivars in order to give a true reflection of the ranges wherein fatty acids can differ. Currently, no national updated database for fatty acid composition of soybean oil is available.

It is important that South Africa, as a soybean producing country, develop and maintain a national fatty acid profile database to the benefit of the Oil Seed Industry. Annual analysis of crop and cultivar samples will ensure that the natural variation caused by different cultivars as well as the influence of climate and locality are included in the database values. Seasonal variations will also be addressed. Recording all variation applicable to the crops in the database will enable the annual review of the specified ranges.

Precision Oil Laboratories was subcontracted to perform fatty acid profile analyses on 20 composite crop samples representing different production regions as well as 21 cultivar samples from different localities. Please refer to Tables 7, 8 and 9 on pages 33 to 36 for the results.

The following fatty acid were included in the profile analysis:

C14:0	Myristic acid
C16:0	Palmitic acid
C16:1	Palmitoleic acid
C17:0	Margaric acid
C17:1	Glinkgolic acid
C18:0	Stearic acid
C18:1 t	trans Oleic acid
C18:1 c	cis Oleic acid
C18:2 t	trans Linoleic acid
C18:2 c	cis Linoleic acid
C18:3n6	n6 Linolenic acid
C18:3n3	n3 Linolenic acid
C20:0	Arachidic acid
C20:1	Eicosenoic acid
C20:2	Eicosadienoic acid

C21:0	Heneicosanoic acid
C22:0	Behenic acid
C22:1	Erucic acid
C24:0	Lignoceric acid
C24:1	Nervonic acid

The samples gathered for the purpose of the annual national soyabean crop survey can be further utilised for future research to the benefit of industry by including the following analyses and results to the newly created database:

- ## Sterol and Tocopherol

  The problem of adulteration of food is not new and methods of detecting it have been described as far back as 1820. Adulteration in the oilseed industry is a reality and blends are often made intentionally in order to increase the profit margin of the oil by blending it with a lower cost oil.

  Although Fatty acid profile is the most important test for adulteration of oil, it can be circumvented. The standard ranges laid down for the fatty acids of pure oils are very wide in order to accommodate natural variation. When blends are made, the natural variations of the constituent oils are superimposed. This causes the problem of checking the identity of oil samples to become more complex. It is possible to blend a number of oils to make it look like a pure oil with respect to the standard ranges of the fatty acid composition.

  Fatty acid profile alone is not sufficient information for discrimination when blends of oils are involved. The inclusion of tocopherol and sterols patterns in a data basis of oils have been proven to not only discriminate between authentic and adulterated oils, but that it can also be used to determine which oils are present in a blend and what proportions were blended.

- ## Free Fatty Acids

  The free fatty acid value of oil is an indicator of hydrolytic deterioration. The free fatty acid value is an important quality parameter for oilseeds and is directly correlated with effective drying of the seeds as well as storage temperatures. High free fatty acid values lead to significant oil losses during refining of the oil. Factors aggravating hydrolytic deterioration are moisture, heat and enzymatic activity. If seeds are not dried properly, the free fatty acid value increases. It is important to update the National database with the free fatty acid value for seed oils. This will ensure that correlations can be made between free fatty acid value and harvesting conditions, as well as free fatty acids and storage temperatures. The information gathered will assist in lowering of free fatty acid values and prevent oil losses.

References:

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Van Niekerk, P.J., 1990. Determination of the component oils of edible oil blends. University of Pretoria.

The Fatty acid Profile information was supplied by Dr. Mathilda Mostert from Precision Oil Laboratories.

Table 7: Fatty acid profile results of a selection of crop quality samples from the 2018/19 season																					
Province	Region	g Fatty acids/100 g Fatty Acids																			
		C14:0	C16:0	C16:1	C17:0	C17:1	C18:0	C18:1 t	C18:1 c	C18:2 t	C18:2 c	C18:3n6	C18:3n3	C20:0	C20:1	C20.2	C21:0	C22:0	C22:1	C24:0	C24:1
Northern Cape	11	ND	10.1	<LOQ	<LOQ	ND	5.52	ND	23.27	ND	52.3	ND	7.21	0.56	<LOQ	ND	ND	0.46	ND	<LOQ	ND
North West	20	ND	9.3	ND	<LOQ	ND	5.80	ND	22.61	ND	52.9	ND	7.93	0.56	<LOQ	ND	ND	0.49	ND	<LOQ	ND
Free State	21	ND	9.3	ND	<LOQ	ND	5.01	ND	20.98	ND	54.1	ND	9.16	0.51	<LOQ	ND	ND	0.51	ND	<LOQ	ND
	23	ND	9.7	ND	<LOQ	ND	4.99	ND	22.12	ND	53.4	ND	8.30	0.53	<LOQ	ND	ND	0.53	ND	<LOQ	ND
	24	ND	9.4	ND	<LOQ	ND	4.65	ND	20.84	ND	54.2	ND	9.47	0.48	<LOQ	ND	ND	0.47	ND	<LOQ	ND
	25	ND	9.1	ND	ND	ND	4.64	ND	19.18	ND	55.2	ND	10.59	0.47	<LOQ	ND	ND	0.448	ND	<LOQ	ND
	26	ND	8.97	ND	ND	ND	4.06	ND	20.18	ND	54.1	ND	11.51	0.424	<LOQ	ND	ND	0.48	ND	<LOQ	ND
	27	ND	10.0	ND	<LOQ	ND	4.31	ND	19.12	ND	54.5	ND	10.68	0.46	<LOQ	ND	ND	0.47	ND	<LOQ	ND
	28	ND	9.3	ND	<LOQ	ND	4.75	ND	21.41	ND	54.0	ND	9.10	0.50	<LOQ	ND	ND	0.454	ND	<LOQ	ND
	28	ND	9.7	ND	<LOQ	ND	4.90	ND	21.08	ND	53.5	ND	9.26	0.48	<LOQ	ND	ND	0.450	ND	<LOQ	ND
	Min	-	8.97	-	-	-	4.06	-	19.12	-	53.4	-	8.30	0.424	-	-	-	0.448	-	-	-
	Max	-	10.0	-	-	-	5.01	-	22.12	-	55.2	-	11.51	0.53	-	-	-	0.53	-	-	-
	N	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Mpumalanga	29	ND	9.9	ND	<LOQ	ND	5.07	ND	25.04	ND	51.6	ND	6.80	0.56	<LOQ	ND	ND	0.52	ND	<LOQ	ND
	30	ND	9.6	ND	<LOQ	ND	4.92	ND	21.98	ND	52.6	ND	9.34	0.48	0.364	ND	ND	0.49	ND	<LOQ	ND
	30	ND	9.5	ND	<LOQ	ND	5.24	ND	21.71	ND	53.1	ND	8.77	0.55	<LOQ	ND	ND	0.66	ND	<LOQ	ND
	31	ND	9.8	ND	<LOQ	ND	5.98	ND	21.77	ND	51.6	ND	8.86	0.63	<LOQ	ND	ND	0.88	ND	<LOQ	ND
	32	ND	9.2	ND	<LOQ	ND	5.62	ND	22.00	ND	53.2	ND	8.55	0.56	<LOQ	ND	ND	0.50	ND	<LOQ	ND
	33	ND	9.5	ND	<LOQ	ND	5.56	ND	23.40	ND	52.0	ND	8.03	0.56	<LOQ	ND	ND	0.52	ND	<LOQ	ND
	33	ND	10.4	ND	ND	ND	5.11	ND	25.74	ND	50.7	ND	6.64	0.50	<LOQ	ND	ND	0.48	ND	<LOQ	ND
	Min	-	9.2	-	-	-	4.92	-	21.71	-	50.7	-	6.64	0.48	-	-	-	0.48	-	-	-
	Max	-	10.4	-	-	-	5.98	-	25.74	-	53.2	-	9.34	0.63	0.364	-	-	0.88	-	-	-
	N	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Gauteng	34	ND	9.3	ND	ND	ND	5.28	ND	21.96	ND	53.2	ND	8.88	0.52	<LOQ	ND	ND	0.53	ND	<LOQ	ND
Limpopo	35	ND	10.2	ND	<LOQ	ND	4.65	ND	25.89	ND	50.5	ND	7.28	0.49	<LOQ	ND	ND	0.51	ND	<LOQ	ND
KwaZulu-Natal	36	ND	10.5	ND	<LOQ	ND	4.62	ND	20.24	ND	54.9	ND	8.29	0.47	<LOQ	ND	ND	0.46	ND	<LOQ	ND
RSA	Min	-	8.97	-	-	-	4.06	-	19.12	-	50.5	-	6.64	0.424	-	-	-	0.448	-	-	-
	Max	-	10.5	-	-	-	5.98	-	25.89	-	55.2	-	11.51	0.63	0.364	-	-	0.88	-	-	-
	N	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

Note:
Limit of detection (LOD) = 0.09 g Fatty acid/100 g Fatty acids.
Limit of quantitation (LOQ) = 0.28 g Fatty acid/100 g Fatty acids.
Values below the limit of quantitation cannot be accurately quantified.
ND = Not detected

Table 8: Fatty acid profile results of a selection of cultivar samples per region from the 2018/19 season

Province	Locality	Region	Cultivar	g Fatty acids/100 g Fatty Acids																		
				C14:0	C16:0	C16:1	C17:0	C17:1	C18:0	C18:1 t	C18:1 c	C18:2 t	C18:2 c	C18:3n6	C18:3n3	C20:0	C20:1	C20.2	C21:0	C22:0	C22:1	C24:0	C24:1
North West	Potchefstroom	18	LDC 5.3	ND	9.9	ND	<LOQ	ND	3.86	ND	19.72	ND	56.3	ND	9.06	0.414	<LOQ	ND	ND	0.451	ND	<LOQ	ND
			DM 5953 RSF	ND	10.1	ND	<LOQ	ND	4.77	ND	21.32	ND	54.1	ND	8.46	0.405	<LOQ	ND	ND	0.405	ND	<LOQ	ND
			PAN 1521 R	ND	10.2	ND	<LOQ	ND	5.59	ND	20.87	ND	53.9	ND	7.79	0.58	<LOQ	ND	ND	0.56	ND	<LOQ	ND
			LS 6868 R	ND	9.8	ND	<LOQ	ND	4.49	ND	20.50	ND	55.5	ND	8.34	0.49	<LOQ	ND	ND	0.47	ND	<LOQ	ND
			NS 6448 R	ND	10.5	ND	<LOQ	ND	5.41	ND	21.09	ND	54.1	ND	7.42	0.54	<LOQ	ND	ND	0.46	ND	<LOQ	ND
			SSS 5052 (tuc)	ND	10.5	ND	<LOQ	ND	4.91	ND	21.57	ND	53.7	ND	7.73	0.52	<LOQ	ND	ND	0.46	ND	<LOQ	ND
			P61 T 38 R	ND	9.7	ND	<LOQ	ND	4.98	ND	20.73	ND	54.9	ND	8.12	0.50	<LOQ	ND	ND	0.51	ND	<LOQ	ND
		Min		-	*9.7*	-	-	-	*3.86*	-	*19.72*	-	*53.7*	-	*7.42*	*0.405*	-	-	-	*0.405*	-	-	-
		Max		-	*10.5*	-	-	-	*5.59*	-	*21.57*	-	*56.3*	-	*9.06*	*0.58*	-	-	-	*0.56*	-	-	-
		N		*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*
Mpumalanga	Kinross	31	LDC 5.3	ND	10.4	<LOQ	ND	ND	4.79	ND	20.35	ND	54.5	ND	8.71	0.49	<LOQ	ND	ND	0.406	ND	<LOQ	ND
			DM 5953 RSF	ND	10.3	ND	<LOQ	ND	6.09	ND	23.72	ND	50.4	ND	8.15	0.49	<LOQ	ND	ND	0.403	ND	<LOQ	ND
			PAN 1521 R	ND	10.0	ND	<LOQ	ND	5.04	ND	20.55	ND	53.7	ND	9.27	0.51	<LOQ	ND	ND	0.431	ND	<LOQ	ND
			LS 6868 R	ND	9.4	ND	<LOQ	ND	3.96	ND	20.12	ND	54.9	ND	10.03	0.429	0.57	ND	ND	0.409	ND	<LOQ	ND
			NS 6448 R	ND	10.2	ND	<LOQ	ND	4.76	ND	19.59	ND	55.3	ND	8.96	0.403	<LOQ	ND	ND	0.385	ND	<LOQ	ND
			SSS 5052 (tuc)	ND	9.7	ND	<LOQ	ND	4.56	ND	21.07	ND	54.2	ND	9.06	0.46	<LOQ	ND	ND	0.433	ND	<LOQ	ND
			P61 T 38 R	ND	9.0	ND	<LOQ	ND	4.80	ND	19.85	ND	54.8	ND	10.12	0.47	<LOQ	ND	ND	0.47	ND	<LOQ	ND
		Min		-	*9.0*	-	-	-	*3.96*	-	*19.59*	-	*50.4*	-	*8.15*	*0.403*	-	-	-	*0.385*	-	-	-
		Max		-	*10.4*	-	-	-	*6.09*	-	*23.72*	-	*55.3*	-	*10.12*	*0.51*	*0.57*	-	-	*0.47*	-	-	-
		N		*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*
	Marble Hall	33	LDC 5.3	ND	10.3	<LOQ	ND	ND	4.40	ND	28.58	ND	48.9	ND	6.26	0.48	<LOQ	ND	ND	0.54	ND	<LOQ	ND
			DM 5953 RSF	ND	11.1	<LOQ	<LOQ	ND	4.90	ND	31.26	ND	45.8	ND	5.60	0.46	<LOQ	ND	ND	0.377	ND	<LOQ	ND
			PAN 1521 R	ND	10.4	ND	ND	ND	5.05	ND	26.41	ND	50.4	ND	6.17	0.61	<LOQ	ND	ND	0.58	ND	<LOQ	ND
			LS 6868 R	ND	10.3	ND	ND	ND	4.27	ND	29.93	ND	48.8	ND	5.05	0.52	<LOQ	ND	ND	0.54	ND	<LOQ	ND
			NS 6448 R	ND	11.0	ND	<LOQ	ND	5.01	ND	23.37	ND	52.4	ND	6.48	0.55	<LOQ	ND	ND	0.51	ND	<LOQ	ND
			SSS 5052 (tuc)	ND	10.9	ND	<LOQ	ND	4.36	ND	24.25	ND	52.0	ND	7.03	0.49	<LOQ	ND	ND	0.50	ND	<LOQ	ND
			P61 T 38 R	ND	10.1	ND	<LOQ	ND	4.63	ND	22.58	ND	54.4	ND	6.78	0.49	<LOQ	ND	ND	0.50	ND	<LOQ	ND
		Min		-	*10.1*	-	-	-	*4.27*	-	*22.58*	-	*45.8*	-	*5.05*	*0.46*	-	-	-	*0.377*	-	-	-
		Max		-	*11.1*	-	-	-	*5.05*	-	*31.26*	-	*54.4*	-	*7.03*	*0.61*	-	-	-	*0.58*	-	-	-
		N		*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*
	Min			-	*9.0*	-	-	-	*3.96*	-	*19.59*	-	*45.8*	-	*5.05*	*0.403*	-	-	-	*0.377*	-	-	-
	Max			-	*11.1*	-	-	-	*6.09*	-	*31.26*	-	*55.3*	-	*10.12*	*0.61*	*0.57*	-	-	*0.58*	-	-	-
	N			*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*	*14*
RSA	Min			-	*9.0*	-	-	-	*3.86*	-	*19.59*	-	*45.8*	-	*5.05*	*0.403*	-	-	-	*0.377*	-	-	-
	Max			-	*11.1*	-	-	-	*6.09*	-	*31.26*	-	*56.3*	-	*10.12*	*0.61*	*0.57*	-	-	*0.58*	-	-	-
	N			*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*

Note:
Limit of detection (LOD) = 0.09 g Fatty acid/100 g Fatty acids.
Limit of quantitation (LOQ) = 0.28 g Fatty acid/100 g Fatty acids.
Values below the limit of quantitation cannot be accurately quantified.
ND = Not detected

Table 9: Fatty acid profile results per cultivar - 2018/19 season

Cultivar	Locality	Region	g Fatty acids/100 g Fatty Acids																		
			C14:0	C16:0	C16:1	C17:0	C17:1	C18:0	C18:1 t	C18:1 c	C18:2 t	C18:2 c	C18:3n6	C18:3n3	C20:0	C20:1	C20.2	C21:0	C22:0	C22:1	C24:0	C24:1
LDC 5.3	Potchefstroom	18	ND	9.9	ND	<LOQ	ND	3.86	ND	19.72	ND	56.3	ND	9.06	0.414	<LOQ	ND	ND	0.451	ND	<LOQ	ND
	Kinross	31	ND	10.4	<LOQ	ND	ND	4.79	ND	20.35	ND	54.5	ND	8.71	0.49	<LOQ	ND	ND	0.406	ND	<LOQ	ND
	Marble Hall	33	ND	10.3	<LOQ	ND	ND	4.40	ND	28.58	ND	48.9	ND	6.26	0.48	<LOQ	ND	ND	0.54	ND	<LOQ	ND
	Min		-	9.9	-	-	-	3.86	-	19.72	-	48.9	-	6.26	0.414	-	-	-	0.406	-	-	-
	Max		-	10.4	-	-	-	4.79	-	28.58	-	56.3	-	9.06	0.49	-	-	-	0.54	-	-	-
	N		3	3	3	3	3	3	3	3	3	3	3	7	3	3	7	3	3	3	3	3
DM 5953 RSF	Potchefstroom	18	ND	10.1	ND	<LOQ	ND	4.77	ND	21.32	ND	54.1	ND	8.46	0.405	<LOQ	ND	ND	0.405	ND	<LOQ	ND
	Kinross	31	ND	10.3	ND	<LOQ	ND	6.09	ND	23.72	ND	50.4	ND	8.15	0.49	<LOQ	ND	ND	0.403	ND	<LOQ	ND
	Marble Hall	33	ND	11.1	<LOQ	<LOQ	ND	4.90	ND	31.26	ND	45.8	ND	5.60	0.46	<LOQ	ND	ND	0.377	ND	<LOQ	ND
	Min		-	10.1	-	-	-	4.77	-	21.32	-	45.8	-	5.60	0.405	-	-	-	0.377	-	-	-
	Max		-	11.1	-	-	-	6.09	-	31.26	-	54.1	-	8.46	0.49	-	-	-	0.405	-	-	-
	N		3	3	3	3	3	3	3	3	3	3	3	7	3	3	7	3	3	3	3	3
PAN 1521 R	Potchefstroom	18	ND	10.2	ND	<LOQ	ND	5.59	ND	20.87	ND	53.9	ND	7.79	0.58	<LOQ	ND	ND	0.56	ND	<LOQ	ND
	Kinross	31	ND	10.0	ND	<LOQ	ND	5.04	ND	20.55	ND	53.7	ND	9.27	0.51	<LOQ	ND	ND	0.431	ND	<LOQ	ND
	Marble Hall	33	ND	10.4	ND	ND	ND	5.05	ND	26.41	ND	50.4	ND	6.17	0.61	<LOQ	ND	ND	0.58	ND	<LOQ	ND
	Min		-	10.0	-	-	-	5.04	-	20.55	-	50.4	-	6.17	0.51	-	-	-	0.431	-	-	-
	Max		-	10.4	-	-	-	5.59	-	26.41	-	53.9	-	9.27	0.61	-	-	-	0.58	-	-	-
	N		3	3	3	3	3	3	3	3	3	3	3	7	3	3	7	3	3	3	3	3
LS 6868 R	Potchefstroom	18	ND	9.8	ND	<LOQ	ND	4.49	ND	20.50	ND	55.5	ND	8.34	0.49	<LOQ	ND	ND	0.47	ND	<LOQ	ND
	Kinross	31	ND	9.4	ND	<LOQ	ND	3.96	ND	20.12	ND	54.9	ND	10.03	0.429	0.57	ND	ND	0.409	ND	<LOQ	ND
	Marble Hall	33	ND	10.3	ND	ND	ND	4.27	ND	29.93	ND	48.8	ND	5.05	0.52	<LOQ	ND	ND	0.54	ND	<LOQ	ND
	Min		-	9.4	-	-	-	3.96	-	20.12	-	48.8	-	5.05	0.429	-	-	-	0.409	-	-	-
	Max		-	10.3	-	-	-	4.49	-	29.93	-	55.5	-	10.03	0.52	0.57	-	-	0.54	-	-	-
	N		3	3	3	3	3	3	3	3	3	3	3	7	3	3	7	3	3	3	3	3
NS 6448 R	Potchefstroom	18	ND	10.5	ND	<LOQ	ND	5.41	ND	21.09	ND	54.1	ND	7.42	0.54	<LOQ	ND	ND	0.46	ND	<LOQ	ND
	Kinross	31	ND	10.2	ND	<LOQ	ND	4.76	ND	19.59	ND	55.3	ND	8.96	0.403	<LOQ	ND	ND	0.385	ND	<LOQ	ND
	Marble Hall	33	ND	11.0	ND	<LOQ	ND	5.01	ND	23.37	ND	52.4	ND	6.48	0.55	<LOQ	ND	ND	0.51	ND	<LOQ	ND
	Min		-	10.2	-	-	-	4.76	-	19.59	-	52.4	-	6.48	0.403	-	-	-	0.385	-	-	-
	Max		-	11.0	-	-	-	5.41	-	23.37	-	55.3	-	8.96	0.55	-	-	-	0.51	-	-	-
	N		3	3	3	3	3	3	3	3	3	3	3	7	3	3	7	3	3	3	3	3
SSS 5052 (tuc)	Potchefstroom	18	ND	10.5	ND	<LOQ	ND	4.91	ND	21.57	ND	53.7	ND	7.73	0.52	<LOQ	ND	ND	0.46	ND	<LOQ	ND
	Kinross	31	ND	9.7	ND	<LOQ	ND	4.56	ND	21.07	ND	54.2	ND	9.06	0.46	<LOQ	ND	ND	0.433	ND	<LOQ	ND
	Marble Hall	33	ND	10.9	ND	<LOQ	ND	4.36	ND	24.25	ND	52.0	ND	7.03	0.49	<LOQ	ND	ND	0.50	ND	<LOQ	ND
	Min		-	9.7	-	-	-	4.36	-	21.07	-	52.0	-	7.03	0.46	-	-	-	0.433	-	-	-
	Max		-	10.9	-	-	-	4.91	-	24.25	-	54.2	-	9.06	0.52	-	-	-	0.50	-	-	-
	N		3	3	3	3	3	3	3	3	3	3	3	7	3	3	7	3	3	3	3	3

Table 9: Fatty acid profile results per cultivar - 2018/19 season																					
Cultivar	Locality	Region	g Fatty acids/100 g Fatty Acids (continue)																		
			C14:0	C16:0	C16:1	C17:0	C17:1	C18:0	C18:1 t	C18:1 c	C18:2 t	C18:2 c	C18:3n6	C18:3n3	C20:0	C20:1	C20.2	C21:0	C22:0	C22:1	C24:0	C24:1
P61 T 38 R	Potchefstroom	18	ND	9.7	ND	<LOQ	ND	4.98	ND	20.73	ND	54.9	ND	8.12	0.50	<LOQ	ND	ND	0.51	ND	<LOQ	ND
	Kinross	31	ND	9.0	ND	<LOQ	ND	4.80	ND	19.85	ND	54.8	ND	10.12	0.47	<LOQ	ND	ND	0.47	ND	<LOQ	ND
	Marble Hall	33	ND	10.1	ND	<LOQ	ND	4.63	ND	22.58	ND	54.4	ND	6.78	0.49	<LOQ	ND	ND	0.50	ND	<LOQ	ND
	Min		-	*9.0*	-	-	-	*4.63*	-	*19.85*	-	*54.4*	-	*6.78*	*0.47*	-	-	-	*0.47*	-	-	-
	Max		-	*10.1*	-	-	-	*4.98*	-	*22.58*	-	*54.9*	-	*10.12*	*0.50*	-	-	-	*0.51*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*7*	*3*	*3*	*7*	*3*	*3*	*3*	*3*	*3*
RSA	Min		-	*9.0*	-	-	-	*3.86*	-	*19.59*	-	*45.8*	-	*5.05*	*0.403*	-	-	-	*0.377*	-	-	-
	Max		-	*11.1*	-	-	-	*6.09*	-	*31.26*	-	*56.3*	-	*10.12*	*0.61*	*0.57*	-	-	*0.58*	-	-	-
	N		*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*

Note:
Limit of detection (LOD) = 0.09 g Fatty acid/100 g Fatty acids.
Limit of quantitation (LOQ) = 0.28 g Fatty acid/100 g Fatty acids.
Values below the limit of quantitation cannot be accurately quantified.
ND = Not detected

Methods

SAMPLING PROCEDURE:

A working group determined the procedure to be followed to ensure that the crop quality samples sent to the SAGL by the various grain silo owners, were representative of the total crop.

