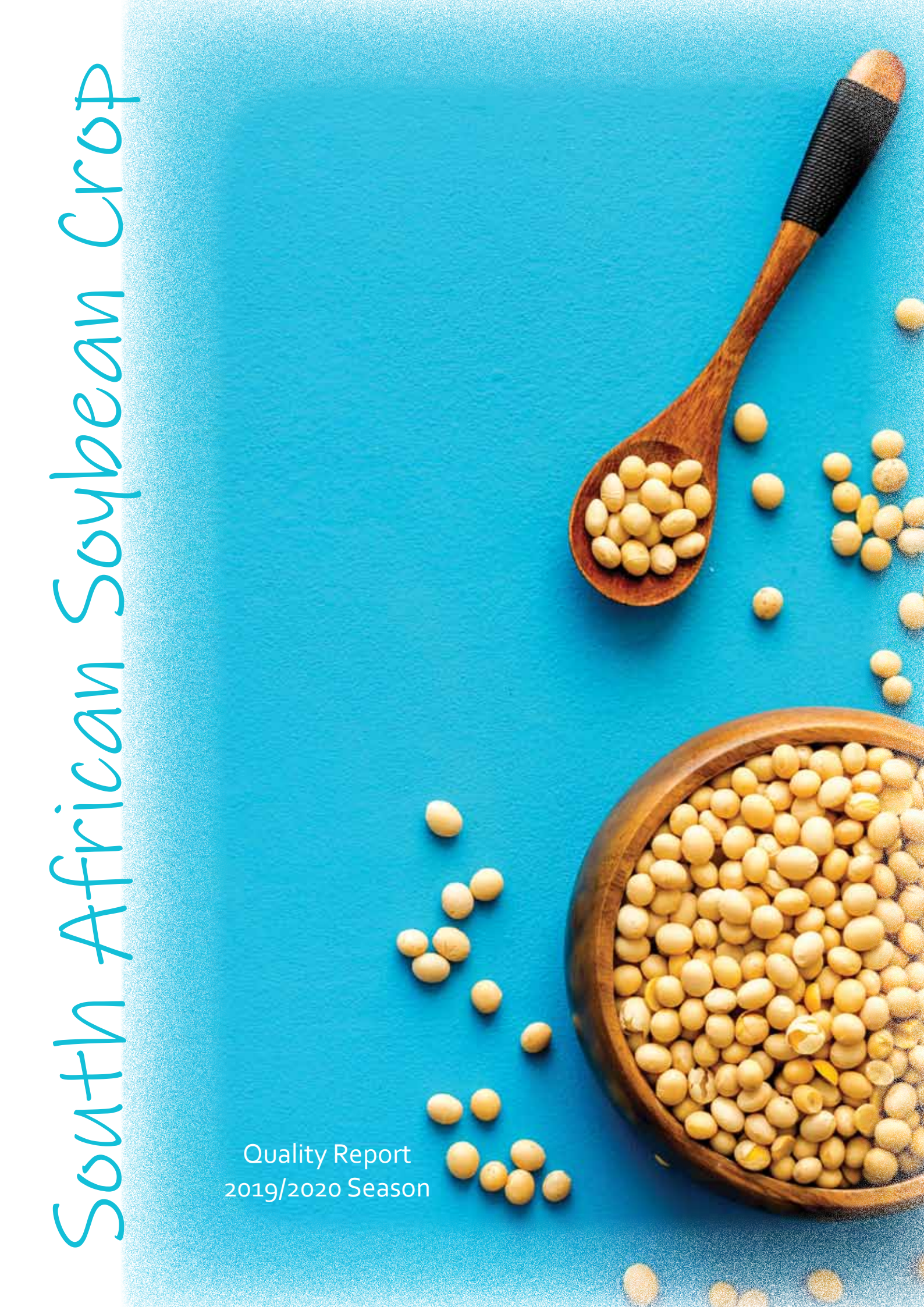
South African Soybean Crop



Quality Report
2019/2020 Season

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South African
COMMERCIAL SOYBEAN QUALITY FOR THE 2019/2020 SEASON

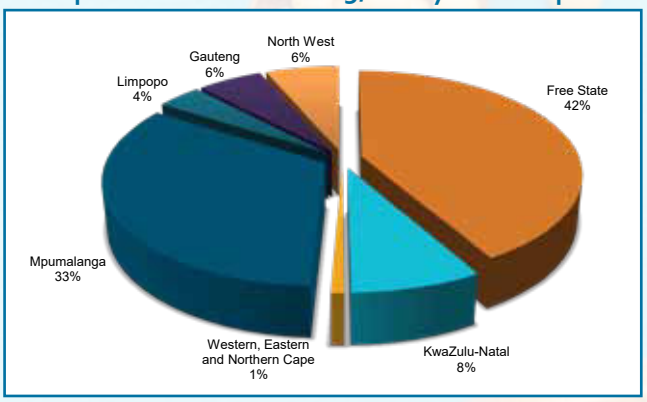
Acknowledgements
With gratitude to:

- ***The Oilseeds Advisory Committee (OAC) as well as the Oil & Protein Seed Development Trust (OPDT) for its financial support in conducting this survey.***
- *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, Land Reform and Rural Development (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 commercial soybean crop figure of the 2019/20 season, as overseen by the National Crop Estimates Liaison Committee (CELC), is 1 245 500 tons and represents a 6% increase (75 155 tons) year on year. The major soybean producing provinces, namely the Free State and Mpumalanga, contributed 75% of the total crop.

Graph 1: Provincial contribution to the production of the 2019/20 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 39. 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 nineth 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 various 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). Hard copy reports are distributed to all Directly Affected Groups and interested parties. The report is also available to read or 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 2019/20 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.

Table 1: Soybean production overview over two seasons

Province	Type of production	2019/20			2018/19		
		Hectares planted, ha	Production, tons	Yield, t/ha	Hectares planted, ha	Production, tons	Yield, t/ha
Western Cape	Dryland	-	-	-	-	-	-
	Irrigation	-	-	-	100	10	0.10
	Total	-	-	-	100	10	0.10
Northern Cape	Dryland	-	-	-	-	-	-
	Irrigation	2 000	7 000	3.50	1 550	5 425	3.50
	Total	2 000	7 000	3.50	1 550	5 425	3.50
Free State	Dryland	304 000	486 750	1.60	292 800	368 350	1.26
	Irrigation	11 000	33 000	3.00	8 200	22 950	2.80
	Total	315 000	519 750	1.65	301 000	391 300	1.30
Eastern Cape	Dryland	1 300	2 300	1.77	1 150	1 380	1.20
	Irrigation	200	700	3.50	-	-	-
	Total	1 500	3 000	2.00	1 150	1 380	1.20
KwaZulu-Natal	Dryland	22 000	56 000	2.55	20 000	47 000	2.35
	Irrigation	13 000	45 500	3.50	13 000	52 000	4.00
	Total	35 000	101 500	2.90	33 000	99 000	3.00
Mpumalanga	Dryland	252 000	390 000	1.55	297 000	470 000	1.58
	Irrigation	8 000	26 000	3.25	13 000	41 500	3.19
	Total	260 000	416 000	1.60	310 000	511 500	1.65
Limpopo	Dryland	2 700	4 350	1.61	2 800	4 980	1.78
	Irrigation	12 800	43 700	3.41	13 400	42 000	3.13
	Total	15 500	48 050	3.10	16 200	46 980	2.90
Gauteng	Dryland	34 000	63 200	1.86	28 500	56 550	1.98
	Irrigation	2 000	7 000	3.50	3 000	9 600	3.20
	Total	36 000	10 200	1.95	31 500	66 150	2.10
North West	Dryland	30 000	51 000	1.70	29 200	27 500	0.94
	Irrigation	10 000	29 000	2.90	6 800	21 100	3.10
	Total	40 000	80 000	2.00	36 000	48 600	1.35
RSA	Dryland	646 000	1 053 600	1.63	671 450	975 760	1.45
	Irrigation	59 000	191 900	3.25	59 050	194 585	3.30
	Total	705 000	1 245 000	1.77	730 500	1 170 345	1.60

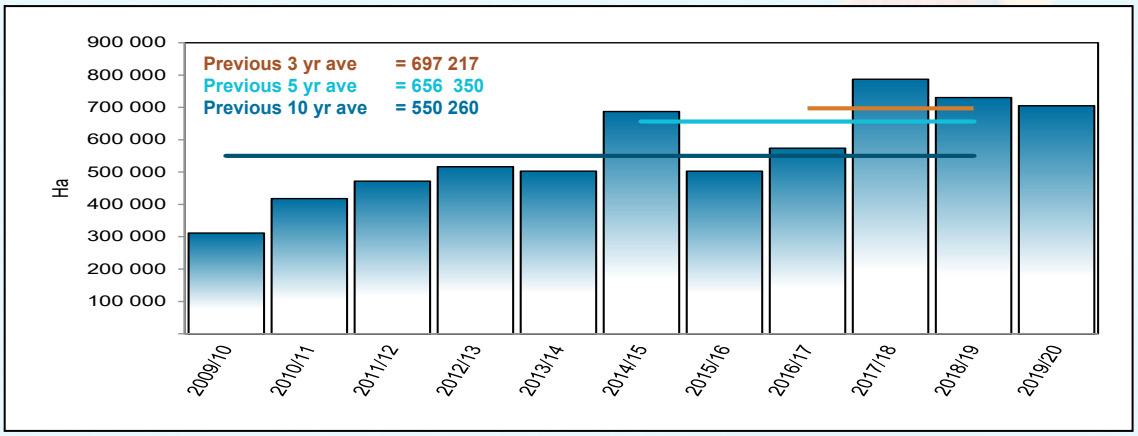
Figures provided by the CEC.