Each delivery was sampled as per the grading regulations for grading purposes.

After grading, the grading samples were placed in separate containers according to class and grade, per silo bin at each silo.

After 80% of the expected harvest had been received, the content of each container was divided with a multi slot divider in order to obtain a 3 kg sample.

If there were more than one container per class and grade per silo bin, the combined contents of the containers were mixed thoroughly before dividing it with a multi slot divider to obtain the required 3 kg sample.

The samples were marked clearly with the name of the depot, the bin/bag/bunker number(s) represented by each individual sample as well as the class and grade and were then forwarded to the SAGL.

GRADING:

Full grading was done in accordance with the Regulations relating to the Grading, Packing and Marking of Soybeans intended for sale in the Republic of South Africa (Government Notice NO. R 370 of 21 April 2017).

Please see pages 87 to 96 of this report.

TEST WEIGHT:

Test weight provides a measure of the bulk density of grain and oilseeds.

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 this report 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).

NUTRITIONAL ANALYSIS:

Milling

Prior to the chemical analyses, the soybean samples were milled on a Retch ZM 200 mill fitted with a 1.0 mm screen.

Moisture

The method prescribed under the ISTA International Rules for Seed Testing, Section 9, latest edition was used to determine the moisture content of the soya samples. This method determines moisture content as a loss in weight of a sample when dried in an oven at 103 °C for 17 hours.

Crude protein

The Dumas combustion analysis technique was used to determine the crude protein content, according to AACCI method 46-30.01, latest edition.

This method prescribes a generic combustion method for the determination of crude protein. Combustion at high temperature in pure oxygen sets nitrogen free, which is measured by thermal conductivity detection. The total nitrogen content of the sample is determined and converted to equivalent protein by multiplication with a factor of 6.25 to obtain the crude protein content.

Crude fat

In-House method 024 was used for the determination of the crude fat in the samples. After sample preparation the fat is extracted by petroleum ether with the aid of the Soxhlet extraction apparatus, followed by the removal of the solvent by evaporation and weighing the dried residue thus obtained. The residue is expressed as % crude fat.

Crude fibre

In-House method 020 was used for the determination of the crude fibre in the samples. Crude fibre is the loss on ignition of the dried residue remaining after digestion of the sample with 1.25% Sulphuric acid (H_2SO_4) and 1.25% Sodium hydroxide (NaOH) solutions under specific conditions.

Ash

Ash is defined as the quantity of mineral matter which remains as incombustible residue of the tested substance, after application of the described working method. In-house method No. 011, based on AACCI method 08-02.01 Rapid (Magnesium Acetate) method, was used for the determination. The samples were incinerated at 700 ± 10 °C in a muffle furnace for 45 minutes.

GMO (Genetically Modified Organisms):

The EnviroLogix QuickComb kit for bulk soybeans was used to quantitatively determine the presence of genetically modified soybeans. The kit is designed to extract and detect the presence of certain proteins at the levels typically expressed in genetically modified bulk soybeans. The procedure prescribed in the EnviroLogix – QuickScan Instruction Manual, latest edition was followed. Results were scanned and interpreted quantitatively with the EnviroLogix QuickScan system.

Precision Oil Laboratories' Fatty Acid Profile Methods:

Fat Extraction

In-House method POL 019 was used for the extraction of the crude fat from the samples. After sample preparation the fat is extracted by petroleum ether under reflux, followed by the removal of the solvent by evaporation. The residue obtained from the fat extraction is used for preparation of methyl esters for determination of the fatty acid profile.

Fatty Acid Profile

In-House method POL 015 was used for determination of the fatty acid composition. Extracted fat is converted to methyl esters using an alkali catalyzed method. Methyl esters are injected into a Gas Chromatograph and an external fatty acid methyl ester standard is used to identify peaks based on retention times. The fatty acid composition is expressed as a total fatty acid content of 100% with different fatty acids representing a percentage of the total fatty acids.

sanas
South African National Accreditation System

CERTIFICATE OF ACCREDITATION

In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

SOUTHERN AFRICAN GRAIN LABORATORY NPC

Co. Reg. No.: 1997/018518/08

Facility Accreditation Number: **T0116**

is a South African National Accreditation System accredited facility provided that all conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation, Annexure "A", bearing the above accreditation number for

CHEMICAL AND PHYSICAL ANALYSIS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2017

The accreditation demonstrates technical competency for a defined scope and the operation of a quality management system

While this certificate remains valid, the Accredited Facility named above is authorised to use the relevant accreditation symbol to issue facility reports and/or certificates

Mr R Josias
Chief Executive Officer

Effective Date: 01 November 2019
Certificate Expires: 31 October 2024

ANNEXURE A

SCHEDULE OF ACCREDITATION

Facility Number: **T0116**

Permanent Address of Laboratory:

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Agri-Hub Office Park - Grain Building
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The Willows
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0040

Technical Signatories:

Ms J Nortje (All Methods excl. In-house method 029)
Ms M Bothma (All Chemical Methods)
Ms M Hammes (All Chemical Methods)
Ms A de Jager (Nutrients & Contaminants Methods)
Ms W Louw (In-house Methods 001, 002, 003, 010 & 026)
Ms D Moleke (Rheological Methods)
Ms I Terblanche (Rheological Methods)
Mrs H Meyer (All Chemical, Nutrients and Contaminants & Grading Methods)
Ms J Kruger (All Chemical Methods)
Ms M Motlanthe (In-house Methods 001, 003 & 026)
Mr B van Der Linde (Grading)
Ms M Ramare (All Chemical Methods Excl. In-House Method 012 and SOP MC23)
Ms Z Skhosana (In-house Method 026)
Ms T de Beer (Rheological Methods)

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Nominated Representative:

Mrs H Meyer

Issue No.: 29
Date of Issue: 14 October 2019
Expiry Date: 31 October 2024

Material or Products Tested	Type of Tests / Properties Measured, Range of Measurement	Standard Specifications, Techniques / Equipment Used
CHEMICAL		
Ground Barley	Moisture (Oven Method)	Analytical EBC Method 3.2, latest Edition (2 hour; 130^{0}C)
Cereal and cereal products specifically-wheat, rice, (hulled paddy), barley, millet, rye, and oats as grain, semolina and flour	Moisture (Oven Method)	ICC Std No.110/1, Latest Edition (90 min; 130˚C) (2 hour; 130˚C)
Flour, semolina, bread, all kind of grains and cereal products and food products (except those that are sugar coated)	Moisture (Oven Method)	AACCI 44-15.02, Latest Edition (1 hour; 130˚C) (72 hour; 103˚C)

are sugar coated)		(72 hour; 103˚C)
Maize Grits	Moisture (Oven Method)	Analytical EBC Method 6.2.2, latest edition (4 hours, 130^{0}C)
Animal feed, Plant tissue and Sunflower (Milled)	Moisture (Oven Method)	AgriLASA 2.1, Latest Edition (5 hours, 105^{0}C)
All flours, cereal grains, oilseeds and animal feeds	Nitrogen and protein (Combustion method - Dumas)	AACCI 46-30.01, Latest Edition
Cereal based food stuff	Dietary fibres (Total)	In-house method 012
Food stuff and feeds	Carbohydrates (by difference) (calculation) Energy value (calculation) Total digestible nutritional value (calculation)	SOP MC 23
Food Stuff and feeds	Determination of Ash	In-house method 011
Wheat Kernels	Moisture (Oven Method)	Government Gazette Wheat Regulation, Latest Edition (72 hour, 103˚C)
Flours of grains e.g. barley, oats, triticale, maize, rye, sorghum and wheat; oilseeds like soybeans and sunflower, feeds and mixed feeds and foodstuffs	Crude fat (Ether extraction by Soxhlet)	In-house method 024
Meal and flour of wheat, rye, barley, other grains, starch containing and malted products	Falling number	ICC Std 107/1, Latest Edition
NUTRIENTS AND CONTAMINANTS		
Vitamin fortified food and feed products and fortification mixes grain based	Vitamin A as all trans Retinol (Saponification) (HPLC)	In-house method 001
	Thiamine Mononitrate (HPLC) Riboflavin (HPLC) Nicotinamide (HPLC) Pyridoxine Hydrochloride (HPLC)	In-house method 002
	Folic Acid (HPLC)	In-house method 003
Grain based food and feed products (fortified and unfortified) and fortification mixes	Total Sodium (Na) Total Iron (Fe) Total Zinc (Zn)	In-house method 010
Yeast and Bread	Vitamin D_2 (HPLC)	In-House method 029

Food and feed	Multi-Mycotoxin: -Aflatoxin G_1, B_1, G_2, B_2 and total -Deoxynivalenol (DON), 15-ADON -Fumonisin B_1, B_2, B_3 -Ochratoxin A -T2, HT-2 - Zearalenone	In-house method 026
GRADING		
Maize	Defective kernels (White maize/ yellow maize)	Government Gazette Maize Regulation, Latest Edition
Cereal as grains (Wheat, barley, rye and oats)	Hectolitre mass (Kern222)	ISO 7971-3, Latest edition
Wheat	Screenings	Government Gazette Wheat Grading Regulation, Latest Edition
RHEOLOGICAL		
Wheat flour	Alveograph (Rheological properties)	ICC Std.121, Latest Edition
Flours	Farinograph (Rheological properties)	AACCI 54.02, Latest Edition (Rheological behaviour of flour Farinograph: Constant Flour Weight procedure)
Hard, soft and durum wheat (flour and whole wheat flour)	Mixograph (Rheological properties)	Industry accepted method 020 (Based on AACCI 54-40.02, Latest Edition Mixograph Method)

Original Date of Accreditation: 01 November 1999

ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM

Accreditation Manager

Landbounavorsingsraad

Graangewasse

Potchefstroom

Agricultural Research Council

Grain Crops

Potchefstroom

Republiek van Suid Afrika

Republic of South Africa

VERSLAG VAN DIE NASIONALE SOJABOON KULTIVARPROEWE/ 2018/19

REPORT OF THE NATIONAL SOYBEAN CULTIVAR TRIALS

Verantwoordelike beampte:

Responsible officer:

AS de Beer

BEDANKINGS

Dank is verskuldig aan die volgende persone vir hul onderskeie bydraes in die verwesenliking van hierdie verslag:

1 **Alle medewerkers en koöperateurs soos gelys op bladsy 11.**

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3 **Me Nicolene Cochrane vir haar hulp met die verwerking en interpertering van die data.**

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6 **Die saadmaatskappye (Tabel 1). Olie- en Proteïensade Ontwikkelingstrust (OPOT) en Landbounavorsingsraad (LNR) wie die projek finansieer.**

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Credit is due to the following persons for their respective contributions to this report:

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2 **Mrs. H. Vermeulen for processing of data and for compiling the report.**

3 **Me Nicolene Cochrane for the processing and interpretation of the data.**

4 **The Research Manager (GC), and the soybean cultivar evaluation committee under whose watchful eye the trials were executed.**

5 **Collegues (Me L. Bronkhorst, Mr's N. Mogapi, C Ramatlotlo and S. Seutwladi) and personnel of GC who rendered assistance in a direct or indirect way.**

6 **The Seed Companies (Table 1), Oil- and Protein Seeds Development Trust (OPDT) and Agricultural Research Council (ARC) for financing the project.**

INHOUD/INDEX

ONDERWERP **BLADSY**
SUBJECT **PAGE**

TABEL
TABLE

BLADSY
PAGE

1 INTRODUCTION

The National Soybean Cultivar Trials (project M101/62 (P05000002) were planted for the 41th successive year this past growing season. A total of 22 trials (of the planned 25 trials) were planted at 22 localities, illustrated in the locality list.

1.1 AIM

The aim of the project was primarily the following:

(I) To compare cultivars for agronomic and economic performance;

(ii) to test the adaptability of cultivars and new releases for specific areas and cultivation practices.

2 MATERIALS AND METHODS

2.1 GENERAL

The trials were planted as randomized block designs as well as a Latinized row-column design using three replications with 32 cultivars for the moderate as well as warm areas and 28 cultivars for the cool areas. Cultivar characteristics are shown in Table 1.

Each trial plot consisted of four, 5 m rows. Four metres were harvested from each of the middle two rows, in order to avoid border effects. Soil form, fertilization and weed control are indicated together with row spacing in Table 2. All seeds were inoculated with Bradyrhizobium japonicum bacteria at planting.

The localities where trials were planted represent a wide range of climatic conditions. Trials were carried out on the ARC and Departmental Research Stations as well as on privately owned farms. Observations were recorded by responsible officers and collaborators as indicated in the list of collaborators. Planting time and cultivation practice were executed to correspond with that of commercial plantings in the specific

areas. Rainfall and irrigation are indicated in Table 3. Note that rainfall is only recorded from October to April and not for the specific growing season of a trial.

2.2 OBSERVATIONS

A brief definition of some of the observations in the trials is as follow:

2.2.1 Date of flowering: The time at which one fully open flower per plant was observed across 50% of the plots.

2.2.2 Physiological maturity: The number of days when 50% of the pods appear yellow or brown.

2.2.3 Date of harvest maturity: When 95% of the pods for a given plot had turned brown. This is an indication of length of growing season, (number of days from date of planting to date of maturity).

2.2.4 Plant height: The average height in centimetre (cm) of plants from the soil surface to the growth point at maturity.

2.2.5 Pod height: The average height in centimetre (cm) of the lowest pods on the plant from soil surface at maturity.

2.2.6 Lodging: Lodging at time of harvest was rated on the following scale:

1 = No lodging
2 = Few lodging, will not hamper mechanical harvesting
3 = Few lodging, lodging less than what will hamper mechanical harvesting
4 = Few lodging, will hamper mechanical harvesting, with yield loss
5 = Fair number of plants lodged, will hamper mechanical harvesting, with yield loss
6 = Many plants lodged, will hamper mechanical harvesting, with yield loss

7 = A large number of plants lodged, will hamper mechanical harvesting, with yield loss

8 = Nearly all plants lodged, will hamper mechanical harvesting, yield loss

9 = All plants lodged, will hamper mechanical harvesting, yield loss

2.2.7 Green stem: The percentage green stems at harvest rated on a 1 (normally mature) to 5 (more than 80% green stems) scale.

2.2.8 Shattering: Measured at time of harvest. Shattering is reported on a scale of 1 (no shattering) to 5 (more than 91-100% pods shattered).

2.2.9 Plant count three (3) weeks after emergence: The number of plants counted on 5 m of the two inner rows. This data will be used to calculate the germination percentage and will be compared with the germination percentage of different soil types.

2.2.10 100 seeds mass: Determined on an air dry basis from a randomly selected sample retained on a 4,75 mm standard grading screen.

2.2.11 Undesirable seed: The mass of undesirable seed was determined in a random 100 g sample with seed size greater than 4,75 mm (excluding mechanical damaged seeds).

2.2.12 Protein and oil percentage: The analysis was done by the SAGL (Southern African Grain Laboratory NPC) by using the “Soxhlet” apparatus (oil percentage) and the “Dumas” method (protein percentage).

2.2.13 Grain yield: Four metres of the two centre rows were harvested by hand at soil level and threshed. The grain moisture was determined and yield calculated on a basis of 12,5% moisture content.

2.3 THE EVALUATION OF TRIALS

The yield data of the individual trials were subjected to analysis of variance (ANOVA) with a randomized complete block design (RCBD) as well as a Latinized row-column design.
The localities with coefficient of variance higher than 25% were rejected from the analysis.

The trial means (x-axis) versus the cultivar means (y-axis) is plotted. A regression line is then fitted with the trial means as x variable and cultivar means as predictor variable. Out of the regression estimates the yield probability percentage above the mean for each cultivar at different yield potentials is then calculated and presented in a table as a guideline for the use of different cultivars under different circumstances.

A yield probability of more than 50% indicated above average yield and a yield probability of less than 50% indicated a below average yield.

3 DISCUSSION OF RESULTS

3.1 GENERAL

The rainfall and irrigation data are shown in Table 3.

Eight (8) of the 22 trials planted could not be included (36.4%) in the report compared to the three (3) out of 21 trials (14%) in the 2017/18 season.

The following trials could not be included in the report for the following reasons:

1 Clocolan – High CV%. Poor emergence due to severe drought just after planting.
2 Delmas – Data not reliable.
3 Dundee – Data not reliable.
4 Middelburg – Poor emergence due to severe drought just after planting. Trial terminated.
5 Leeudoringstad - Poor emergence due to severe drought just after

planting. Trial terminated.

6 Potchefstroom Seed Co – High CV%. Poor emergence and low yield due to severe drought.

7 Schweizer Reneke - Poor emergence and low yield due to severe drought. Trial terminated.

8 Skuinsdrift – Insufficient data.

As in the previous seasons the evaluation of the trials was based on a number of parameters. No conclusion can be made on a single parameter.

3.2 DISCUSSION OF TABLES

3.2.1 Days to flowering (Table 4), physiologically mature (Table 5) and length of the growing season (Table 6)

The number of days from planting to flowering (Table 4) is an effective measure for the grouping of cultivars because the relative order of rank for this characteristic is repeated to a great extent over localities and years. As expected the average days to flowering was the shortest in the warm areas (48 days Groblersdal) and the longest in the cooler areas (85 days at Clarens).

The number of days to physiological maturity is shown in Table 5. The longest average days to maturity was experienced at Bethlehem (165 days).

The number of days to harvest maturity (Table 6) was used to determine the length of the growing season of a cultivar. The number of days to harvest maturity is however, more dependent on climatic changes and planting date for soybeans and, the number of days to flowering is therefore a more reliable maturity grouping criterion.

3.2.2 Plant height (Table 7)

The indeterminate cultivar DM 6.8i RR (MG 6.8) had a mean plant height of 130 cm (highest) in the warm area compared to 52 cm (lowest) of the indeterminate cultivar P48T48 R (MG 4.8) in the moderate region.

The average plant height between localities varied from a mean of 53 cm at Kroonstad to 105 cm at Bapsfontein.

3.2.3 Pod height (Table 8)

The variation in pod and plant height between cultivars is linked with the length of the growing season of a cultivar. The cultivars LS 6860 R (MG 6.0; indeterminate), P64T39 R (MG 6.4; indeterminate) and LS 6164 R (MG 6.0; determinate), had a mean pod height of 32 cm in the warm area, but also had an above average pod height in the cool and moderate areas.

Other cultivars with above average pod heights for all the climate areas are SSS 5052 (tuc) (MG 5.5; indeterminate), NS 5909 R (MG 5.9; indeterminate), LS 6860 R (MG 6.0; indeterminate), LS 6164 R (MG 6.0; determinate), LS 6161 R (MG 6.1; indeterminate), NS 6448 R (MG 6.4, semi-determinate), PAN 1653 R (MG 6.7; determinate) and LS 6868 R (MG 6.8; indeterminate).

NS 5009 R (MG 5.0; indeterminate), NS 5258 R (MG 5.2; indeterminate) and Y 540 (MG 5.4; indeterminate) had the lowest reading of 5 cm. Considerable harvest losses can occur due to low pod height; thus pod height is an important factor influencing cultivar choice. Differences in pod height between localities can mainly be attributed to differences in row width and climate. A pod height of at least 7.5 cm (combine harvesting height) is preferable.

3.2.4 Lodging (Table 9)

The highest overall lodging occurred in the trial at Bapsfontein. The highest lodging figures was reported for LS 6164 R and LDC 5.9 at Bergville in the moderate area.

3.2.5 Green stem (Table 10)

A high percentage of green stem, was recorded at Potchefstroom, Kroonstad and Bapsfontein while the cultivar DM 5351 RSF showed a high tendency for green stem, across all three climatic regions. P48T48 R showed above average figures for the

cool and moderate areas and SSS 6560 (tuc) for the warm area. Plants also retained their leaves that could hamper the harvesting process.

3.2.6 Shattering with harvesting (Table 11)

The highest shattering occurred at Clarens in the cool-, Stoffberg in the moderate-, as well as at Groblersdal in the warm area.

3.2.7 Number of plants three (3) weeks after emergence (Table 12)

Enough certified seed was provided to establish 400 000 plants ha^{-1} for the irrigation and high rainfall areas and 350 000 for dryland. Extremely poor emergence were recorded for cultivars Y 540 and Y 605.

3.2.8 Percentage undesirable seed (Table 13)

The lowest mean of 0.24% undesirable seeds was recorded for the moderate region. The range varied from 0.65% at Groblersdal 0.03% at Greytown.

3.2.9 Mass (g) 100^{-1} seeds (Table 14)

The variation in seed mass among localities ranged between 13.15 g 100^{-1} seeds at Clarens to 19.09 g 100^{-1} seeds at Greytown. The highest seed mass was recorded for P48T48 R in the cool and moderate regions, while SSS 5449 (tuc), had the smallest seed in all the climate regions.

3.2.10 Oil percentage (Table 15)

The cultivar DM 5901 RSF had, the highest average oil percentage for all the regions (20.61% cool, 22.29% moderate, 22.48% warm). The average oil percentage are 21.28% for the warm, 20.47% for the moderate and 19.29% for the cool area.

3.2.11 Crude Protein percentage (Table 16)

The cultivar DM 5302 RSF, as the previous season had the highest values for all the climate regions (42.34% cool, 43.67% moderate, 43.44% warm). The overall average are 40.72% for the warm, 41.15% for the moderate and 39.65% for the cool area.

3.2.12 Profat (Table 17)

The inclusion of this table in the report was requested by Dr Erhard Bredenham as the total value of oil and protein is a much better indicator for the selection of a cultivar than the single oil or protein factor. The cultivar DM 5302 RSF, as the previous season, had the highest average profat value for all the regions.

3.2.10 Yield (Table 18)

Due to the sensitivity of soybean cultivars to environmental conditions, it is preferable to divide the soybean production areas into cool, moderate and warm regions. A better yield can be established by choosing a cultivar suitably adapted for a specific region. It is also necessary to use data from more than one year to select between cultivars. Due to the significant cultivar and locality interaction, conclusions on cultivar performance should not be made from average yield data alone. The mean yield over localities has therefore been omitted.

4 INTERPRETATION OF YIELD RESULTS

4.1 INTRODUCTION

A stated aim of the national soybean cultivar trials is the evaluation of cultivars for their adaptability to a potential production area, and for their yield performance. Adaptability is especially important because of the fact that soybean cultivars are known to be restricted in terms of recommended production area. This fact is also demonstrated by the results discussed in this report.

Because of genotypic restriction in adaptability the statistical analysis of data over all trial entries and localities tend to demonstrate strong interaction components which confound interpretation. Interaction makes genotype rankings at one site inapplicable to another site. The larger the interaction the more information is lost if interaction is not analysed effectively. This will be a lesser problem for homogeneous areas than for non-homogeneous areas. However, a purpose of the national trials is to identify homogeneous areas or homogeneous growing conditions based on cultivar performance. Localities were therefore grouped together based on past research experience and with the assistance of photo thermal charts provided by the Institute for Soil, Climate and Water. Localities were grouped in cool, moderate and warm production areas.

4.2 YIELD PROBABILITY AND YIELD (Tables 19, 20, 21, 22, 23 & 24)

A minimum number of successful trials per climatic area are needed to calculate saved yield probability values. Yield probability tables are set up for cool-, moderate and warm regions, if enough data is available.

Yield probability of a cultivar is the chance to get an above average yield at a particular yield potential. For instance, if the yield probability of a cultivar, at a particular yield potential equals 60%, the chance to get a yield above the mean of all cultivars is 60% with a 40% chance of obtaining a yield below the mean. Thus a 60% probability indicated a 10% change of an above average yield, while a 40% probability indicated a 10% change of getting a below average yield.

P64T39 R and DM 5302 RSF showed an above average yield probability (Table 19) for all the yield potentials in the cool area. For the moderate area PAN 1521 R as for the warm area, showed above average figures over the whole production potential range (Table 21 and 23). P61T38 R and P64T39 R also performed above average for the warm areas (Table 23).

Lokaliteite, medewerkers en adresse van kultivarproewe soos beplan vir, 2018/19
Localities, co-operators and addresses of the cultivar trials, 2018/19

Nr No	Lokaliteit Locality	Adres van proeflokaliteit Adress of trial locality	Tel. no. Tel. nr.	Verantwoordelike beampte Responsible officer
1	Bapsfontein	-	013 665 2251/082 969 1981	A Mathebula
2	Bergville	J Jackson Shamrock H4 Bergville 3350	082 388 0311	R Wessels
3	Bethlehem	Kleingraan Instituut Bethlehem 9700	082 375 8999	L Bronkhorst
4	Bossies	-	082 375 8999/083 660 2521	L Bronkhorst & G de Beer
5	Brits K2	K2 Navorsingstasie Brits 0250	071 601 5092	D Leeuwner
6	Cedara	Cedara P/bag X9059 Pietermaritzburg 3200	033-355 9495/079 898 5522	J Arathoon
7	Clarens	D Terblanche Taillefert Clarens 9707	082 388 0311	R Wessels
8	Clocolan	G Hugo van Niekerk Kroon Clocolan 9735	082 375 8999	L Bronkhorst
9	Delmas-Pannar	Pannar Saad Navorsingsplaas Posbus 439 Delmas 2210	013-665 8524/082 969 1981	A Mathebula
10	Dundee	Dundee Navorsingstasie Posbus 626 Dundee 3000	034 212 479/076 953 3587	M Buthelezi
11	Greytown	Pannar Proefplaas Posbus 19 Greytown 3250	033-413 9639	A Jarvie
12	Groblersdal (Agricol)	R Louw De Wagensrift B5 Suite 38 postnet Groblersdal 0470	083 625 4906/081 016 7848	F Hamman & C Schoeman
13	Hertzogville	-	082 375 8999/083 660 2521	L Bronkhorst & G de Beer
14	Hoopstad	-	082 375 8999/083 660 2521	L Bronkhorst & G de Beer
15	Hopetown/Skuinsdrift	-	084 475 0924/071 746 6618	D Scheepers & PJ Fourie
16	Kinross	Vosstoffel Boerdery Posbus 80 Kinross 2270	082 375 8999	L Bronkhorst
17	Kokstad	Research Station P/Bag X501 Kokstad 4700	039 727 2105/072 778 8785	MP Skhakhane
18	Kroonstad	Hoërskool Kroonstad Kroonstad 9500	082 375 8999	L Bronkhorst
19	Leeudoringstad	-	082 375 8999/083 660 2521	L Bronkhorst & G de Beer
20	Marble Hall	-	071 601 5092	D Leeuwner
21	Middelburg	G Anderson Postnet Suite 15 P/Bag 1866 Middelburg 1050	082 375 8999	L Bronkhorst
22	Potchefstroom Seed Co	-	082 314 0959	Khuliso
23	Potchefstroom ARC	114 Chris Hani Street Potchefstroom 2531	082 375 8999	L Bronkhorst
24	Schweizer Reneke	-	082 375 8999/083 660 2521	L Bronkhorst & G de Beer
25	Stoffberg	P Prinsloo Blinkwater Posbus 6 Stoffberg 1056	083 625 4906/081 016 7848	F Hamman & C Schoeman

Tabel 1 Sojaboonsaad eienskappe en inligting oor verskaffers, 2018/19
Table 1 Soybean seed characteristics and information about agents, 2018/19

Kultivar Cultivar	Volwassenheids-groeperings Maturity Group	Groeiwyse Growth habit *1	Hilum kleur Hilum colour *2	Blomkleur Flower colour *3	Haarkleur Pubescence *4	Op varieteits lys On variety list	Verskaffer Agent	Telersregte Breeding rights
P48T48 R	4.8	I	B	W	T	JA/YES	Pioneer	JA/YES
LS 6248 R	4.8	I	BL	W	W	JA/YES	Link Seed	JA/YES
DM 5953 RSF	4.8	I	IB	P	W	JA/YES	GDM Seeds	JA/YES
SSS 5449 (tuc)	4.9	I	B	P	G	JA/YES	Sensako	JA/YES
NS 5009 R	5.0	I	B	W	T	JA/YES	K2	NEE/NO
NS 5258 R	5.2	I	BL	W	B	JA/.YES	K2	NEE/NO
PAN 1532 R	5.3	I	LB	P	G	JA/YES	Pannar	JA/YES
LDC 5.3	5.3	I	B	W	G	JA/YES	Louise Dreyfus	NEE/NO
DM 5351 RSF	5.3	I	IB	W	B	JA/YES	GDM Seeds	JA/YES
Y 540	5.4	I	B	W	-	JA/YES	Southern Hemisphere Seeds	NEE/NO
SSS 5052 (tuc)	5.5	I	B	W	G	JA/YES	Sensako	JA/YES
NA 5509	5.5	I	BL	P	B	JA/YES	K2	NEE/NO
LS 6851 R	5.5	D	B	P	W	JA/YES	Link Seed	JA/YES
PAN 1521 R	5.7	I	IB	P	G	JA/YES	Pannar	JA/YES
DM 5302 RSF	5.7	I	LB	P	G	JA/YES	GDM Seeds	JA/YES
NS 5909 R	5.9	I	IB	P	G	JA/YES	K2	NEE/NO
LDC 5.9	5.9	I	LB	W	B	JA/YES	Louise Dreyfus	NEE/NO
DM 5901 RSF	5.9	I	LB	W	G	JA/YES	GDM Seeds	JA/YES
LS 6860 R	6.0	I	B	P	W	JA/YES	Link Seed	JA/YES
LS 6164 R	6.0	D	LB	W	G	JA/YES	Link Seed	JA/YES
P61T38 R	6.1	D	LB	W	G	JA/YES	Pannar	JA/YES
Y 605	6.1	I	LB	P	-	JA/YES	Southern Hemisphere Seeds	NEE/NO
LS 6161 R	6.1	I	IB	P	B	JA/YES	Link Seed	JA/YES
SSS 6560 (tuc)	6.2	I	B	W	G	JA/YES	Sensako	JA/YES
Y 627	6.2	I	B	W	-	JA/YES	Southern Hemisphere Seeds	NEE/NO
DM 6663 RSF	6.3	I	LB	P	G	JA/YES	GDM Seeds	JA/YES
NS 6448 R	6.4	SD	LB	P	G	JA/YES	K2	NEE/NO
P64T39 R	6.4	I	KL	W	G	JA/YES	Pannar	JA/YES
Y 657	6.5	I	B	P	-	JA/YES	Southern Hemisphere Seeds	NEE/NO
PAN 1644 R	6.7	I	IB	P	G	JA/YES	Pannar	NEE/NO
PAN 1653 R	6.7	D	LB	P	G	JA/YES	Pannar	JA/YES
LS 6868 R	6.8	I	B	W	W	JA/YES	Link Seed	JA/YES
DM 6.8i RR	6.8	I	B	P	G	JA/YES	GDM Seeds	JA/YES
DM 6968 RSF	6.9	I	IB	P	G	JA/YES	GDM Seeds	JA/YES
P71T74 R	7.1	I	KL	W	G	JA/YES	Pioneer	JA/YES

*1 D - Bepaald/determinate; I - Onbepaald/indeterminate; SD - Semi-Bepaald/semi deteminate
*2 BL - Swart/black; IB - Onvollodig swart/imperfect black; B - Bruin/brown; LB - Ligbruin/buff; G - Grys/grey; KL - Kleurloos/buff
*3 P - Pers/purple; W - Wit/white
*4 B - Bruin/brown; G - Grys/grey; W - Wit/white; T – Taankleurig/Tawny

Tabel 2 Algemene inligting aangaande grond en verbouiingpraktyke by die onderskeie proeflokaliteite van die kultivarproewe, 2018/19
Table 2 General information in connection with soil and cultivation practices at the different trial localities, 2018/19

Lokaliteit Locality	Plantdatum Date of planting	Grondvorm Soil type	Grond ontleding Soil analysis			Bemesting Fertilization			Spasiëring Spacing (cm)	Onkruid beheer Weed control	Koördinate van lokaliteite Co-ordinate of localities	
			pH (H_2O)	P	K	N	P	K				
Bapsfontein/B/I	08/11/2018	-	-	-	-	-	-	-	90	-	26.0876 S	28.5818 O
Bergville/B/I	05/11/2018	-	4.91	151	188	-	-	-	90	-	28°42.824 S	029°17.965 O
Bethlehem/D	24/10/2018	Avalon	6.49	56	303	3.36	2.52	0	75	Strongarm, Alachlor, skoffel	28°54'25.2" S	027°35'56.9" O
Bossies/D	Not planted to dry	-	4.80	27	233	-	-	-	75	-	-	-
Brits K2/B/I	07/12/2018	Katspruit	-	-	-	-	-	-	75	Geen. Slegs geskoffel	25°35'33.5" S	27°43'00.4" O
Cedara/D	22/11/2018	Hutton	4.38	8	192	0	4.725	0	45	Dual S Gold, Bateleur Gold and Round-up powermax	29°32'10" S	30°16'00" O
Clarens/D	30/11/2018	-	4.86	48	174	-	-	-	90	-	28°22'44.7" S	28°23'49.9" O
Clocolan/D	27/11/2018	-	5.06	32	80	6.44	2.52	10	75	Strongarm en Alachlor	28.90864° S	027.60007° O
Delmas/D	14/11/2018	Sandy loam (Davidson)	-	-	-	-	-	-	90	Flumetsulam, Metolachlor 960, Roundup	-26.1468 S	-28.7131 O
Dundee/D	12/12/2018	Hutton	-	-	-	-	-	-	45	-	28°8'37" S	30°18'24" O
Greytown/D	03/12/2018	Hutton	-	-	-	-	-	-	75	Metagan Gold, Roundup		
Groblersdal/B/I	14/11/2018	Hutton	6.41	21	333	-	-	-	76	Round-up powermax	25.371089 S	29.377447 O
Hertzogville/D	Not planted to dry	-	6.57	22	153	-	-	-	75	-	-28.1998250 S	25.4263320 O
Hoopstad/D	Not planted to dry	-	7.26	30	108	-	-	-	75	-	-27.8756250 S	25.128520 O
Kinross/D	22/11/2018	-	6.34	44	100	3.08	2.31	0	75	Strongarm, Alachlor, Round-up, skoffel	26°22'26.2" S	29°08'47.7" O
Kokstad/D	05/12/2018	-	-	-	-	-	-	-	45	Dual Gold	30°31'53.6" S	29°24'47.7" O
Kroonstad/D	19/12/2018	-	6.85	27	243	5.32	8.19	0	75	Strongarm, Alachlor, Round-up, skoffel	27°36'28.4" S	027°13'47.1" O
Leeudoringstad/D	04/01/2019	-	6.34	24	145	-	-	-	75	-	27°17'06.4" S	026°26'36.8" O
Marble Hall/B/I	06/12/2018	Avalon	-	-	-	-	-	-	75	Strongarm, Agill, Round-up	25°04'08.75" S	29°08'54.2" O
Middelburg/D	13/11/2018	-	Boer werk op globale grondmonster			-	-	-	75	Strongarm, Agill, Round-up, skoffel	28°09'41.4" S	028°18'15.5" O
Potchefstroom Seed Co/D	22/11/2018/ 06/12/2018	-	5.70	24	291	-	-	-	75	-	26°47'46.1" S	27°05'26.0" O
Potchefstroom ARC/B	29/11/2018	Hutton	6.14	61	268	0	2.31	0	75	Strongarm, Alachlor, Round-up, skoffel	26°44'00.0" S	027°04'01.2" O
Schweizer Reneke/D	03/01/2019	-	5.13	24	153	-	-	-	75	-	26°58'50.4" S	25°21'04.0" O
Skuinsdrift (Hopetown)/B	18/12/2018	-	-	-	-	-	-	-	75	-	-	-
Stoffberg/D	12/11/2018	Hutton	4.77	15	150	-	-	-	76	Round-up powermax	25.437176 S	29.853436 O

- Inligting nie beskikbaar/information not available **Cedara – bird damage at emergence** **Stoffberg hael 21 Desember 2018**

Tabel 3 Reënval en besproeiing vir die verskillende lokaliteite (mm), 2018/19
Table 3 Rainfall and irrigation at the different localities (mm), 2018/19

Lokaliteit Locality	Maandelikse reënval (mm)/Monthly rainfall (mm)							Totaal Total *	Besproeiing Irrigation	Totaal Total **
	Okt	Nov	Des	Jan	Feb	Mrt	Apr			
Bethlehem	24,38	30,99	52,07	84,58	81,28	141,99	181,1	596,39	-	596,39
Cedara	61,47	40,89	147,32	57,41	123,19	61,47	111	602,75	0	602,75
Delmas	61,51	78,15	120,47	196,07	131,27	55,98	121,92	765,37	0	765,37
Greytown	64,4	47,4	146,6	65,2	153,4	121,8	70,8	669,6	0	669,6
Groblersdal	5	105	122	135	189	89	38	683	535	1218
Kroonstad	3,81	7,87	60,96	48,77	62,99	101,09	201,42	486,91	0	486,91
Potchefstroom B	22,1	17,02	42,42	70,87	49,02	34,54	145,8	381,77	-	381,77
Stoffberg	3	134	106	134	170	52	94	693	0	693

* Vir reënval/For rainfall
* Vir reënval en besproeiing/For rainfall and irrigation

Tabel 4 Die aantal dae vanaf plant tot 50% blomstadium van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19

Table 4 The number of days from planting to 50% flowering stage of the different soybean cultivars at the different trial localities, 2018/19

Kultivar Cultivar	Koel/Cool						Matig/Moderate						Warm	
	Bapsfontein	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean	Bergville	Cedara	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Groblersdal-Agricol	Gem/Mean
P48T48 R	77	53	75	55	51	62	45	47	46	-	55	48	-	-
LS 6248 R	63	53	82	69	77	69	59	61	65	56	55	59	42	42
DM 5953 RSF	77	62	70	62	52	65	45	49	46	52	55	49	37	37
SSS 5449 (tuc)	67	82	88	75	75	77	45	61	58	62	58	57	43	43
NS 5009 R	77	65	75	55	53	65	45	49	46	47	57	49	40	40
NS 5258 R	76	65	70	55	54	64	44	55	50	52	58	52	39	39
PAN 1532 R	68	82	90	69	77	77	52	61	46	52	59	54	43	43
LDC 5.3	64	65	88	69	95	76	52	59	46	52	59	54	44	44
DM 5351 RSF	77	53	90	55	54	66	45	48	46	52	55	49	36	36
Y 540	-	-	82	-	75	79	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	68	71	88	82	77	77	59	62	58	56	60	59	49	49
NA 5509 R	70	92	88	75	80	81	59	68	63	56	63	62	49	49
LS 6851 R	66	71	82	69	73	72	52	61	58	54	61	57	45	45
PAN 1521 R	65	82	82	78	77	77	59	65	63	56	63	61	47	47
DM 5302 RSF	62	89	85	69	76	76	45	59	46	52	63	53	45	45
NS 5909 R	71	89	90	75	78	81	52	69	65	52	63	60	51	51
LDC 5.9	63	82	88	70	76	76	59	62	58	56	64	60	50	50
DM 5901 RSF	68	89	85	78	70	78	59	63	65	56	65	62	49	49
LS 6860 R	72	82	88	75	78	79	59	70	65	57	68	64	48	48
LS 6164 R	68	71	88	69	76	74	59	65	63	52	68	61	51	51
P61T38 R	67	53	82	75	76	71	59	67	63	56	64	62	52	52
Y 605	-	-	-	-	-	-	-	-	-	-	65	65	-	-
LS 6161 R	68	82	82	78	77	77	55	62	65	54	68	61	51	51
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	-	-	50	50
Y 627	-	-	-	-	-	-	63	63	63	54	69	62	49	49
DM 6663 RSF	-	-	-	-	-	-	66	78	63	57	66	66	52	52
NS 6448 R	70	82	90	75	79	79	63	68	68	57	67	65	52	52
P64T39 R	74	89	90	78	80	82	66	67	65	56	67	64	52	52
Y 657	-	-	-	-	-	-	66	66	68	56	67	65	54	54
PAN 1644 R	70	89	90	75	78	80	63	67	63	56	66	63	54	54
PAN 1653 R	70	96	88	78	79	82	63	70	63	59	70	65	49	49
LS 6868 R	72	96	94	82	81	85	59	69	63	56	68	63	53	53
DM 6.8i RR	-	-	-	-	-	-	63	68	63	57	69	64	54	54
DM 6968 RSF	-	-	-	-	-	-	-	-	-	-	-	-	55	55
P71T74 R	-	-	-	-	-	-	63	70	65	59	66	65	56	56
Gem/Mean	70	76	85	71	73	75	56	63	59	55	63	59	48	48

Tabel 5 Die aantal dae vanaf plant tot fisiologiesrypstadium van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19
Table 5 The number of days from planting to physiological maturity of the different soybean cultivars at the different trial localities, 2018/19

Kultivar Cultivar	Koel/Cool					Matig/Moderate						Warm	
	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean	Bergville	Cedara	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Groblersdal-Agricol	Gem/Mean
P48T48 R	136	138	126	128	132	135	119	122	-	125	125	-	-
LS 6248 R	146	138	145	142	143	135	125	127	121	126	127	109	109
DM 5953 RSF	136	138	126	126	132	128	120	122	142	124	127	110	110
SSS 5449 (tuc)	168	138	126	132	141	125	124	127	106	126	122	107	107
NS 5009 R	166	138	126	126	139	121	119	123	106	123	118	113	113
NS 5258 R	146	138	126	126	134	121	124	122	106	125	120	111	111
PAN 1532 R	182	138	141	132	148	125	130	127	106	129	123	111	111
LDC 5.3	182	138	145	139	151	135	128	127	106	130	125	114	114
DM 5351 RSF	136	138	126	126	132	128	122	127	106	124	121	110	110
Y 540	-	138	-	139	139	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	166	138	145	142	148	128	129	133	119	130	128	116	116
NA 5509 R	146	138	149	142	144	128	134	141	119	131	131	117	117
LS 6851 R	159	138	145	139	145	121	135	130	119	128	127	113	113
PAN 1521 R	146	138	139	128	138	128	127	127	116	131	126	117	117
DM 5302 RSF	182	138	139	139	150	121	126	121	106	127	120	112	112
NS 5909 R	182	152	161	142	159	124	134	137	106	134	127	120	120
LDC 5.9	166	152	145	139	151	128	88	127	121	134	120	115	115
DM 5901 RSF	159	145	145	139	147	135	134	141	106	133	130	114	114
LS 6860 R	166	152	161	145	156	124	137	147	119	133	132	119	119
LS 6164 R	166	152	145	142	151	124	135	127	119	135	128	116	116
P61T38 R	166	145	145	139	149	118	138	133	121	132	128	117	117
Y 605	-	-	-	-	-	-	-	-	-	127	127	-	-
LS 6161 R	182	152	161	142	159	135	134	133	151	134	137	121	121
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	-	120	120
Y 627	-	-	-	-	-	128	132	137	121	134	130	122	122
DM 6663 RSF	-	-	-	-	-	119	136	137	95	135	124	121	121
NS 6448 R	166	152	145	142	151	124	137	147	119	135	132	119	119
P64T39 R	182	159	161	142	161	124	139	133	119	135	130	119	119
Y 657	-	-	-	-	-	135	134	137	142	136	137	122	122
PAN 1644 R	182	152	161	142	159	135	135	137	151	134	138	122	122
PAN 1653 R	182	145	161	142	158	128	142	137	126	137	134	122	122
LS 6868 R	182	166	161	145	164	154	142	137	151	137	144	120	120
DM 6.8i RR	-	-	-	-	-	154	139	133	151	139	143	123	123
DM 6968 RSF	-	-	-	-	-	-	-	-		-	-	124	124
P71T74 R	-	-	-	-	-	154	140	144	151	139	146	126	126
Gem/Mean	165	144	144	137	147	130	130	132	122	131	129	117	117

Tabel 6 Die aantal dae vanaf plant tot oesstadium van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19
Table 6 The number of days from planting to maturity of the different soybean cultivars at the different trial localities, 2018/19

Kultivar Cultivar	Koel/Cool						Matig/Moderate						Warm	
	Bapsfontein	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean	Bergville	Cedara	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Groblersdal-Agricol	Gem/Mean
P48T48 R	134	168	168	150	149	154	163	140	141	-	143	147	-	-
LS 6248 R	140	178	168	161	167	163	163	145	145	153	143	150	119	119
DM 5953 RSF	137	173	168	145	167	158	163	140	141	140	143	145	119	119
SSS 5449 (tuc)	146	173	168	156	167	162	163	140	141	141	143	146	119	119
NS 5009 R	137	177	168	145	149	155	163	140	141	147	143	147	119	119
NS 5258 R	131	182	168	140	167	158	163	140	141	141	143	146	119	119
PAN 1532 R	150	187	168	161	167	167	163	145	145	151	143	149	119	119
LDC 5.3	151	187	168	161	167	167	163	150	145	153	143	151	119	119
DM 5351 RSF	136	173	168	145	149	154	163	140	145	131	143	144	119	119
Y 540	-	-	168	-	167	168	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	150	198	168	161	167	169	163	150	149	151	154	153	119	119
NA 5509 R	150	193	168	170	167	169	163	155	154	151	154	155	126	126
LS 6851 R	148	182	168	161	167	165	163	155	149	153	143	153	119	119
PAN 1521 R	149	168	168	161	167	163	163	145	146	154	143	150	126	126
DM 5302 RSF	149	188	168	156	167	166	163	140	141	140	143	145	119	119
NS 5909 R	158	183	168	165	167	168	163	155	153	153	154	156	126	126
LDC 5.9	152	193	168	161	167	168	163	157	149	154	154	155	119	119
DM 5901 RSF	154	193	168	161	167	169	163	155	153	151	154	155	119	119
LS 6860 R	165	193	168	170	167	172	163	157	153	156	154	157	126	126
LS 6164 R	155	193	168	174	167	171	163	161	145	156	154	156	126	126
P61T38 R	150	182	168	161	167	166	163	157	153	151	154	156	133	133
Y 605	-	-	-	-	-	-	-	-	-	-	143	143	-	-
LS 6161 R	152	193	168	161	167	168	163	155	153	153	154	156	126	126
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	-	-	126	126
Y 627	-	-	-	-	-	-	163	157	153	156	154	157	133	133
DM 6663 RSF	-	-	-	-	-	-	163	157	153	156	154	157	126	126
NS 6448 R	151	187	168	165	167	168	163	155	153	151	154	155	126	126
P64T39 R	156	198	168	174	167	173	163	159	153	153	154	156	126	126
Y 657	-	-	-	-	-	-	163	155	153	154	154	156	133	133
PAN 1644 R	150	187	168	161	167	167	163	155	154	156	154	157	133	133
PAN 1653 R	154	182	168	165	167	167	163	161	154	154	154	157	133	133
LS 6868 R	151	198	168	174	167	172	163	161	153	158	154	158	126	126
DM 6.8i RR	-	-	-	-	-	-	163	161	154	158	154	158	133	133
DM 6968 RSF	-	-	-	-	-	-	-	-	-	158	-	-	133	133
P71T74 R	-	-	-	-	-	-	163	161	153	158	154	158	133	133
Gem/Mean	148	185	168	160	165	165	163	152	149	151	150	153	125	125

Tabel 7 Die planthoogte van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19
Table 7 The plant height of the different soybean cultivars at the different trial localities, 2018/19

Kultivar Cultivar	Koel/Cool						Matig/Moderate							Warm	
	Bapsfontein	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean	Bergville	Cedara	Greytwon	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Groblersdal-Agricol	Gem/Mean
P48T48 R	78	63	65	70	36	62	65	68	60	33	-	35	52	-	-
LS 6248 R	121	82	95	97	67	92	95	92	78	58	90	65	80	97	97
DM 5953 RSF	91	80	75	77	45	74	60	74	61	52	89	51	65	87	87
SSS 5449 (tuc)	101	77	70	95	70	83	80	81	80	53	102	66	77	86	86
NS 5009 R	89	58	70	68	44	66	75	68	61	45	73	48	62	94	94
NS 5258 R	79	55	85	80	48	69	75	73	62	43	88	47	65	105	105
PAN 1532 R	93	68	70	73	65	74	95	74	66	52	102	52	73	70	70
LDC 5.3	107	78	80	88	68	84	95	83	75	43	85	53	72	97	97
DM 5351 RSF	95	67	85	87	61	79	90	80	71	53	98	49	74	85	85
Y 540	-	-	65	78	44	62	-	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	106	82	95	100	68	90	105	97	78	62	102	70	86	107	107
NA 5509 R	103	82	90	112	70	91	75	98	82	57	100	78	82	110	110
LS 6851 R	96	62	80	78	61	75	75	70	69	33	58	38	57	75	75
PAN 1521 R	110	88	85	100	75	92	100	89	77	57	108	82	86	106	106
DM 5302 RSF	98	72	70	88	55	77	70	69	67	52	90	51	67	83	83
NS 5909 R	111	80	100	97	71	92	100	98	82	53	98	63	82	97	97
LDC 5.9	119	97	95	98	73	96	100	89	77	55	105	58	81	104	104
DM 5901 RSF	105	73	85	92	67	84	60	80	73	54	100	68	73	82	82
LS 6860 R	127	90	105	117	84	105	110	109	97	57	122	80	96	122	122
LS 6164 R	121	93	105	112	75	101	110	104	95	60	100	64	89	122	122
P61T38 R	97	43	90	82	51	73	75	76	77	30	63	27	58	74	74
Y 605	-	-	-	-	-	-	-	-	-	-	-	46	46	-	-
LS 6161 R	116	85	100	97	85	97	90	98	87	58	103	68	84	104	104
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	-	-	-	111	111
Y 627	-	-	-	-	-	-	95	98	76	62	135	73	90	114	114
DM 6663 RSF	-	-	-	-	-	-	110	118	96	62	118	64	95	112	112
NS 6448 R	106	70	90	102	66	87	90	89	84	50	98	46	76	97	97
P64T39 R	128	87	90	112	77	99	110	99	90	55	120	39	86	113	113
Y 657	-	-	-	-	-	-	100	104	83	53	103	47	82	117	117
PAN 1644 R	110	78	85	97	66	87	95	85	85	58	105	62	82	121	121
PAN 1653 R	97	58	95	85	61	79	80	82	81	50	68	37	66	84	84
LS 6868 R	119	78	110	110	66	97	105	96	98	45	90	54	81	92	92
DM 6.8i RR	-	-	-	-	-	-	110	114	104	75	117	67	98	130	130
DM 6968 RSF	-	-	-	-	-	-	-	-	-	-	-	-	-	123	123
P71T74 R	-	-	-	-	-	-	110	103	102	63	113	70	94	122	122
Gem/Mean	105	75	86	92	64	84	90	89	80	53	98	57	77	101	101

Tabel 8 Die peulhoogte van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19

Table 8 The pod height of the different soybean cultivars at the different trial localities, 2018/19

Kultivar Cultivar	Koel/Cool						Matig/Moderate							Warm	
	Bapsfontein	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean	Bergville	Cedara	Greytwon	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Groblersdal-Agricol	Gem/Mean
P48T48 R	10	7	5	9	3	7	5	9	12	2	-	1	6	-	-
LS 6248 R	18	10	10	11	5	11	10	18	14	4	8	5	10	17	17
DM 5953 RSF	12	9	5	8	4	7	5	9	11	1	9	2	6	10	10
SSS 5449 (tuc)	10	6	6	13	4	8	6	9	13	2	12	4	8	13	13
NS 5009 R	7	5	3	6	4	5	6	11	11	1	4	4	6	13	13
NS 5258 R	7	4	4	9	3	5	7	6	10	1	7	2	5	24	24
PAN 1532 R	12	10	5	8	5	8	5	12	13	4	13	3	8	14	14
LDC 5.3	13	8	6	12	4	9	5	12	13	2	7	3	7	17	17
DM 5351 RSF	11	7	3	8	4	6	5	9	13	5	9	2	7	9	9
Y 540	-	-	4	8	5	5	-	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	11	11	12	11	5	10	19	18	18	4	12	3	12	24	24
NA 5509 R	12	7	10	13	3	9	16	18	16	4	8	7	12	18	18
LS 6851 R	13	8	7	11	5	9	5	15	16	4	6	1	8	6	6
PAN 1521 R	19	8	5	11	4	9	9	16	17	6	9	11	11	28	28
DM 5302 RSF	13	9	3	10	5	8	9	10	14	2	9	2	8	13	13
NS 5909 R	16	15	15	12	5	12	17	22	18	8	13	3	14	24	24
LDC 5.9	17	12	7	9	5	10	10	13	8	2	10	5	8	18	18
DM 5901 RSF	17	6	5	12	4	9	6	14	15	4	9	4	9	7	7
LS 6860 R	24	13	8	15	7	13	16	21	21	5	14	4	13	32	32
LS 6164 R	13	11	14	13	5	11	18	24	19	4	12	4	13	32	32
P61T38 R	16	10	15	11	5	11	8	21	19	2	12	1	11	9	9
Y 605	-	-	-	-	-	-	-	-	-	-	-	3	3	-	-
LS 6161 R	21	9	10	13	5	12	8	20	20	6	10	6	12	22	22
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	-	-	-	30	30
Y 627	-	-	-	-	-	-	9	16	14	5	9	5	10	13	13
DM 6663 RSF	-	-	-	-	-	-	13	18	19	6	15	8	13	8	8
NS 6448 R	14	10	12	9	5	10	14	19	18	7	10	2	12	26	26
P64T39 R	23	10	10	15	3	12	10	17	14	6	12	4	10	32	32
Y 657	-	-	-	-	-	-	10	16	15	2	8	3	9	31	31
PAN 1644 R	21	11	14	11	4	12	8	15	17	5	11	2	9	29	29
PAN 1653 R	15	9	12	15	5	11	9	20	21	4	10	1	11	22	22
LS 6868 R	16	7	21	16	5	13	17	21	20	4	8	3	12	23	23
DM 6.8i RR	-	-	-	-	-	-	18	20	18	5	13	3	13	29	29
DM 6968 RSF	-	-	-	-	-	-	-	-	-	-	-	-	-	26	26
P71T74 R	-	-	-	-	-	-	17	18	22	5	13	8	14	27	27
Gem/Mean	15	9	9	11	4	9	10	16	16	4	10	4	10	20	20

Tabel 9 Omvalwaarnemings (1-5) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19

Table 9 Lodging dat (1-5) of the different soybean cultivars at the different trial localities, 2018/19

Kultivar Cultivar	Koel/Cool					Matig/Moderate							Warm	
	Bapsfontein	Bethlehem	Clarens	Kinross	Gem/Mean	Bergville	Cedara	Greytwon	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Groblersdal-Agricol	Gem/Mean
P48T48 R	2,67	1,00	1,00	1,00	1,42	1,00	1,00	1,00	1,00	-	1,00	1,00	-	-
LS 6248 R	3,67	1,00	1,00	1,00	1,67	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
DM 5953 RSF	2,00	1,00	1,00	1,00	1,25	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
SSS 5449 (tuc)	2,33	1,00	1,00	1,00	1,33	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NS 5009 R	2,33	1,00	1,00	1,00	1,33	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NS 5258 R	2,67	1,00	1,00	1,00	1,42	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PAN 1532 R	2,33	1,00	1,00	1,00	1,33	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LDC 5.3	3,67	1,00	1,00	1,00	1,67	3,00	1,00	1,00	1,00	1,33	1,00	1,39	1,00	1,00
DM 5351 RSF	2,67	1,00	1,00	1,00	1,42	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Y 540	-	-	1,00	1,00	1,00	-	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	4,00	1,00	1,00	1,00	1,75	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NA 5509 R	4,00	1,00	1,00	1,00	1,75	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	2,00
LS 6851 R	2,33	1,00	1,00	1,00	1,33	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PAN 1521 R	3,67	1,00	1,00	1,00	1,67	1,00	1,00	1,00	1,00	1,67	1,00	1,11	1,00	1,00
DM 5302 RSF	3,00	1,00	1,00	1,00	1,50	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NS 5909 R	4,00	1,00	1,00	1,00	1,75	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LDC 5.9	4,00	1,33	1,00	1,00	1,83	5,00	1,00	1,00	1,00	2,00	1,00	1,83	1,00	1,00
DM 5901 RSF	3,67	1,00	1,00	1,00	1,67	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LS 6860 R	4,00	1,00	1,00	1,67	1,92	3,00	1,00	1,00	1,00	1,67	1,00	1,44	1,00	1,00
LS 6164 R	4,00	1,00	1,00	1,00	1,75	5,00	1,00	1,00	1,00	1,33	1,00	1,72	1,00	1,00
P61T38 R	2,67	1,00	1,00	1,00	1,42	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Y 605	-	-	-	-	-	-	-	-	-	-	1,00	1,00	-	-
LS 6161 R	4,00	1,00	1,00	1,00	1,75	1,00	1,00	1,00	1,00	1,33	1,00	1,06	1,00	1,00
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	-	-	1,00	1,00
Y 627	-	-	-	-	-	3,00	1,00	1,00	1,00	1,00	1,00	1,33	1,00	1,00
DM 6663 RSF	-	-	-	-	-	4,00	1,00	1,00	1,00	1,33	1,00	1,56	1,00	1,00
NS 6448 R	4,00	1,00	1,00	1,00	1,75	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
P64T39 R	4,00	1,00	1,00	1,00	1,75	1,00	1,00	1,00	1,00	2,67	1,00	1,28	1,00	1,00
Y 657	-	-	-	-	-	2,00	1,00	1,00	1,00	1,33	1,00	1,22	1,00	1,00
PAN 1644 R	4,00	1,00	1,00	1,00	1,75	3,00	1,00	1,00	1,00	2,00	1,00	1,50	1,00	1,00
PAN 1653 R	3,67	1,00	1,00	1,33	1,75	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LS 6868 R	4,00	0,00	1,00	1,00	1,50	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
DM 6.8i RR	-	-	-	-	-	4,00	1,00	1,00	1,00	1,67	1,00	1,61	1,00	1,00
DM 6968 RSF	-	-	-	-	-	-	-	-	-	-	-	-	1,00	1,00
P71T74 R	-	-	-	-	-	1,00	1,00	1,00	1,00	1,67	1,00	1,11	1,00	1,00
Gem/Mean	3,36	0,97	1,00	1,04	1,57	1,74	1,00	1,00	1,00	1,27	1,00	1,16	1,03	1,03

Tabel 10 Groenstam (1-5) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19

Table 10 Greenstem (1-5) of the different soybean cultivars at the different trial localities, 2018/19

Kultivar Cultivar	Koel/Cool						Matig/Moderate							Warm	
	Bapsfontein	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean	Bergville	Cedara	Greytwon	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Groblersdal-Agricol	Gem/Mean
P48T48 R	2,00	3,33	2,00	1,33	1,00	1,93	1,00	1,00	2,67	4,00	-	1,00	1,93	-	-
LS 6248 R	3,00	1,67	1,00	1,00	1,00	1,53	1,00	1,00	1,00	2,00	3,33	1,00	1,56	1,00	1,00
DM 5953 RSF	1,67	1,00	2,00	1,33	1,00	1,40	1,00	1,00	1,00	1,00	2,00	1,00	1,17	1,00	1,00
SSS 5449 (tuc)	1,00	2,67	1,00	1,67	1,00	1,47	1,00	1,00	1,00	1,67	2,33	1,00	1,33	1,00	1,00
NS 5009 R	1,00	1,00	1,00	1,33	1,00	1,07	1,00	1,00	4,33	2,00	2,67	1,00	2,00	1,00	1,00
NS 5258 R	1,00	1,33	2,00	1,00	1,00	1,27	1,00	1,00	1,00	1,33	2,00	1,00	1,22	1,00	1,00
PAN 1532 R	2,00	1,67	1,00	1,33	1,00	1,40	1,00	1,00	1,00	2,00	2,33	1,00	1,39	1,00	1,00
LDC 5.3	2,00	2,33	1,00	1,33	1,00	1,53	1,00	1,00	1,00	1,67	2,67	1,00	1,39	1,00	1,00
DM 5351 RSF	2,67	2,00	3,00	1,00	1,00	1,93	1,00	1,67	3,67	1,67	3,00	1,00	2,00	2,00	2,00
Y 540	-	-	1,00	2,00	1,00	1,33	-	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	2,00	1,67	1,00	1,00	1,00	1,33	1,00	1,00	1,00	1,67	4,00	1,00	1,61	1,00	1,00
NA 5509 R	1,33	2,00	1,00	1,33	1,00	1,33	1,00	1,00	1,00	3,33	3,00	1,00	1,72	1,00	1,00
LS 6851 R	1,33	2,33	1,00	1,00	1,00	1,33	1,00	1,00	1,00	2,00	3,33	1,00	1,56	1,00	1,00
PAN 1521 R	1,67	1,67	1,00	1,33	1,00	1,33	1,00	1,00	1,00	1,67	2,33	1,00	1,33	1,00	1,00
DM 5302 RSF	1,33	1,67	2,00	1,33	1,00	1,47	1,00	1,00	1,00	2,00	2,33	1,00	1,39	1,00	1,00
NS 5909 R	4,00	3,33	1,00	1,67	1,00	2,20	1,00	1,00	1,00	3,00	3,33	1,00	1,72	1,00	1,00
LDC 5.9	2,67	2,00	1,00	1,33	1,00	1,60	1,00	1,00	1,00	1,67	2,33	1,00	1,33	1,00	1,00
DM 5901 RSF	3,67	2,00	1,00	1,33	1,00	1,80	1,00	1,00	1,00	2,67	2,67	1,00	1,56	1,00	1,00
LS 6860 R	4,00	1,67	1,00	1,33	1,00	1,80	4,00	1,00	1,00	2,67	2,00	1,00	1,94	1,00	1,00
LS 6164 R	3,33	3,00	1,00	1,33	1,00	1,93	4,00	1,00	1,00	3,00	2,33	1,00	2,06	1,00	1,00
P61T38 R	3,00	2,67	1,00	1,00	1,00	1,73	1,00	1,00	1,00	2,67	4,00	1,00	1,78	1,00	1,00
Y 605	-	-	-	-	-	-	-	-	-	-	-	1,00	1,00	-	-
LS 6161 R	3,33	2,33	1,00	1,67	1,00	1,87	3,00	1,00	1,00	2,33	2,00	1,00	1,72	1,00	1,00
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	-	-	-	2,00	2,00
Y 627	-	-	-	-	-	-	3,00	1,00	1,00	1,67	2,67	1,00	1,72	1,00	1,00
DM 6663 RSF	-	-	-	-	-	-	1,00	1,67	1,33	4,67	2,67	1,00	2,06	1,00	1,00
NS 6448 R	1,67	2,33	1,00	1,00	1,00	1,40	1,00	1,00	1,00	2,00	2,33	1,00	1,39	1,00	1,00
P64T39 R	3,33	2,33	1,00	1,00	1,00	1,73	1,00	1,00	1,00	2,33	3,67	1,00	1,67	1,00	1,00
Y 657	-	-	-	-	-	-	1,00	1,00	1,00	1,33	1,67	1,00	1,17	1,00	1,00
PAN 1644 R	3,00	3,67	1,00	1,00	1,00	1,93	3,00	1,00	1,00	1,33	2,33	1,00	1,61	1,00	1,00
PAN 1653 R	1,33	2,67	1,00	1,00	1,00	1,40	1,00	1,00	1,00	1,00	1,33	1,00	1,06	1,00	1,00
LS 6868 R	3,33	0,00	1,00	1,00	1,00	1,27	1,00	1,00	1,00	2,33	2,33	1,00	1,44	1,00	1,00
DM 6.8i RR	-	-	-	-	-	-	1,00	1,00	1,00	4,00	2,33	1,00	1,72	1,00	1,00
DM 6968 RSF	-	-	-	-	-	-	-	-	-	-	-	-	-	1,00	1,00
P71T74 R	-	-	-	-	-	-	1,00	1,00	1,00	5,00	2,67	1,00	1,94	1,00	1,00
Gem/Mean	2,33	2,09	1,22	1,26	1,00	1,57	1,39	1,04	1,26	2,31	2,60	1,00	1,58	1,06	1,06

Tabel 11 Oopspring (1-5) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19

Table 11 Shattering (1-5) of the different soybean cultivars at the different trial localities, 2018/19

Kultivar Cultivar	Koel/Cool				Matig/Moderate						Warm	
	Bethlehem	Clarens	Kinross	Gem/Mean	Bergville	Cedara	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Groblersdal-Agricol	Gem/Mean
P48T48 R	1,00	2,00	1,00	1,33	1,00	1,00	1,00	-	2,00	1,00	-	-
LS 6248 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	1,20	3,00	3,00
DM 5953 RSF	1,00	2,00	1,00	1,33	1,00	1,00	1,00	1,00	2,00	1,20	2,00	2,00
SSS 5449 (tuc)	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	1,20	3,00	3,00
NS 5009 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	1,20	1,00	1,00
NS 5258 R	1,00	2,00	1,00	1,33	1,00	1,00	1,00	1,00	2,00	1,20	3,00	3,00
PAN 1532 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	2,00
LDC 5.3	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	3,00	3,00
DM 5351 RSF	1,00	3,00	1,00	1,67	1,00	1,00	1,00	1,00	2,00	1,20	2,00	2,00
Y 540	-	-	1,00	1,00	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NA 5509 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LS 6851 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	2,00
PAN 1521 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
DM 5302 RSF	1,00	2,00	1,00	1,33	1,00	1,00	1,00	1,00	2,00	1,20	2,00	2,00
NS 5909 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,33	1,07	2,00	2,00
LDC 5.9	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	2,00
DM 5901 RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	2,00
LS 6860 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LS 6164 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	2,00
P61T38 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Y 605	-	-	-	-	-	-	-	-	1,00	1,00	-	-
LS 6161 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	2,00
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	1,00	1,00
Y 627	-	-	-	-	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
DM 6663 RSF	-	-	-	-	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NS 6448 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	1,20	3,00	3,00
P64T39 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	2,00
Y 657	-	-	-	-	1,00	1,00	1,00	1,00	1,00	1,00	2,00	2,00
PAN 1644 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PAN 1653 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	2,00
LS 6868 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	2,00
DM 6.8i RR	-	-	-	-	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
DM 6968 RSF	-	-	-	-	-	-	-	-	-	-	1,00	1,00
P71T74 R	-	-	-	-	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Gem/Mean	1,00	1,23	1,00	1,07	1,00	1,00	1,00	1.00	1,29	1,05	1,75	1,75

Tabel 12 Die planttelling drie weke na opkoms (x 1000) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19

Table 12 The number of plant three weeks after germination(x 1000) of the different soybean cultivars at the different trial localities, 2018/19

Kultivar Cultivar	Koel/Cool						Matig/Moderate						Warm	
	Bapsfontein	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean	Bergville	Cedara	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Groblersdal-Agricol	Gem/Mean
P48T48 R	310	243	115	202	269	228	260	248	229	-	185	230	-	-
LS 6248 R	390	267	175	259	261	270	256	278	196	269	185	237	302	302
DM 5953 RSF	368	270	126	244	243	250	245	290	256	268	193	250	308	308
SSS 5449 (tuc)	285	247	111	241	244	226	266	296	223	227	200	243	310	310
NS 5009 R	116	140	5	139	118	104	230	231	17	183	201	173	309	309
NS 5258 R	253	171	92	238	181	187	219	220	113	242	196	198	308	308
PAN 1532 R	389	272	140	264	236	260	248	333	223	242	193	248	304	304
LDC 5.3	280	243	138	198	247	221	231	256	211	291	196	237	300	300
DM 5351 RSF	298	246	103	245	202	219	234	220	127	278	195	211	289	289
Y 540	-	-	6	41	39	29	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	338	221	174	215	196	229	273	303	209	283	194	252	287	287
NA 5509 R	380	249	99	213	217	232	260	272	207	283	187	242	279	279
LS 6851 R	298	277	169	273	284	260	248	259	193	268	188	231	278	278
PAN 1521 R	396	295	149	236	304	276	274	306	261	202	184	246	275	275
DM 5302 RSF	320	246	97	247	206	223	250	266	209	282	187	239	274	274
NS 5909 R	376	258	211	243	305	279	259	277	236	277	180	245	290	290
LDC 5.9	315	264	114	224	194	222	258	209	172	239	181	212	301	301
DM 5901 RSF	273	253	159	223	184	218	267	256	156	200	182	212	316	316
LS 6860 R	272	229	134	202	232	214	263	272	214	266	190	241	312	312
LS 6164 R	344	269	156	227	210	241	285	304	234	249	190	252	304	304
P61T38 R	387	274	148	257	247	263	258	242	222	268	195	237	300	300
Y 605	-	-	-	-	-	-	-	-	-	-	196	196	-	-
LS 6161 R	364	238	206	272	247	266	237	323	202	186	205	230	299	299
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	-	-	304	304
Y 627	-	-	-	-	-	-	253	289	193	272	206	243	306	306
DM 6663 RSF	-	-	-	-	-	-	270	260	169	273	207	236	297	297
NS 6448 R	364	255	150	253	251	255	305	289	230	283	205	262	287	287
P64T39 R	338	250	191	173	266	244	275	285	254	270	198	256	273	273
Y 657	-	-	-	-	-	-	242	292	192	228	195	230	272	272
PAN 1644 R	280	266	140	237	219	228	289	287	236	234	187	247	270	270
PAN 1653 R	370	277	167	274	306	279	249	291	237	262	188	245	273	273
LS 6868 R	279	0	85	245	192	160	232	245	168	250	189	217	277	277
DM 6.8i RR	-	-	-	-	-	-	249	204	221	276	196	229	282	282
DM 6968 RSF	-	-	-	-	-	-	-	-	-	-	-	-	286	286
P71T74 R	-	-	-	-	-	-	239	219	232	302	199	238	296	296
Gem/Mean	322	239	132	225	226	225	256	269	201	255	193	233	293	293

Tabel 13 Persentasie ongewenste sade van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19

Table 13 Percentage undesirable seed of the different soybean cultivars at the different trial localities, 2018/19

Kultivar Cultivar	Koel/Cool						Matig/Moderate							Warm			
	Bapsfontein	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean	Bergville	Cedara	Greytwon	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Brits	Marble Hall	Groblersdal-Agricol	Gem/Mean
P48T48 R	0,35	1,22	0,00	0,15	0,00	0,34	0,00	0,00	0,00	0,79	0,00	2,36	0,53	-	-	-	-
LS 6248 R	0,51	0,60	0,18	0,53	0,34	0,43	0,00	0,38	0,00	0,14	0,00	0,12	0,11	0,06	0,22	0,20	0,16
DM 5953 RSF	0,00	0,67	0,18	0,34	0,00	0,24	0,00	0,17	0,00	0,77	0,41	0,00	0,23	0,07	0,10	0,39	0,19
SSS 5449 (tuc)	0,26	0,71	0,92	0,08	0,00	0,39	0,05	0,20	0,00	0,11	0,08	0,00	0,07	0,04	0,21	0,00	0,08
NS 5009 R	0,40	0,52	0,22	0,00	0,00	0,23	0,00	0,00	0,00	0,00	0,09	0,00	0,02	0,00	0,00	0,34	0,11
NS 5258 R	0,00	0,55	0,17	0,64	0,04	0,28	0,00	0,32	0,57	1,09	0,57	0,00	0,43	0,00	0,08	0,31	0,13
PAN 1532 R	0,59	0,16	0,12	0,04	0,00	0,18	0,23	0,22	0,00	0,20	0,10	0,00	0,13	0,06	0,24	0,00	0,10
LDC 5.3	0,21	0,98	0,60	0,11	0,04	0,39	0,07	0,28	0,00	0,08	0,29	0,27	0,17	0,19	0,11	0,00	0,10
DM 5351 RSF	0,00	1,51	0,60	0,29	0,00	0,48	0,00	0,33	0,00	0,05	0,31	0,94	0,27	0,02	0,00	1,29	0,44
Y 540	0,00	0,00	0,12	0,00	0,04	0,03	-	-	-	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	0,00	0,60	0,22	0,18	0,08	0,22	0,22	0,19	0,00	0,26	0,31	0,00	0,16	0,19	0,09	0,42	0,23
NA 5509 R	0,00	0,67	0,16	0,00	0,12	0,19	0,87	0,18	0,00	0,26	0,77	0,00	0,35	0,45	0,00	0,00	0,15
LS 6851 R	0,64	0,74	0,10	0,22	0,41	0,42	0,37	0,47	0,00	0,00	0,51	0,16	0,25	0,04	0,15	0,00	0,06
PAN 1521 R	0,23	1,71	0,28	0,51	0,06	0,56	0,39	0,10	0,00	0,91	1,32	0,79	0,59	0,05	0,45	0,61	0,37
DM 5302 RSF	0,00	0,00	0,15	0,00	0,00	0,03	0,33	0,10	0,00	0,64	0,23	0,38	0,28	0,36	0,00	0,00	0,12
NS 5909 R	0,19	0,45	0,20	0,26	0,20	0,26	0,92	0,10	0,00	0,32	0,06	0,00	0,23	0,20	0,00	0,55	0,25
LDC 5.9	0,17	0,59	0,50	0,60	0,04	0,38	0,31	0,41	0,00	0,28	0,27	0,00	0,21	0,00	0,40	0,28	0,23
DM 5901 RSF	0,82	0,79	0,12	0,12	0,20	0,41	0,38	0,00	0,00	0,36	0,59	0,00	0,22	0,26	0,09	0,00	0,12
LS 6860 R	0,00	0,22	0,21	0,39	0,08	0,18	0,67	1,07	0,00	0,00	0,21	0,15	0,35	0,06	0,00	0,13	0,06
LS 6164 R	0,78	0,57	0,18	0,38	0,29	0,44	0,46	0,26	0,00	1,02	0,67	0,00	0,40	0,00	0,00	1,35	0,45
P61T38 R	0,00	1,31	0,06	0,29	0,13	0,36	0,00	0,23	0,00	0,00	0,62	0,00	0,14	0,00	0,00	0,54	0,18
Y 605	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,26	0,04	-	-	-	-
LS 6161 R	0,54	0,21	0,12	0,31	0,17	0,27	0,19	0,18	0,00	0,17	0,15	0,00	0,12	0,00	0,20	0,33	0,18
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	-	-	-	0,07	0,07	0,87	0,34
Y 627	-	-	-	-	-	-	0,57	0,85	0,00	0,46	0,52	0,00	0,40	0,08	0,17	0,00	0,08
DM 6663 RSF	-	-	-	-	-	-	0,97	0,00	0,22	0,21	0,91	0,00	0,39	0,07	0,17	4,75	1,66
NS 6448 R	0,28	0,17	0,95	0,43	0,18	0,40	0,58	0,27	0,24	0,00	0,80	0,37	0,38	0,00	0,00	0,00	0,00
P64T39 R	0,27	0,46	0,26	0,46	0,26	0,34	0,43	0,00	0,00	0,59	0,47	0,00	0,25	0,30	0,06	0,20	0,19
Y 657	-	-	-	-	-	-	0,30	0,11	0,00	0,26	0,00	0,00	0,11	0,17	0,00	0,00	0,06
PAN 1644 R	0,23	0,61	0,25	0,03	0,04	0,23	0,32	0,20	0,00	0,00	0,45	0,00	0,16	0,07	0,00	0,50	0,19
PAN 1653 R	0,44	0,58	0,73	1,08	0,17	0,60	0,37	0,00	0,00	0,00	0,37	0,00	0,12	0,09	0,00	0,00	0,03
LS 6868 R	0,77	0,73	0,77	0,44	0,13	0,57	0,43	0,07	0,02	0,09	0,36	0,14	0,19	0,06	0,15	0,00	0,07
DM 6.8i RR	-	-	-	-	-	-	0,40	0,03	0,00	0,78	0,48	0,00	0,28	0,24	0,00	1,06	0,43
DM 6968 RSF	-	-	-	-	-	-	-	-	-	-	-	-	-	0,11	0,06	6,22	2,13
P71T74 R	-	-	-	-	-	-	0,00	0,00	0,00	0,00	0,10	0,00	0,02	0,09	0,33	0,57	0,33
Gem/Mean	0,27	0,62	0,30	0,28	0,11	0,32	0,31	0,21	0,03	0,31	0,38	0,19	0,24	0,11	0,10	0,65	0,29

Tabel 14 Massa van 100 sade (g) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19

Table 14 Mass 100 seeds (g) of the different soybean cultivars at the different trial localities, 2018/19

	Koel/Cool						Matig/Moderate							Warm			
Kultivar Cultivar	Bapsfontein	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean	Bergville	Cedara	Greytwon	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Brits K2	Groblersdal-Agricol	Marble Hall	Gem/Mean
P48T48 R	19,23	18,31	15,45	19,39	18,27	18,13	19,90	21,70	23,70	22,93	-	17,96	21,24	-	-	-	-
LS 6248 R	15,70	15,17	12,17	13,97	12,64	13,93	15,23	15,59	19,02	16,29	15,77	14,15	16,01	16,29	15,48	15,19	15,65
DM 5953 RSF	17,22	13,69	14,16	16,31	15,52	15,38	17,25	16,56	19,76	17,75	16,17	13,27	16,79	15,81	17,51	16,89	16,74
SSS 5449 (tuc)	13,31	14,67	12,40	14,40	13,40	13,64	15,48	14,26	17,76	15,41	15,11	13,57	15,27	15,96	14,62	14,71	15,10
NS 5009 R	17,62	18,52	11,65	17,47	17,49	16,55	18,97	20,04	25,31	17,40	18,84	15,85	19,40	18,55	19,52	18,08	18,72
NS 5258 R	15,37	16,81	13,58	14,52	14,09	14,87	17,00	16,00	20,98	17,23	16,78	12,98	16,83	16,17	16,45	14,47	15,70
PAN 1532 R	15,32	16,30	13,50	14,99	14,19	14,86	16,59	16,25	20,44	17,37	16,91	13,81	16,90	14,52	15,09	14,64	14,75
LDC 5.3	14,91	16,01	14,17	15,08	13,70	14,77	16,44	15,95	18,66	16,71	16,27	15,01	16,51	16,60	18,29	17,82	17,57
DM 5351 RSF	16,28	15,08	12,93	17,06	15,89	15,45	17,02	17,96	22,53	17,91	17,66	15,11	18,03	16,89	19,87	14,51	17,09
Y 540	-	-	13,49	15,05	15,43	14,66	-	-	-	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	14,27	16,15	11,87	14,54	13,14	13,99	15,85	14,02	17,29	16,43	14,76	15,45	15,63	15,85	18,53	15,62	16,67
NA 5509 R	16,72	15,36	13,61	15,90	14,33	15,18	18,66	18,22	19,54	16,84	16,86	15,33	17,57	16,40	17,70	17,49	17,20
LS 6851 R	13,57	16,99	13,52	13,30	13,12	14,10	15,35	15,19	15,50	16,66	17,65	14,62	15,83	16,83	14,70	13,83	15,12
PAN 1521 R	17,18	16,13	13,02	17,09	15,35	15,75	18,49	16,88	19,54	21,02	18,57	15,40	18,32	17,04	17,93	16,44	17,14
DM 5302 RSF	16,75	17,35	14,47	15,67	14,57	15,76	17,66	16,29	18,56	18,34	17,34	16,03	17,37	17,75	17,89	17,10	17,58
NS 5909 R	16,27	17,99	12,91	16,59	14,70	15,69	20,09	17,29	19,47	18,86	17,64	15,38	18,12	15,53	17,24	16,74	16,50
LDC 5.9	17,85	19,48	13,53	16,91	16,37	16,83	18,94	18,21	20,15	20,08	19,65	16,17	18,87	18,13	19,73	17,56	18,47
DM 5901 RSF	15,92	17,93	12,66	15,61	14,94	15,41	17,49	17,31	18,25	18,84	17,78	14,60	17,38	19,08	17,00	16,40	17,49
LS 6860 R	19,33	19,46	13,20	18,09	14,75	16,97	20,01	18,48	17,99	20,37	19,33	16,77	18,83	18,52	20,51	17,49	18,84
LS 6164 R	15,48	16,59	11,32	15,44	13,20	14,40	17,59	17,49	17,47	16,99	16,73	14,84	16,85	14,79	17,69	16,28	16,25
P61T38 R	15,62	17,56	12,93	15,12	14,26	15,10	16,25	17,63	19,38	16,82	16,96	15,78	17,14	17,88	17,07	16,82	17,26
Y 605	-	-	-	-	-	-	-	-	-	-	-	17,01	17,01	-	-	-	-
LS 6161 R	15,09	16,97	12,74	14,95	13,78	14,70	15,68	16,33	18,76	16,27	16,76	14,84	16,44	16,72	17,03	15,89	16,55
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	-	-	-	16,57	17,69	16,29	16,85
Y 627	-	-	-	-	-	-	17,97	17,02	19,32	15,94	16,16	16,87	17,21	16,00	17,49	15,72	16,40
DM 6663 RSF	-	-	-	-	-	-	19,18	17,95	20,90	18,60	18,46	17,41	18,75	17,66	18,19	17,98	17,94
NS 6448 R	15,26	17,13	14,05	14,68	13,53	14,93	16,62	16,26	18,13	18,78	15,88	12,14	16,30	15,68	16,51	16,77	16,32
P64T39 R	17,37	18,13	12,71	16,33	14,22	15,75	18,48	17,76	18,41	16,73	18,48	16,43	17,72	15,29	18,14	16,19	16,54
Y 657	-	-	-	-	-	-	16,21	14,66	15,72	15,59	16,22	14,17	15,43	16,23	16,54	15,17	15,98
PAN 1644 R	16,36	17,64	12,74	15,53	14,03	15,26	17,09	15,90	17,93	16,68	17,26	15,47	16,72	16,97	18,90	15,98	17,28
PAN 1653 R	16,13	18,84	12,91	15,15	14,61	15,53	17,84	18,27	17,43	17,60	17,80	16,90	17,64	17,93	18,05	17,33	17,77
LS 6868 R	15,05	17,42	13,41	13,67	13,44	14,60	15,88	15,26	15,17	16,14	16,04	14,40	15,48	17,04	16,11	14,80	15,98
DM 6.8i RR	-	-	-	-	-	-	19,70	17,48	19,31	19,75	19,73	14,87	18,47	18,68	19,54	17,39	18,53
DM 6968 RSF	-	-	-	-	-	-	-	-	-	-	-	-	-	20,95	21,29	18,48	20,24
P71T74 R	-	-	-	-	-	-	17,62	17,49	19,37	17,98	19,20	16,06	17,95	17,48	20,10	17,07	18,22
Gem/Mean	16,12	16,99	13,15	15,66	14,55	15,27	17,50	16,96	19,09	17,75	17,29	15,27	17,31	16,93	17,76	16,35	17,01

Tabel 15 Oliepersentasie op vogvrye basis van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2018/19

Table 15 Oil percentage on moisture free basis of the different soybean cultivars at the different trial localities, 2018/19

Kultivar Cultivar	Koel/Cool			Matg/Moderate			Warm		
	Bethlehem	Kinross	Gem/Mean	Cedara	Greytwon	Gem/Mean	Brits K2	Marble Hall	Gem/Mean
P48T48 R	19,90	18,29	19,10	20,02	20,94	20,48			
LS 6248 R	19,86	18,75	19,31	20,99	21,17	21,08	21,78	23,76	22,77
DM 5953 RSF	19,16	19,05	19,11	21,60	22,54	22,07	21,80	23,24	22,52
SSS 5449 (tuc)	20,59	19,09	19,84	21,57	22,43	22,00	21,39	23,71	22,55
NS 5009 R	18,34	17,84	18,09	19,20	19,77	19,49	19,76	21,28	20,52
NS 5258 R	19,19	19,14	19,17	20,66	21,47	21,07	20,63	21,67	21,15
PAN 1532 R	19,28	18,79	19,04	20,80	21,06	20,93	20,84	21,23	21,04
LDC 5.3	20,27	19,21	19,74	20,89	21,59	21,24	21,70	21,95	21,83
DM 5351 RSF	19,57	19,78	19,68	21,23	21,41	21,32	21,55	23,40	22,48
Y 540	22,04	19,91	20,98	-	-	-	-	-	-
SSS 5052 (tuc)	21,11	19,06	20,09	20,06	21,33	20,70	20,06	21,56	20,81
NA 5509 R	19,49	17,42	18,46	21,03	21,32	21,18	20,27	23,26	21,77
LS 6851 R	22,17	19,20	20,69	20,81	21,69	21,25	20,78	22,70	21,74
PAN 1521 R	18,92	18,08	18,50	20,35	21,37	20,86	19,94	21,70	20,82
DM 5302 RSF	19,53	17,53	18,53	19,14	20,54	19,84	18,73	21,14	19,94
NS 5909 R	19,65	19,28	19,47	20,07	21,52	20,80	19,42	22,75	21,09
LDC 5.9	19,34	18,14	18,74	20,67	21,24	20,96	21,01	22,75	21,88
DM 5901 RSF	21,14	20,08	20,61	22,15	22,42	22,29	22,04	22,91	22,48
LS 6860 R	19,52	18,68	19,10	24,65	21,91	23,28	20,92	22,67	21,80
LS 6164 R	19,30	17,71	18,51	19,61	20,58	20,10	19,93	22,15	21,04
P61T38 R	19,22	18,23	18,73	19,51	20,70	20,11	19,81	20,87	20,34
Y 605	-	-	-	-	-	-	-	-	-
LS 6161 R	19,47	19,36	19,42	21,18	21,77	21,48	20,60	21,57	21,09
SSS 6560 (tuc)	-	-	-	-	-	-	19,96	22,30	21,13
Y 627	-	-	-	20,18	19,77	19,98	19,66	22,95	21,31
DM 6663 RSF	-	-	-	19,27	19,84	19,56	18,93	20,14	19,54
NS 6448 R	20,91	19,12	20,02	20,25	21,18	20,72	19,50	22,10	20,80
P64T39 R	19,37	17,88	18,63	19,95	20,89	20,42	20,18	22,09	21,14
Y 657	-	-	-	18,79	20,32	19,56	19,20	20,65	19,93
PAN 1644 R	18,82	18,38	18,60	19,96	20,67	20,32	19,68	21,23	20,46
PAN 1653 R	20,71	19,33	20,02	21,04	21,17	21,11	21,70	22,57	22,14
LS 6868 R	18,44	18,80	18,62	21,15	21,28	21,22	21,49	23,03	22,26
DM 6.8i RR	-	-	-	19,86	20,11	19,99	20,79	22,29	21,54
DM 6968 RSF	-	-	-	-	-	-	21,26	21,42	21,34
P71T74 R	-	-	-	19,12	19,51	19,32	19,80	19,81	19,81
Gem/Mean	19,83	18,75	19,29	20,51	21,08	20,79	20,47	22,09	21,28

Tabel 16 Ru-proteïenpersentasie op vogvrye basis van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2016/17

Table 16 Percentage crude protein on moisture free basis of the different soybean cultivars at the different trial localities, 2016/17

Kultivar Cultivar	Koel/Cool			Matig/Moderate			Warm		
	Bethlehem	Kinross	Gem/Mean	Cedara	Greytwon	Gem/Mean	Brits K2	Marble Hall	Gem/Mean
P48T48 R	40,01	41,57	40,79	40,63	44,05	42,34	-	-	-
LS 6248 R	37,85	39,15	38,50	38,70	42,14	40,42	40,44	38,90	39,67
DM 5953 RSF	41,06	40,26	40,66	39,04	41,72	40,38	40,70	39,93	40,32
SSS 5449 (tuc)	39,30	40,08	39,69	39,50	42,79	41,15	42,38	39,47	40,93
NS 5009 R	41,51	42,04	41,78	41,63	43,70	42,67	41,37	41,19	41,28
NS 5258 R	40,51	40,93	40,72	40,08	46,05	43,07	40,88	41,39	41,14
PAN 1532 R	40,55	39,82	40,19	39,30	41,76	40,53	40,37	40,67	40,52
LDC 5.3	39,23	39,42	39,33	40,14	41,65	40,90	40,97	41,75	41,36
DM 5351 RSF	39,73	39,08	39,41	38,15	42,06	40,11	39,98	37,44	38,71
Y 540	37,19	37,91	37,55	-	-	-	-	-	-
SSS 5052 (tuc)	39,09	38,51	38,80	40,43	40,90	40,67	40,84	40,25	40,55
NA 5509 R	38,75	38,09	38,42	39,45	42,37	40,91	42,96	41,05	42,01
LS 6851 R	36,01	39,71	37,86	39,49	41,83	40,66	40,98	39,55	40,27
PAN 1521 R	40,25	41,16	40,71	41,37	42,47	41,92	40,72	40,52	40,62
DM 5302 RSF	41,97	42,71	42,34	43,63	43,71	43,67	43,31	43,56	43,44
NS 5909 R	40,31	39,92	40,12	41,15	41,47	41,31	41,62	39,86	40,74
LDC 5.9	39,63	41,95	40,79	40,71	42,03	41,37	40,49	40,77	40,63
DM 5901 RSF	36,16	37,85	37,01	37,46	39,55	38,51	38,81	40,45	39,63
LS 6860 R	38,09	40,09	39,09	39,20	40,74	39,97	39,67	39,10	39,39
LS 6164 R	38,04	40,38	39,21	42,42	42,09	42,26	41,30	40,22	40,76
P61T38 R	40,65	39,83	40,24	44,01	42,12	43,07	40,76	41,65	41,21
Y 605	-	-	-	-	-	-	-	-	-
LS 6161 R	39,85	39,40	39,63	39,40	42,12	40,76	41,40	41,31	41,36
SSS 6560 (tuc)	-	-	-	-	-	-	41,67	40,88	41,28
Y 627	-	-	-	39,69	42,19	40,94	39,76	39,96	39,86
DM 6663 RSF	-	-	-	41,53	41,68	41,61	40,27	40,64	40,46
NS 6448 R	37,18	39,73	38,46	41,55	41,63	41,59	40,98	41,31	41,15
P64T39 R	38,05	41,21	39,63	40,16	41,63	40,90	40,94	41,16	41,05
Y 657	-	-	-	42,06	41,12	41,59	39,58	41,61	40,60
PAN 1644 R	42,51	40,79	41,65	40,95	42,43	41,69	41,64	41,56	41,60
PAN 1653 R	36,79	38,29	37,54	39,88	40,35	40,12	39,09	39,42	39,26
LS 6868 R	41,41	39,71	40,56	39,54	41,87	40,71	41,43	40,40	40,92
DM 6.8i RR	-	-	-	37,38	40,80	39,09	39,82	39,78	39,80
DM 6968 RSF	-	-	-	-	-	-	41,72	42,13	41,93
P71T74 R	-	-	-	39,68	41,81	40,75	39,63	41,65	40,64
Gem/Mean	39,32	39,98	39,65	40,27	42,03	41,15	40,83	40,61	40,72

Tabel 17 Gemiddelde van die olie-en proteïen persentasie saamgevoeg (Protolie), 2016/17

Table 17 Average of the oil and protein percentage joined (Profat), 2016/17

Kultivar Cultivar	Koel/Cool			Matig/Moderate			Warm		
	Bethlehem	Kinross	Gem/Mean	Cedara	Greytwon	Gem/Mean	Brits K2	Marble Hall	Gem/Mean
P48T48 R	59,91	59,86	59,89	60,65	64,99	62,82	-	-	-
LS 6248 R	57,71	57,90	57,81	59,69	63,31	61,50	62,22	62,66	62,44
DM 5953 RSF	60,22	59,31	59,77	60,64	64,26	62,45	62,50	63,17	62,84
SSS 5449 (tuc)	59,89	59,17	59,53	61,07	65,22	63,15	63,77	63,18	63,48
NS 5009 R	59,85	59,88	59,87	60,83	63,47	62,15	61,13	62,47	61,80
NS 5258 R	59,70	60,07	59,89	60,74	67,52	64,13	61,51	63,06	62,29
PAN 1532 R	59,83	58,61	59,22	60,10	62,82	61,46	61,21	61,90	61,56
LDC 5.3	59,50	58,63	59,07	61,03	63,24	62,14	62,67	63,70	63,19
DM 5351 RSF	59,30	58,86	59,08	59,38	63,47	61,43	61,53	60,84	61,19
Y 540	59,23	57,82	58,53	-	-	-	-	-	-
SSS 5052 (tuc)	60,20	57,57	58,89	60,49	62,23	61,36	60,90	61,81	61,36
NA 5509 R	58,24	55,51	56,88	60,48	63,69	62,09	63,23	64,31	63,77
LS 6851 R	58,18	58,91	58,55	60,30	63,52	61,91	61,76	62,25	62,01
PAN 1521 R	59,17	59,24	59,21	61,72	63,84	62,78	60,66	62,22	61,44
DM 5302 RSF	61,50	60,24	60,87	62,77	64,25	63,51	62,04	64,70	63,37
NS 5909 R	59,96	59,20	59,58	61,22	62,99	62,11	61,04	62,61	61,83
LDC 5.9	58,97	60,09	59,53	61,38	63,27	62,33	61,50	63,52	62,51
DM 5901 RSF	57,30	57,93	57,62	59,61	61,97	60,79	60,85	63,36	62,11
LS 6860 R	57,61	58,77	58,19	63,85	62,65	63,25	60,59	61,77	61,18
LS 6164 R	57,34	58,09	57,72	62,03	62,67	62,35	61,23	62,37	61,80
P61T38 R	59,87	58,06	58,97	63,52	62,82	63,17	60,57	62,52	61,55
Y 605	0,00	0,00	0,00	0,00	0,00	0,00	-	-	-
LS 6161 R	59,32	58,76	59,04	60,58	63,89	62,24	62,00	62,88	62,44
SSS 6560 (tuc)	-	-	-	-	-	-	61,63	63,18	62,41
Y 627	-	-	-	59,87	61,96	60,92	59,42	62,91	61,16
DM 6663 RSF	-	-	-	60,80	61,52	61,16	59,20	60,78	59,99
NS 6448 R	58,09	58,85	58,47	61,80	62,81	62,31	60,48	63,41	61,95
P64T39 R	57,42	59,09	58,26	60,11	62,52	61,32	61,12	63,25	62,19
Y 657	-	-	-	60,85	61,44	61,15	58,78	62,26	60,52
PAN 1644 R	-	-	-	60,91	63,10	62,01	61,32	62,79	62,06
PAN 1653 R	61,33	59,17	60,25	60,92	61,52	61,22	60,79	61,99	61,39
LS 6868 R	57,50	57,62	57,56	60,69	63,15	61,92	62,92	63,43	63,18
DM 6.8i RR	59,85	58,51	59,18	57,24	60,91	59,08	60,61	62,07	61,34
DM 6968 RSF	-	-	-	-	-	-	62,98	63,55	63,27
P71T74 R	-	-	-	58,80	61,32	60,06	59,43	61,46	60,45
Gem/Mean	57,04	56,63	56,83	58,88	61,14	60,01	61,30	62,70	62,00

Tabel 18 Die graanopbrengs van elke kultivar by die verskillende lokaliteite, 2018/19

Table 18 The grain yield of the cultivars at the different localities, 2018/19

Kultivar Cultivar	Koel/Cool						Matig/Moderate							Warm			
	Bapsfontein	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean	Bergville	Cedara	Greytwon	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Brits K2	Groblersdal-Agricol	Marble Hall	Gem/Mean
P48T48 R	4375	2716	1929	3621	2056	2939	3892	4848	4089	1744	-	923	3099	-	-	-	-
LS 6248 R	5001	2642	2017	2611	2713	2997	3564	4672	4144	2020	3334	1270	3167	3578	3716	3212	3502
DM 5953 RSF	4782	3167	2345	4300	2241	3367	3890	4644	3888	2155	3078	1545	3200	3678	4492	4301	4157
SSS 5449 (tuc)	4767	2492	1791	3302	2917	3054	4188	4246	4246	2006	2900	1719	3217	4366	2833	3091	3430
NS 5009 R	4032	2770	1249	2653	2287	2598	3659	4259	4129	954	2678	1392	2845	2980	4194	3083	3419
NS 5258 R	3229	2084	1914	3507	3435	2834	4216	4685	4481	1390	3233	1529	3256	3763	4242	3360	3788
PAN 1532 R	5017	2674	2325	2788	3407	3242	3957	4474	4794	2308	4224	1766	3587	3323	2919	3728	3323
LDC 5.3	5657	2770	2444	3241	3176	3458	3872	4650	4736	1603	3219	1811	3315	3916	3952	3599	3822
DM 5351 RSF	5214	2324	2131	4544	3991	3641	3712	5818	4426	1751	3977	1524	3535	3933	3900	3751	3861
Y 540	-	-	1631	2263	1667	1854	-	-	-	-	-	-	-	-	-	-	-
SSS 5052 (tuc)	6108	3063	2234	2847	2278	3306	4045	4568	4609	2605	2996	1878	3450	4197	4386	3667	4083
NA 5509 R	4944	3845	1814	3137	2917	3331	4123	4896	5019	2380	3557	1993	3661	3282	4683	3551	3838
LS 6851 R	5389	2901	2560	3136	3435	3484	4286	5374	4642	1833	3425	1589	3525	3603	3770	3630	3667
PAN 1521 R	5821	2824	2274	3215	3009	3429	4060	4715	4637	2945	3181	1444	3497	3848	4592	3497	3979
DM 5302 RSF	5947	2710	2174	3926	2972	3546	3611	4375	4300	1974	3107	1973	3223	3570	3825	3090	3495
NS 5909 R	6140	2801	1929	2800	2639	3262	4179	5124	5343	1956	3249	1680	3588	3797	3854	3815	3822
LDC 5.9	6077	3964	1680	3284	3907	3783	4102	5563	4725	2395	3562	2707	3842	3828	4027	3846	3901
DM 5901 RSF	5588	2882	2436	3092	3000	3400	4122	4752	5006	2037	3781	2284	3664	3374	4158	3350	3627
LS 6860 R	5391	2737	2142	2719	2796	3157	3011	4709	5026	2331	3111	1672	3310	3385	4039	2240	3222
LS 6164 R	4867	3389	2496	2724	2898	3275	4043	3930	5234	2074	3405	1864	3425	3207	4514	3531	3751
P61T38 R	5452	2353	2372	2600	2991	3153	4323	4801	5202	2450	3304	1427	3585	2523	4257	3583	3455
Y 605	-	-	-	-	-	-	-	-	-	-	-	1832	1832	-	-	-	-
LS 6161 R	5245	3315	2056	2961	3185	3352	3812	4546	5006	1950	3333	1767	3402	3263	4132	3447	3614
SSS 6560 (tuc)	-	-	-	-	-	-	-	-	-	-	-	-	-	3225	4382	3825	3811
Y 627	-	-	-	-	-	-	3738	4725	5422	2376	3494	2249	3667	3740	4121	3652	3838
DM 6663 RSF	-	-	-	-	-	-	2966	4678	5355	1816	3165	1913	3315	4111	4239	3506	3952
NS 6448 R	5232	3202	2129	3313	3167	3409	4667	4857	5632	2429	3493	1552	3772	4319	3910	2724	3651
P64T39 R	5624	4671	2895	3366	3056	3922	4213	5133	5329	2564	3775	1865	3813	3482	4601	3890	3991
Y 657						-	4055	4968	5107	2252	3575	2475	3739	3666	4229	3948	3948
PAN 1644 R	5167	2788	2169	3436	3565	3425	4344	4555	4969	2142	3001	1938	3492	3448	4233	3323	3668
PAN 1653 R	5183	3089	2073	2519	3028	3178	3778	5359	5080	2192	3517	1473	3566	3704	4189	3702	3865
LS 6868 R	5459	2721	2600	2516	2435	3146	3223	4465	4592	1393	2552	1393	2936	4060	2786	2991	3279
DM 6.8i RR	-	-	-	-	-	-	3110	4901	4972	2600	3276	2014	3479	3735	3855	3474	3688
DM 6968 RSF	-	-	-	-	-	-	-	-	-	-	-	-	-	3655	3454	4180	3763
P71T74 R	-	-	-	-	-	-	3902	5195	5206	2474	3435	2042	3709	4652	4334	3648	4211
Gem/Mean	5220	2957	2141	3127	2932	3242	3892	4790	4818	2100	3331	1766	3397	3663	4026	3507	3732
CV	12,9	16,7	20,4	13,2	13,9		11,7	9,9	6,2	21,8	16,1	9,7		15,7	6,0	12,4	

Tabel 19 Opbrengswaarskynlikheid (%) van kultivars geëvalueer in 2016/17, 2017/18 en 2018/19 vir die koeler droëland produksiegebiede by verskillende opbrengspotensiaal
Table 16 Yield probability (%) of cultivars in the 2016/17, 2017/18 and 2018/19 for the cooler dryland production areas at different potentials

Kultivar	Opbrengspotensiaal/Yield potential (t/ha)							
Cultivar	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5
LS6248R	49	44	36	28	21	16	13	13
DM5953RSF	39	46	55	66	75	83	87	89
SSS5449(tuc)	15	16	19	24	32	42	52	61
PAN1532R	80	77	72	64	53	41	32	25
SSS5052(tuc)	27	22	18	14	11	10	10	12
PAN1521R	40	46	53	62	71	78	83	85
DM5302RSF	54	56	58	61	63	64	64	65
NS5909R	17	18	20	24	31	40	49	57
P61T38R	48	46	43	40	36	34	32	32
LS6161R	56	53	48	44	38	33	30	28
NS6448R	92	90	86	78	65	49	34	24
P64T39R	60	64	67	71	74	76	76	75

Tabel 20 Graanopbrengs (kg/ha^{-1}) van kultivars gedurende die 2017/18 en 2018/19 groeiseisoen ten opsigte van die verskillende lokaliteite wat in die koeler produksiegebiede geleë is

Table 20 Grain yield (kg/ha^{-1}) of cultivars during the 2017/18 and 2018/19 growing season for the various localities situated in the cooler production areas

Kultivar Cultivar	2017/18									2018/19					
	Bapsfontein	Bethlehem	Clarens	Clocolan	Delmas	Kinross	Kokstad	Middelburg	Gem/Mean	Bapsfontein	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean
P48T48 R	5610	2060	3023	3091	1857	4014	2797	4014	2979	4375	2716	1929	3621	2056	2939
LS 6248 R	4380	1561	2654	2115	3102	3434	2017	2294	2454	5001	2642	2017	2611	2713	2997
DM 5953 RSF	5853	3544	3687	3369	2661	3681	3932	3846	3531	4782	3167	2345	4300	2241	3367
SSS 5449 (tuc)	5085	1961	2459	2660	2897	3870	2156	3543	2792	4767	2492	1791	3302	2917	3054
NS 5009 R	4865	1389	2553	2433	2131	2951	2793	3897	2593	4032	2770	1249	2653	2287	2598
NS 5258 R	5462	2972	3752	1722	3450	3153	2672	3851	3082	3229	2084	1914	3507	3435	2834
PAN 1532 R	5222	2286	2863	2447	3637	3341	2912	3973	3065	5017	2674	2325	2788	3407	3242
LDC 5.3	-	-	-	-	-	-	-	-	-	5657	2770	2444	3241	3176	3458
DM 5351 RSF	5579	2693	3222	3624	2343	3608	4165	4835	3499	5214	2324	2131	4544	3991	3641
Y 540	4967	2758	2173	2639	2486	4261	3305	4107	3104	-	-	1631	2263	1667	1854
SSS 5052 (tuc)	5082	1649	1837	1737	3071	3555	1976	2855	2383	6108	3063	2234	2847	2278	3306
NA 5509 R	4466	1343	2646	2930	3430	3391	2625	4532	2985	4944	3845	1814	3137	2917	3331
LS 6851 R	5260	896	1818	2896	2694	2931	1943	2876	2294	5389	2901	2560	3136	3435	3484
PAN 1521 R	4927	2180	2821	2513	3305	3756	3432	3334	3049	5821	2824	2274	3215	3009	3429
DM 5302 RSF	5125	2399	3311	3016	2917	3658	2630	3270	3029	5947	2710	2174	3926	2972	3546
NS 5909 R	4891	1354	1837	1916	3078	3510	2233	3328	2465	6140	2801	1929	2800	2639	3262
LDC 5.9	-	-	-	-	-	-	-	-	-	6077	3964	1680	3284	3907	3783
DM 5901 RSF	-	-	-	-	-	-	-	-	-	5588	2882	2436	3092	3000	3400
LS 6860 R	4368	1304	1374	1079	3310	3247	1450	2800	2081	5391	2737	2142	2719	2796	3157
LS 6164 R										4867	3389	2496	2724	2898	3275
P61T38 R	5551	1871	2659	3123	3437	3373	2197	2921	2797	5452	2353	2372	2600	2991	3153
Y 605	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LS 6161 R	2938	926	2253	1959	3131	3817	2844	3213	2592	5245	3315	2056	2961	3185	3352
NS 6448 R	5543	1703	2699	2208	3698	3825	1876	3627	2805	5232	3202	2129	3313	3167	3409
P64T39 R	5208	1412	2745	2760	3333	4292	1941	3687	2881	5624	4671	2895	3366	3056	3922
PAN 1644 R	-	-	-	-	-	-	-	-	-	5167	2788	2169	3436	3565	3425
PAN 1653 R	-	-	-	-	-	-	-	-	-	5183	3089	2073	2519	3028	3178
LS 6868 R	3132	1087	1833	1696	3040	2267	2271	2810	2143	5459	2721	2600	2516	2435	3146
PAN 1454 R	5554	1840	2854	2643	1969	3263	2218	4142	2704	-	-	-	-	-	-
PHB 94 Y 80 R	5375	1763	3865	2711	1331	4205	4326	4433	3234	-	-	-	-	-	-
Y 550	4516	1490	2713	2474	3392	3558	2429	3475	2790	-	-	-	-	-	-
DM 5609 RSF	5697	2028	3031	2027	3427	3473	2779	3266	2861	-	-	-	-	-	-
PHB 96 T 06 R	4843	1223	2481	2566	3939	3843	2268	2932	2750	-	-	-	-	-	-
PAN 1623 R	3515	1404	3056	3590	3876	4230	1839	3941	3134	-	-	-	-	-	-
LS 6862 R	3147	1310	2175	2080	3458	3847	1938	3138	2564	-	-	-	-	-	-
SSS 6560 (tuc)	4777	1416	2378	2725	3032	2948	3183	2459	2592	-	-	-	-	-	-
NS 6267 R	5107	1664	2596	2825	3143	4199	2939	3728	3013	-	-	-	-	-	-
Y 627	5108	1677	2628	3125	3379	4228	1954	3198	2884	-	-	-	-	-	-
DM 6663 RSF	4661	1483	1981	2330	3343	4094	1458	3616	2615	-	-	-	-	-	-
DM 6402 RSF	4774	1402	1646	1199	2651	2990	1403	3084	2053	-	-	-	-	-	-
Y 657	5182	1754	2680	2726	3721	4125	1751	4383	3020	-	-	-	-	-	-
DM 6.8i RR	4936	1359	2381	1924	3517	3042	1536	3301	2437	-	-	-	-	-	-
Gem/Mean	4877	1748	2591	2482	3062	3599	2462	3506	2779	5220	2957	2141	3127	2932	3242

Table 21 Opbrengswaarskynlikheid (%) van kultivars geëvalueer in 2016/17, 2017/18 en 2018/19 vir die matige produksiegebiede by verskillende opbrengspotensiaal
Table 21 Yield probability (%) of cultivars in the 2016/17, 2017/18 and 2018/19 for the moderate production areas at different yield potentials

Kultivar	Opbrengspotensiaal/Yield potential (t/ha)							
Cultivar	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5
LS6248R	49	44	38	33	28	23	20	17
DM5953RSF	56	54	52	49	47	45	42	40
SSS5449(tuc)	49	43	37	30	25	20	16	13
PAN1532R	64	61	57	53	48	44	40	36
SSS5052(tuc)	74	69	62	54	46	38	30	24
PAN1521R	94	92	89	86	81	75	68	60
DM5302RSF	81	76	68	59	49	38	29	22
NS5909R	22	28	35	44	53	63	71	78
P61T38R	27	34	43	52	62	71	79	85
LS6161R	64	60	54	49	42	37	31	28
DM6663RSF	25	29	33	38	43	49	55	60
NS6448R	17	23	30	39	49	60	68	77
P64T39R	37	45	54	63	71	79	84	89
DM6.8iRR	44	47	51	55	58	62	65	68

Tabel 22 Saadopbrengs (kg/ha^{-1}) van kultivars gedurende die 2017/18 en 2018/19 groeiseisoen ten opsigte van die verskillende lokaliteite wat in die matige droëland produksiegebiede geleë is

Table 22 Seed yield (kg/ha^{-1}) of cultivars during the 2017/18 and 2018/19 growing season for the various localities situated in the moderate dryland production areas

Kultivar Cultivar	2017/18								2018/19						
	Bergville	Cedara	Dundee	Greytown	Kroonstad	Potchefstroom	Stoffberg	Gem/Mean	Bergville	Cedara	Greytwon	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean
P48T48 R	4357	4343	2499	2272	2679	2402	1346	3189	3892	4848	4089	1744	-	923	3099
LS 6248 R	3911	3873	2357	1829	3685	3209	1866	3139	3564	4672	4144	2020	3334	1270	3167
DM 5953 RSF	4165	4727	2561	1752	2200	5139	1701	3512	3890	4644	3888	2155	3078	1545	3200
SSS 5449 (tuc)	3702	4006	1700	1932	3048	3271	1912	3082	4188	4246	4246	2006	2900	1719	3217
NS 5009 R	4111	4331	1324	2130	2791	2818	1375	2968	3659	4259	4129	954	2678	1392	2845
NS 5258 R	4258	4196	1537	1888	2984	4232	1398	3244	4216	4685	4481	1390	3233	1529	3256
PAN 1532 R	4203	4096	1842	2137	4119	3932	2340	3486	3957	4474	4794	2308	4224	1766	3587
LDC 5.3	-	-	-	-	-	-	-	-	3872	4650	4736	1603	3219	1811	3315
DM 5351 RSF	4103	4514	2264	1773	2488	5018	1328	3383	3712	5818	4426	1751	3977	1524	3535
SSS 5052 (tuc)	3245	3417	2217	2159	4323	3673	2000	3264	4045	4568	4609	2605	2996	1878	3450
NA 5509 R	3893	3890	2335	1987	4346	3931	1915	3345	4123	4896	5019	2380	3557	1993	3661
LS 6851 R	4351	5269	1981	2075	3653	3475	1173	3405	4286	5374	4642	1833	3425	1589	3525
PAN 1521 R	3545	4155	2734	2140	3967	4277	2806	3569	4060	4715	4637	2945	3181	1444	3497
DM 5302 RSF	4176	4213	2253	2031	3306	3865	2236	3401	3611	4375	4300	1974	3107	1973	3223
NS 5909 R	4183	4352	2294	2060	3295	4534	1835	3431	4179	5124	5343	1956	3249	1680	3588
LDC 5.9	-	-	-	-	-	-	-	-	4102	5563	4725	2395	3562	2707	3842
DM 5901 RSF	-	-	-	-	-	-	-	-	4122	4752	5006	2037	3781	2284	3664
LS 6860 R	3570	3863	2332	1785	3832	3532	2278	3195	3011	4709	5026	2331	3111	1672	3310
LS 6164 R	-	-	-	-	-	-	-	-	4043	3930	5234	2074	3405	1864	3425
P61T38 R	4269	5066	2448	2334	4051	3725	1526	3621	4323	4801	5202	2450	3304	1427	3585
Y 605	-	-	-	-	-	-	-	-	-	-	-	-	-	1832	1832
LS 6161 R	3960	3741	2304	2116	3252	4705	2049	3133	3812	4546	5006	1950	3333	1767	3402
Y 627	4224	4466	2314	2081	4373	4282	2291	3642	3738	4725	5422	2376	3494	2249	3667
DM 6663 RSF	3326	4905	2391	2187	4290	3815	1638	3401	2966	4678	5355	1816	3165	1913	3315
NS 6448 R	4402	4183	2010	2044	4346	3156	1675	3420	4667	4857	5632	2429	3493	1552	3772
P64T39 R	3165	4698	2356	2304	4136	5275	1326	3558	4213	5133	5329	2564	3775	1865	3813
Y 657	4644	4295	2590	2153	4153	3714	2478	3651	4055	4968	5107	2252	3575	2475	3739
PAN 1644 R	-	-	-	-	-	-	-	-	4344	4555	4969	2142	3001	1938	3492
PAN 1653 R	-	-	-	-	-	-	-	-	3778	5359	5080	2192	3517	1473	3566
LS 6868 R	3588	3924	1654	2020	3652	3007	1457	2804	3223	4465	4592	1393	2552	1393	2936
DM 6.8i RR	4158	4452	2360	2242	4280	4575	1565	3571	3110	4901	4972	2600	3276	2014	3479
P71T74 R	-	-	-	-	-	-	-	-	3902	5195	5206	2474	3435	2042	3709
PAN 1454 R	3468	4174	1219	1757	2590	3158	996	2864	-	-	-	-	-	-	-
PHB 94 Y 80 R	4301	4536	1601	1771	1806	2911	2229	3066	-	-	-	-	-	-	-
Y 540	4607	4802	1882	2172	3925	4408	2270	3629	-	-	-	-	-	-	-
Y 550	3749	3962	1732	1918	3139	2778	2173	2996	-	-	-	-	-	-	-
DM 5609 RSF	3985	4259	2555	2196	3802	3341	1793	3454	-	-	-	-	-	-	-
PHB 96 T 06 R	4047	3860	1691	1882	3640	3866	2146	3247	-	-	-	-	-	-	-
PAN 1623 R	3534	3888	2743	2304	3858	3835	2140	3227	-	-	-	-	-	-	-
LS 6862 R	4760	5331	2185	1889	3868	4724	2910	3602	-	-	-	-	-	-	-
SSS 6560 (tuc)	3832	4238	2290	1934	3297	3794	2723	3360	-	-	-	-	-	-	-
NS 6267 R	4599	4279	2015	2197	4078	3298	2660	3529	-	-	-	-	-	-	-
DM 6402 RSF	4098	3663	2258	2209	4153	3522	1423	3263	-	-	-	-	-	-	-
Gem/Mean	4014	4285	2138	2047	3583	3806	1914	3333	3892	4790	4818	2100	3331	1766	3397

Table 23 Opbrengswaarskynlikheid (%) van kultivars geëvalueer in 2016/17, 2017/18 en 2018/19 vir die warm besproeiings produksiegebiede by verskillende opbrengspotensiaal
Table 23 Yield probability (%) of cultivars in the 2016/17, 2017/18 and 2018/19 for the warm irrigation production areas at different yield potentials

Kultivar	Opbrengspotensiaal/Yield potential (t/ha)						
Cultivar	1,5	2.0	2,5	3.0	3,5	4.0	4,5
LS6248R	43	42	43	44	45	47	49
DM5953RSF	91	88	83	73	58	40	26
SSS5449(tuc)	44	43	41	40	39	39	39
PAN1532R	9	8	7	6	7	9	14
SSS5052(tuc)	14	16	21	29	42	55	68
PAN1521R	94	94	93	89	83	71	57
DM5302RSF	37	37	38	39	42	44	48
NS5909R	23	23	23	23	26	30	36
P61T38R	78	78	78	76	73	67	61
LS6161R	2	3	6	15	39	68	87
SSS6560(tuc)	7	10	18	32	56	77	89
DM6663RSF	57	57	56	55	53	51	49
NS6448R	38	37	36	35	36	37	40
P64T39R	51	54	60	65	71	74	77
DM6.8iRR	87	85	82	75	66	52	41

Tabel 24 Graanopbrengs (kg/ha^{-1}) van kultivars gedurende die 2017/18 en 2018/19 groeiseisoen ten opsigte van die verskillende lokaliteite wat in die warm produksiegebiede geleë is
Table 24 Grain yield (kg/ha^{-1}) of cultivars during the 2017/18 and 2018/19 growing season for the various localities situated in the warm production areas

Kultivar Cultivar	2017/18				2018/19			
	Brits K2	Groblersdal Agricol	Marble Hall	Gem/Mean	Brits K2	Groblersdal-Agricol	Marble Hall	Gem/Mean
LS 6248 R	2629	3397	4812	3613	3578	3716	3212	3502
DM 5953 RSF	2957	3015	3750	3240	3678	4492	4301	4157
SSS 5449 (tuc)	2729	3133	4591	3484	4366	2833	3091	3430
NS 5009 R	2507	3235	5073	3605	2980	4194	3083	3419
NS 5258 R	2294	2356	5353	3334	3763	4242	3360	3788
PAN 1532 R	2443	2737	4404	3195	3323	2919	3728	3323
LDC 5.3	-	-	-	-	3916	3952	3599	3822
DM 5351 RSF	2776	3258	4840	3624	3933	3900	3751	3861
SSS 5052 (tuc)	2609	3174	4796	3526	4197	4386	3667	4083
NA 5509 R	3080	4627	4261	3989	3282	4683	3551	3838
LS 6851 R	2939	2330	4504	3258	3603	3770	3630	3667
PAN 1521 R	3458	3580	5109	4049	3848	4592	3497	3979
DM 5302 RSF	2748	2780	5164	3564	3570	3825	3090	3495
NS 5909 R	2977	3325	4608	3637	3797	3854	3815	3822
LDC 5.9	-	-	-	-	3828	4027	3846	3901
DM 5901 RSF	-	-	-	-	3374	4158	3350	3627
LS 6860 R	3026	3608	4484	3706	3385	4039	2240	3222
LS 6164 R	-	-	-	-	3207	4514	3531	3751
P61T38 R	3971	4187	5001	4386	2523	4257	3583	3455
LS 6161 R	2572	3215	5082	3623	3263	4132	3447	3614
SSS 6560 (tuc)	2700	4060	5126	3962	3225	4382	3825	3811
Y 627	2333	3716	4130	3393	3740	4121	3652	3838
DM 6663 RSF	3517	4032	4239	3930	4111	4239	3506	3952
NS 6448 R	3580	3624	4624	3943	4319	3910	2724	3651
P64T39 R	3767	3875	5439	4360	3482	4601	3890	3991
Y 657	2692	5035	5105	4277	3666	4229	3948	3948
PAN 1644 R	-	-	-	-	3448	4233	3323	3668
PAN 1653 R	-	-	-	-	3704	4189	3702	3865
LS 6868 R	2888	2766	4711	3455	4060	2786	2991	3279
DM 6.8i RR	3439	3766	4361	3855	3735	3855	3474	3688
DM 6968 RSF	-	-	-	-	3655	3454	4180	3763
P71T74 R	-	-	-	-	4652	4334	3648	4211
PAN 1454 R	2964	2139	4497	3200	-	-	-	-
PHB 94 Y 80 R	2750	1951	4372	3024	-	-	-	-
P48T48 R	2606	1880	4502	2996	-	-	-	-
Y 540	2481	2161	5169	3270	-	-	-	-
Y 550	2194	3245	4256	3232	-	-	-	-
DM 5609 RSF	2078	3115	4849	3347	-	-	-	-
PHB 96 T 06 R	2987	3627	4039	3551	-	-	-	-
PAN 1623 R	3091	4463	4715	4090	-	-	-	-
LS 6862 R	2386	4618	4718	3907	-	-	-	-
NS 6267 R	2582	3427	4532	3514	-	-	-	-
DM 6402 RSF	2398	3782	4706	3629	-	-	-	-
Gem/Mean	2833	3350	4683	3622	3663	4026	3507	3732

Tabel 25 Saamgevatte inligting van al die lokaliteite vir koeler produksiegebiede, 2018/19

Table 25 Summarised information for all the localities for cooler production areas, 2018/19

Kultivar/Cultivar	Dae tot blom/ Days to flowe-ring	Fisiologies ryp/ Physiological mature	Oes datum/ Harvest date	Planthoog te/ Plant height	Peulhoog te/ Pod height	Omval/ Lod-ging	Groenstam/ Green stem	Oopspring/ Shattering	Planttelling/ Number of plants	Persentasie ongewenste sade/Percentage undesirable seed	Massa 100 sade/ Mass 100 seeds	Olie persen-tasie/Oil percentage	Ru-proteïen-persentasie/ Crude protein percentage	Opbrengs/ Yield
P48T48 R	62	132	154	62	7	1,42	1,93	1,33	228	0,34	18,13	19,10	40,79	2939
LS 6248 R	69	143	163	92	11	1,67	1,53	1,00	270	0,43	13,93	19,31	38,50	2997
DM 5953 RSF	65	132	158	74	7	1,25	1,40	1,33	250	0,24	15,38	19,11	40,66	3367
SSS 5449 (tuc)	77	141	162	83	8	1,33	1,47	1,00	226	0,39	13,64	19,84	39,69	3054
NS 5009 R	65	139	155	66	5	1,33	1,07	1,00	104	0,23	16,55	18,09	41,78	2598
NS 5258 R	64	134	158	69	5	1,42	1,27	1,33	187	0,28	14,87	19,17	40,72	2834
PAN 1532 R	77	148	167	74	8	1,33	1,40	1,00	260	0,18	14,86	19,04	40,19	3242
LDC 5.3	76	151	167	84	9	1,67	1,53	1,00	221	0,39	14,77	19,74	39,33	3458
DM 5351 RSF	66	132	154	79	6	1,42	1,93	1,67	219	0,48	15,45	19,68	39,41	3641
Y 540	79	139	168	62	5	1,00	1,75	1,00	29	0,03	14,66	20,98	37,55	1854
SSS 5052 (tuc)	77	148	169	90	10	1,75	1,33	1,00	229	0,22	13,99	20,09	38,80	3306
NA 5509 R	81	144	169	91	9	1,75	1,33	1,00	232	0,19	15,18	18,46	38,42	3331
LS 6851 R	72	145	165	75	9	1,33	1,33	1,00	260	0,42	14,10	20,69	37,86	3484
PAN 1521 R	77	138	163	92	9	1,67	1,33	1,00	276	0,56	15,75	18,50	40,71	3429
DM 5302 RSF	76	150	166	77	8	1,50	1,47	1,33	223	0,03	15,76	18,53	42,34	3546
NS 5909 R	81	159	168	92	12	1,75	2,20	1,00	279	0,26	15,69	19,47	40,12	3262
LDC 5.9	76	151	168	96	10	1,83	1,60	1,00	222	0,38	16,83	18,74	40,79	3783
DM 5901 RSF	78	147	169	84	9	1,67	1,80	1,00	218	0,41	15,41	20,61	37,01	3400
LS 6860 R	79	156	172	105	13	1,92	1,80	1,00	214	0,18	16,97	19,10	39,09	3157
LS 6164 R	74	151	171	101	11	1,75	1,93	1,00	241	0,44	14,40	18,51	39,21	3275
P61T38 R	71	149	166	73	11	1,42	1,73	1,00	263	0,36	15,10	18,73	40,24	3153
Y 605	-	-	-	-	-	-	-	-	-	0,00	-	-	-	-
LS 6161 R	77	159	168	97	12	1,75	1,87	1,00	266	0,27	14,70	19,42	39,63	3352
NS 6448 R	79	151	168	87	10	1,75	1,40	1,00	255	0,40	14,93	20,02	38,46	3409
P64T39 R	82	161	173	99	12	1,75	1,73	1,00	244	0,34	15,75	18,63	39,63	3922
PAN 1644 R	80	159	167	87	12	1,75	1,93	1,00	228	0,23	15,26	18,60	41,65	3425
PAN 1653 R	82	158	167	79	11	1,75	1,40	1,00	279	0,60	15,53	20,02	37,54	3178
LS 6868 R	85	164	172	97	13	1,50	1,27	1,00	160	0,57	14,60	18,62	40,56	3146
Gem/Mean	75	147	165	84	9	1,57	1,58	1,07	225	0,32	15,27	19,29	39,65	3242

Tabel 26 Saamgevatte inligting van al die lokaliteite vir matige produksiegebiede, 2018/19

Table 26 Summarised information for all the localities for moderate production areas, 2018/19

Kultivar/Cultivar	Dae tot blom/ Days to flowe-ring	Fisiologies ryp/ Physiological mature	Oes datum/ Harvest date	Planthoogte/ Plant height	Peulhoogte/ Pod height	Omval/ Lod-ging	Groenstam/ Green stem	Oopspring/ Shattering	Planttelling/ Number of plants	Persentasie ongewenste sade/Percentage undesirable seed	Massa 100 sade/ Mass 100 seeds	Olie persen-tasie/Oil percentage	Ru-proteïen-persentasie/ Crude protein percentage	Opbrengs/ Yield
P48T48 R	48	125	147	52	6	1,00	1,93	1,00	230	0,53	21,24	20,48	42,34	3099
LS 6248 R	59	127	150	80	10	1,00	1,56	1,20	237	0,11	16,01	21,08	40,42	3167
DM 5953 RSF	49	127	145	65	6	1,00	1,17	1,20	250	0,23	16,79	22,07	40,38	3200
SSS 5449 (tuc)	57	122	146	77	8	1,00	1,33	1,20	243	0,07	15,27	22,00	41,15	3217
NS 5009 R	49	118	147	62	6	1,00	2,00	1,20	173	0,02	19,40	19,49	42,67	2845
NS 5258 R	53	120	146	65	5	1,00	1,22	1,20	198	0,43	16,83	21,07	43,07	3256
PAN 1532 R	54	123	149	73	8	1,00	1,39	1,00	248	0,13	16,90	20,93	40,53	3587
LDC 5.3	54	125	151	72	7	1,39	1,39	1,00	237	0,17	16,51	21,24	40,90	3315
DM 5351 RSF	49	121	144	74	7	1,00	2,00	1,20	211	0,27	18,03	21,32	40,11	3535
SSS 5052 (tuc)	59	128	153	86	12	1,00	1,61	1,00	252	0,16	15,63	20,70	40,67	3450
NA 5509 R	62	131	155	82	12	1,00	1,72	1,00	242	0,35	17,57	21,18	40,91	3661
LS 6851 R	57	127	153	57	8	1,00	1,56	1,00	231	0,25	15,83	21,25	40,66	3525
PAN 1521 R	61	126	150	86	11	1,11	1,33	1,00	246	0,59	18,32	20,86	41,92	3497
DM 5302 RSF	53	120	145	67	8	1,00	1,39	1,20	239	0,28	17,37	19,84	43,67	3223
NS 5909 R	60	127	156	82	14	1,00	1,72	1,07	245	0,23	18,12	20,80	41,31	3588
LDC 5.9	60	120	155	81	8	1,83	1,33	1,00	212	0,21	18,87	20,96	41,37	3842
DM 5901 RSF	62	130	155	73	9	1,00	1,56	1,00	212	0,22	17,38	22,29	38,51	3664
LS 6860 R	64	132	157	96	13	1,44	1,94	1,00	241	0,35	18,83	23,28	39,97	3310
LS 6164 R	61	128	156	89	13	1,72	2,06	1,00	252	0,40	16,85	20,10	42,26	3425
P61T38 R	62	128	156	58	11	1,00	1,78	1,00	237	0,14	17,14	20,11	43,07	3585
Y 605	65	127	143	46	3	1,00	1,00	1,00	196	0,04	17,01	-	-	1832
LS 6161 R	61	137	156	84	12	1,06	1,72	1,00	230	0,12	16,44	21,48	40,76	3402
Y 627	62	130	157	90	10	1,33	1,72	1,00	243	0,40	17,21	19,98	40,94	3667
DM 6663 RSF	66	124	157	95	13	1,56	2,06	1,00	236	0,39	18,75	19,56	41,61	3315
NS 6448 R	65	132	155	76	12	1,00	1,39	1,20	262	0,38	16,30	20,72	41,59	3772
P64T39 R	64	130	156	86	10	1,28	1,67	1,00	256	0,25	17,72	20,42	40,90	3813
Y 657	65	137	156	82	9	1,22	1,17	1,00	230	0,11	15,43	19,56	41,59	3739
PAN 1644 R	63	138	157	82	9	1,50	1,61	1,00	247	0,16	16,72	20,32	41,69	3492
PAN 1653 R	65	134	157	66	11	1,00	1,06	1,00	245	0,12	17,64	21,11	40,12	3566
LS 6868 R	63	144	158	81	12	1,00	1,44	1,00	217	0,19	15,48	21,22	40,71	2936
DM 6.8i RR	64	143	158	98	13	1,61	1,72	1,00	229	0,28	18,47	19,99	39,09	3479
P71T74 R	65	146	158	94	14	1,11	1,94	1,00	238	0,02	17,95	19,32	40,75	3709
Gem	59	129	153	77	10	1,16	1,58	1,05	233	0,24	17,31	20,79	41,15	3397

Tabel 27 Saamgevatte inligting van al die lokaliteite vir warmer produksiegebiede, 2018/19

Table 27 Summarised information for all the localities for warmer production areas, 2018/19

Kultivar/Cultivar	Dae tot blom/ Days to flowe-ring	Fisiologies ryp/ Physiological mature	Oes datum/ Harvest date	Planthoogte/ Plant height	Peulhoogte/ Pod height	Omval/ Lod-ging	Groenstam/ Green stem	Oopspring/ Shattering	Planttelling/ Number of plants	Persentasie ongewenste sade/Percentage undesirable seed	Massa 100 sade/ Mass 100 seeds	Olie persen-tasie/Oil percentage	Ru-proteïen-persentasie/ Crude protein percentage	Opbrengs/ Yield
LS 6248 R	42	109	119	97	17	1,00	1,00	3,00	302	0,20	15,65	22,77	39,67	3502
DM 5953 RSF	37	110	119	87	10	1,00	1,00	2,00	308	0,39	16,74	22,52	40,32	4157
SSS 5449 (tuc)	43	107	119	86	13	1,00	1,00	3,00	310	0,00	15,10	22,55	40,93	3430
NS 5009 R	40	113	119	94	13	1,00	1,00	1,00	309	0,34	18,72	20,52	41,28	3419
NS 5258 R	39	111	119	105	24	1,00	1,00	3,00	308	0,31	15,70	21,15	41,14	3788
PAN 1532 R	43	111	119	70	14	1,00	1,00	2,00	304	0,00	14,75	21,04	40,52	3323
LDC 5.3	44	114	119	97	17	1,00	1,00	3,00	300	0,00	17,57	21,83	41,36	3822
DM 5351 RSF	36	110	119	85	9	1,00	2,00	2,00	289	1,29	17,09	22,48	38,71	3861
SSS 5052 (tuc)	49	116	119	107	24	1,00	1,00	1,00	287	0,42	16,67	20,81	40,55	4083
NA 5509 R	49	117	126	110	18	2,00	1,00	1,00	279	0,00	17,20	21,77	42,01	3838
LS 6851 R	45	113	119	75	6	1,00	1,00	2,00	278	0,00	15,12	21,74	40,27	3667
PAN 1521 R	47	117	126	106	28	1,00	1,00	1,00	275	0,61	17,14	20,82	40,62	3979
DM 5302 RSF	45	112	119	83	13	1,00	1,00	2,00	274	0,00	17,58	19,94	43,44	3495
NS 5909 R	51	120	126	97	24	1,00	1,00	2,00	290	0,55	16,50	21,09	40,74	3822
LDC 5.9	50	115	119	104	18	1,00	1,00	2,00	301	0,28	18,47	21,88	40,63	3901
DM 5901 RSF	49	114	119	82	7	1,00	1,00	2,00	316	0,00	17,49	22,48	39,63	3627
LS 6860 R	48	119	126	122	32	1,00	1,00	1,00	312	0,13	18,84	21,80	39,39	3222
LS 6164 R	51	116	126	122	32	1,00	1,00	2,00	304	1,35	16,25	21,04	40,76	3751
P61T38 R	52	122	133	74	9	1,00	1,00	1,00	300	0,54	17,26	20,34	41,21	3455
LS 6161 R	51	121	126	104	22	1,00	1,00	2,00	299	0,33	16,55	21,09	41,36	3614
SSS 6560 (tuc)	50	120	126	111	30	1,00	2,00	1,00	304	0,87	16,85	21,13	41,28	3811
Y 627	49	122	133	114	13	1,00	1,00	1,00	306	0,00	16,40	21,31	39,86	3838
DM 6663 RSF	52	121	126	112	8	1,00	1,00	1,00	297	4,75	17,94	19,54	40,46	3952
NS 6448 R	52	119	126	97	26	1,00	1,00	3,00	287	0,00	16,32	20,80	41,15	3651
P64T39 R	52	119	126	113	32	1,00	1,00	2,00	273	0,20	16,54	21,14	41,05	3991
Y 657	54	122	133	117	31	1,00	1,00	2,00	272	0,00	15,98	19,93	40,60	3948
PAN 1644 R	54	122	133	121	29	1,00	1,00	1,00	270	0,50	17,28	20,46	41,60	3668
PAN 1653 R	49	122	133	84	22	1,00	1,00	2,00	273	0,00	17,77	22,14	39,26	3865
LS 6868 R	53	120	126	92	23	1,00	1,00	2,00	277	0,00	15,98	22,26	40,92	3279
DM 6.8i RR	54	123	133	130	29	1,00	1,00	1,00	282	1,06	18,53	21,54	39,80	3688
DM 6968 RSF	55	124	133	123	26	1,00	1,00	1,00	286	6,22	20,24	21,34	41,93	3763
P71T74 R	56	126	133	122	27	1,00	1,00	1,00	296	0,57	18,22	19,81	40,64	4211
Gem	48	117	125	101	20	1,03	1,06	1,75	293	0,65	17,01	21,28	40,72	3732

DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES

NO. R. 370 **21 APRIL 2017**

AGRICULTURAL PRODUCT STANDARDS ACT, 1990
(ACT No. 119 OF 1990)

REGULATIONS RELATING TO THE GRADING, PACKING AND MARKING OF SOYA BEANS INTENDED FOR SALE IN THE REPUBLIC OF SOUTH AFRICA

The Minister of Agriculture, Forestry and Fisheries has under section 15 of the Agricultural Product Standards Act, 1990 (Act No. 119 of 1990) --

(a) made the regulations in the Schedule;

(b) determined that the said regulations shall come into operation on date of publication; and

(c) read together with section 3(2) of the said Act, repealed the Regulations published by Government Notice No. R478 of 20 June 2014.

SCHEDULE

Definitions

1. In these regulations any word or expression to which a meaning has been assigned in the Act, shall have that meaning and, unless the context otherwise indicates --

"animal filth" means dead rodents, dead birds and dung;

"bag" means bag manufactured from --

(a) jute or phormium or a mixture of jute and phormium; or

(b) polypropylene that complies with SABS specification CKS632 1246: 2012;

"bulk container" means any vehicle or container in which bulk soya beans is transported or stored;

"consignment" means --

(a) a quantity of soya beans of the same class, which belongs to the same owner, delivered at any one time under cover of the same consignment note, delivery note or receipt note, or delivered by the same vehicle or bulk container, or loaded from the same bin of a grain elevator or from a ship's hold; or

(b) in the case where a quantity referred to in paragraph (a), is subdivided into different grades, each such quantity of each of the different grades.

"container" means a bag or a bulk container;

"defective soya beans" means soya beans and pieces of beans which --

(a) have been damaged by frost, heat or weather conditions;

(b) have been visibly damaged by insects;

(c) are contaminated by moulds or infected by plant diseases;

(d) have a distinctly immature form or which are covered with a whitish membrane or where the testa have a green discolouration; and

(e) when the testa is removed, display discolouration, excluding green discolouration:

Provided that soya beans which were damaged by insects in the green pod stage and of which the discolouration as a result of the damaged is not larger half of the surface of the soya beans, shall not be deemed as defective soya beans;

"foreign matter" means all matter that --

(a) pass through the 1,8 mm slotted screen during the sieving process (including soya beans and pieces of soya beans);

(b) that do not pass through the 1,8 mm slotted screen other than soya beans, glass, coal, dung, sclerotia or metal (including loose seed coats of soya bean as well as pods and parts of pods);

"frost damaged" soya beans with green to green brown seed-lobes with a waxy appearance;

"heat damaged" soya beans with light to dark brown seed-lobes in a cross section;

"insect" in relation to soya beans, means any live insect which is injurious to stored soya beans, irrespective of the stage of development of the insect;

"mould infected soya beans " means soya beans that is shrivelled and deformed in appearance with a colour that varies from medium to dark brown, whereby the parts of infected beans covered in mould;

"other grains" grains or pieces of grains of wheat, barley, oats, triticate, maize, rye and sorghum;

"pods" all whole or damaged soya bean pods;

"poisonous seeds" mean seeds or part of seeds of plant species that in terms of the foodstuffs, cosmetics and disinfectants Act No. 54 of 1972, may present a hazard to human or animal health when consumed, including seeds of *Argemone mexicana L, Convolvulus spp., Crotalaria spp., Datura spp., Ipomoea spp., Lolium temulentum, Ricinus communis* or *Xanthium spp.;*

"sclerotia" *Sclerotinia sclerotiorum* is a fungus that produces hard masses of fungi tissue, known as sclerotia. The sclerotia vary in size and form and consist of dark exterior, a white interior and rough surface texture;

"soiled soya beans" means whole soya beans which do not pass through the 4,75 mm screen and which are discoloured by soil or any other substances: Provided that if the discolouration is caused by plant material such as soya beans shall not be regarded as soiled soya beans;

"soya beans" means the threshed seed or pieces of seeds of the plant *Glycine max* and where the word "soya beans" is used in conjunction with the word "consignment", it includes matter other than soya beans that is included in a consignment;

"the Act" means the Agricultural Product Standards Act No. 119 of 1990;

"the 1,8 mm slotted screen" means a sieve --

(a) with a flat bottom of metal sheet of 1,0 mm thickness with apertures 12,7 mm long and 1,8 mm wide with rounded ends. The spacing between the slots in the same row must be 2,43 mm wide and the spacing between the rows of slots must be 2,0 mm wide. The slots must be alternately oriented with a slot always opposite the solid inter segment of the next row of slots;

(b) of which the upper surface of the sieve is smooth;

(c) with a round frame of suitable material with an inner diameter of between 300 mm and 310 mm maximum and at least 50 mm high; and

(d) that fits onto a tray with a solid bottom and must be at least 20 mm above the bottom of the tray.

"the 4,75 mm round-hole screen" means a sieve --

(a) with a flat metal sheet of 1,0 mm thickness perforated with round holes of 4,75 mm in diameter that are arranged with the centres of holes at the points of intersection of an equilateral triangular grid with a pitch of 8 mm;

(b) of which the upper surface of the sieve is smooth;

(c) the frame of which is at least 40 mm high;

(d) with the inner width of at least 200 mm and the inner length of at least 300 mm. or, in the case of a circular sieve, the inner diameter of at least 278 mm; and

(e) that fits into a tray with a solid bottom; and not less than 20 mm above the bottom of the tray.

"wet pods" all whole or damaged soya bean pods with a moisture content higher than the permissible moisture content.

Restriction on sale of soya beans

2. (1) No person shall sell soya beans in the Republic of South Africa --

(a) unless the soya beans are sold according to the classes set out in regulation 3;

(b) unless the soya beans comply with the standards for the class concerned set out in regulation 4;

(c) unless the soya beans, where applicable, comply with the grades of soya beans and the standards for grades set out in regulation 5 and 6 respectively;

d) unless the soya beans are packed in accordance with the packing requirements set out in regulation 7;

(e) unless the container or sale documents, as the case may be, are marked in accordance with the marking requirements set out in regulation 8; and

(f) if such soya beans contain a substance that renders it unfit for human or animal consumption or for processing into or thereof as food or feed.

(2) The Executive Officer may grant written exemption, entirely or partially to any person on such conditions as he or she may deem necessary, from the provision of subregulation (1): Provided that such exemption is done in terms of section 3(1) (c) of the Act.

PART I

QUALITY STANDARDS

Classes of soya beans

3. There are two classes of soya beans, namely Class SB and Class Other soya beans.

Standards for classes of soya beans

4. (1) A consignment of soya beans shall --

(a) be free from a musty, sour, khaki bush or other undesirable smell or odour;

(b) be free from any substance that renders it unsuitable for human or animal consumption or for processing into or utilisation as food or feed;

(c) contain not more poisonous seeds than permitted in terms of the Foodstuffs, Cosmetics and Disinfectants Act No. 54 of 1972;

(d) be free from glass, metal, coal or dung;

(e) with the exception of Class Other soya beans, be free from insects;

(f) be free from animal filth;

(g) with the exception of Class Other soya beans, have a moisture content of not more than 13 percent; and

(h) shall not exceed the maximum percentage of permissible deviation as determined in the Table in the Annexure for the grade.

(2) A consignment of soya beans is classified as Class SB if it --

(a) consists of any seeds of soya beans; and

(b) complies with the standards for the grade of Class SB soya beans as set out in regulation 5.

(3) A consignment of soya beans is classified as Class Other soya beans if it does not comply with the standards for Class SB.

Grades for soya beans

5. (1) Soya beans of Class SB shall be graded as Grade SB1.

(2) No grades are determined for Class Other soya beans.

Standards for grades of soya beans

6. A consignment of soya beans shall be graded as--

Grade SB1 soya beans if the nature of the deviation, specified in column 1 of Table 1 of the Annexure, in that consignment does not exceed the percentage specified in column 2 of the said table opposite the deviation concerned.

PART II

PACKING AND MARKING REQUIREMENTS

Packing requirements

7. Soya beans of different classes and grades shall be packed in different containers or stored separately.

Marking requirements

8. Each container or the accompanying sales documents of a consignment of soya beans shall be marked or endorsed with the class and grade of the soya beans.

PART III

SAMPLING

Obtaining sample

9. (1) A representative sample of a consignment of soya beans shall --

(a) in the case of soya beans delivered in bags and subject to regulation 10, be obtained by sampling at least ten per cent of the bags, chosen from that consignment at random, with a bag probe: Provided that at least 25 bags in a consignment shall be sampled and where a consignment consists of less than 25 bags, all the bags in that consignment shall be sampled; and

(b) in the case of soya beans delivered in bulk and subject to regulation 10, be obtained by sampling that consignment throughout the whole depth of the layer, in at least six different places, chosen at random in that bulk quantity, with a bulk sampling apparatus.

(2) The collective sample obtained in subregulation (1) (a) or (b) shall --

(a) have a total mass of at least 10 kg; and

(b) be thoroughly mixed by means of dividing before further examination.

(3) If it is suspected that the sample referred to in subregulation (1)(a) is not representative of that consignment, an additional five per cent of the remaining bags, chosen from that consignment at random, shall be emptied into a suitable bulk container and sampled in the manner contemplated in subregulation (1)(b).

(4) If it is suspected that sample referred to in subregulation (1)(b) is not representative of that consignment, an additional representative sample shall be obtained by using an alternative sampling patter, apparatus or method.

(5) A sample taken in terms of these regulations shall be deemed to be representative of the consignment from which it was taken.

Sampling if contents differ

10. (1) If, after an examination of the soya beans taken from different bags in a consignment in terms of regulation 9(1), it appears that the contents of those bags differ substantially --

(a) all the bags in the consignment concerned shall be sampled in order to do such separation;

(b) the bags concerned shall be placed separately; and

(c) each group of bags with similar contents in that consignment shall for the purpose of these regulations be deemed to be a separate consignment.

(2) If, after the discharge of a consignment of soya beans in bulk has commenced, it is suspected that the consignment could be of a grade other than that determined by means of that initial sampling, the discharge shall immediately be stopped and the part of the consignment remaining in the bulk container, as well as the soya beans that are already in the collecting tray, shall be sampled anew with a bulk sampling apparatus or by catching at least 20 samples at regular intervals throughout the whole off-loading period with a suitable container from the stream of grain that is flowing in bulk.

Working sample

11. A working sample shall be obtained by dividing the representative sample of the consignment according to the ICC (International Association of Cereal Chemistry) 101/1 method.

PART IV

INSPECTION METHODS

Determination of undesirable odours, harmful substances, poisonous seeds, glass, metal, coal, dung, insects and animal filth

12. A consignment or a sample of a consignment of soya beans shall be sensorially assessed or chemically analysed in order to determine --

(a) whether it has musty, sour, khaki bush or other undesirable odour;

(b) whether it contains soya beans in which or on which a substance is found, that renders it unfit for human or animal consumption or for processing into or for utilisation as food or feed;

(c) whether it contains poisonous seeds;

(d) whether it contains glass, metal, coal or dung;

(e) whether it contains any insects; and

(f) whether it contains animal filth.

Determination of moisture content

13. The moisture content of a consignment of soya beans may be determined according to any suitable method: Provided that the result thus obtained is in accordance with the maximum permitted for a class 1 moisture meter as detailed in ISO 7700/2 based on result of the 72 hour, 103°C oven dried method [the latest revision of the AACCI ("American Association of Cereal Chemists International) Method 44 - 15A].

Determination of percentage of wet pods

14. The percentage of wet pods in a consignment of soya beans shall be determined as follows:

(a) Obtain a working sample of at least 10 kg of soya beans from a representative sample of the consignment.

(b) Remove all wet pods by hands from the working sample and determine the mass thereof.

(c) Express the mass thus determined as a percentage of the mass of the working sample concerned.

(d) Such percentage represents the percentage of wet pods in the consignment concerned.

Determination of percentage of other grain, sunflower seed, stones, sclerotia and foreign matter

15. The percentage of other grain, sunflower seed, stones, sclerotia and foreign matter in a consignment of soya beans shall be determined as follows:

(a) Obtain working samples of at least 200 g from a representative sample of the consignment.

(b) Place the 1,8 mm slotted screen in the pan and the 4,75 mm round-hole screen on top of the 1,8 mm slotted screen. Place the sample on the 4,75 mm round-hole screen and sieve the sample by moving the sieve 30 strokes to and fro, alternately away from and towards the operator of the sieve, in the same direction as the long axes of the slots of the 1,8 mm screen, which rests on a table or other suitable smooth surface, 250 mm to 460 mm away and towards the operator with each stroke. The prescribed 30 strokes must be completed within 30 to 35 seconds: Provided that the screening process may also be performed in some or other container or an automatic sieving apparatus.

(c) Remove the foreign matter from both sieves by hand and add it to the foreign matter below the 1,8 mm screen in the pan and determine the mass of the foreign matter. Remove all other grain, sunflower seed, stones and sclerotia by hand from the working samples and determine the mass of the other grain, sunflower seed, stones and sclerotia separately.

(d) Express the respective masses thus determined as a percentage of the total mass of the working sample concerned.

(e) Such percentages represent the percentages of other grain, sunflower seed, stones, sclerotia and that of foreign matter in the consignment concerned.

Determination of the percentage defective soya beans

16. The percentage of defective soya beans shall be determined as follows:

(a) Obtain a working sample of at least 100 g soya beans that remain on top of the 4,75 mm round-hole screen after sieving action, which is free of other grain, sunflower, stones, sclerotia and foreign matter, from the representative sample of the consignment.

(b) Sieve the working sample with the 4,75 mm round-hole screen by moving the screen 20 strokes to and fro, alternately away from and towards the operator of the sieve for 20 seconds.

(c) Remove all defective soya beans from the other soya beans on the 4,75 mm round-hole screen by hand.

(d) Determine the mass of the defective soya beans on the 4,75 mm round-hole screen and express it as a percentage of the mass of the working samples concerned.

(e) Such percentage represents the percentage of defective soya beans in the consignment.

Determination of the soya beans and pieces of beans which pass through the 4,75 mm round-hole screen

17. The percentage of soya beans and pieces of soya beans which pass through the 4,75 mm round-hole screen shall be determined as follows:

(a) Determine the mass of the soya beans and pieces of soya beans that pass through the 4,75 mm round-hole screen and remain on top of the 1,8 mm slotted screen from which the other grain, sunflower seed, stones, sclerotia and foreign matter have been removed and express as percentage of the mass of the working sample.

(b) Such percentage represents the percentage soya beans and pieces of soya beans in the consignment which passes through the 4,75 mm round-hole screen and not through a 1,8 mm slotted screen.

Determination of percentage of soiled beans

18. The percentage of soiled soya beans in a consignment of soya beans shall be determined as follows:

(a) Remove all soiled soya beans from the working sample obtained in regulation 17(a) by hand and determine the mass thereof.

(b) Express the mass thus determined, as a percentage of the mass of the working sample obtained in regulation 17(a).

(c) Such percentage represents the percentage of soiled soya beans in the consignment concerned.

PART V

MASS DETERMINATION

19. The mass of soya beans shall be determined by deducting the actual percentage sclerotia, screenings and foreign material found during the inspection process from the total mass of the consignment: Provided that the weighing instruments used for the determination of mass shall comply with the requirements of SANS 1649:2001 published in terms of the Legal Metrology Act No. 09 of 2014 for the specific class of instrument.

PART VI

OFFENCES AND PENALTIES

20. Any person who fails to comply with any provision of these regulations shall be guilty of an offence and upon conviction be liable to a fine or imprisonment in accordance with section 11 of the Act.

ANNEXURE

TABLE

STANDARDS FOR GRADES OF SOYA BEANS

Nature of deviation	*Maximum percentage permissible deviation (m/m)*
	Grade/Graad SB1
1	2
(a) Wet pods	0,2%
(b) Foreign matter, including stones, other grain and sunflower seeds: Provided that such deviations are individually within the limits specified in itmes (c), (d) and (e)	5%
(c) Other grain	0,5%
(d) Sunflower seed	0,1%
(e) Stones	1%
(f) Sclerotia	4%
(g) Soya beans and parts of soya beans above the 1,8 mm slotted screen which pass through the 4,75 mm round-hole screen	10%
(h) Defective soya beans on the 4,75 mm round-hole screen	10%
(i) Soiled soya beans	10%
(j) Deviation in (b) and (f) collectively: Providedthat such deviations are individually within the limits of said items	7%