Compared to the 2018/19 production season, the area utilised for commercial soybean crop production decreased by just more than 3% (25 500 hectares). Both the area planted as well as the production figure, are the third highest figures on record. The average national yield increased by almost 11% to 1.77 t/ha.

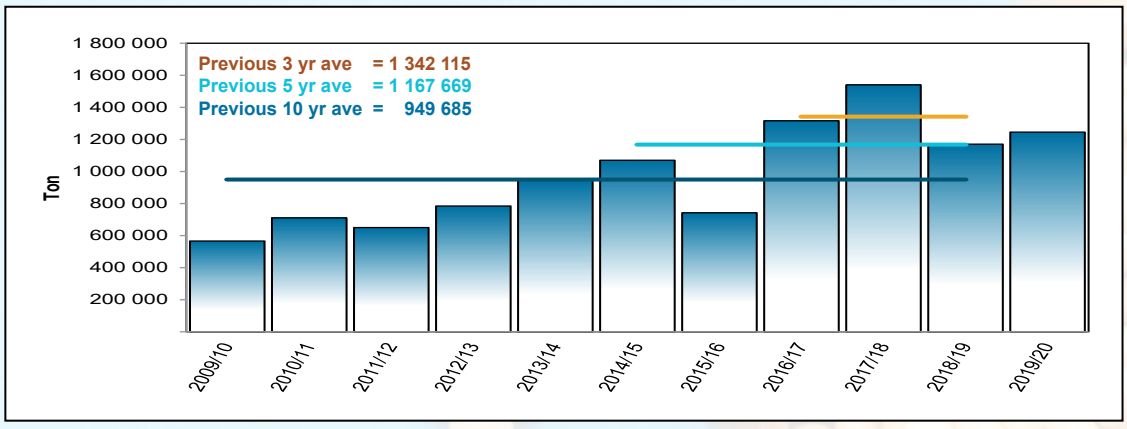
According to the *BFAP Baseline, Agricultural Outlook 2020 – 2029*, the area cultivated to soybeans is projected to continue increasing, expanding by 47% over the ten-year period to 2029. A substantial share of further area expansion is expected in the western regions, traditionally considered to be more marginal with regards to soybean production. The national average yield is nevertheless still projected to increase by 13% relative to the base period, as the introduction of the breeding technology levy, is expected to incentivise seed companies to make the latest technology available to South African producers.

Soybeans account for more than half of the world oilseed production. According to the *World Agricultural Supply and Demand Estimates Report (WASDE – 610)* an estimated 339.00 million metric tons of soybeans were produced during the 2019/20 season. Brazil, the United States and Argentina are the biggest contributors to this total. The world soybean production during the 2020/21 season is projected to be 361.82 million metric tons.

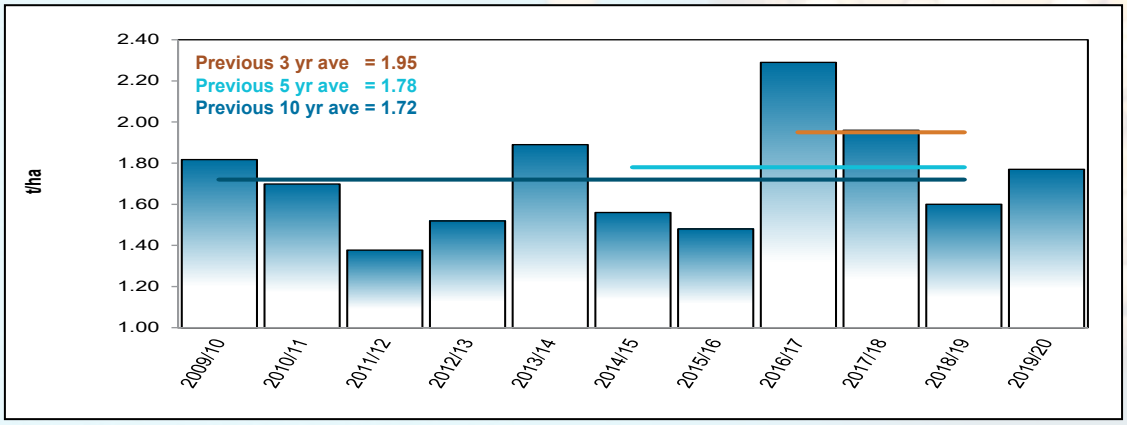
Graph 2: Total RSA area utilised for soybean production from 2009/10 to 2019/20



Graph 3: Soybean production in RSA from 2009/10 to 2019/20

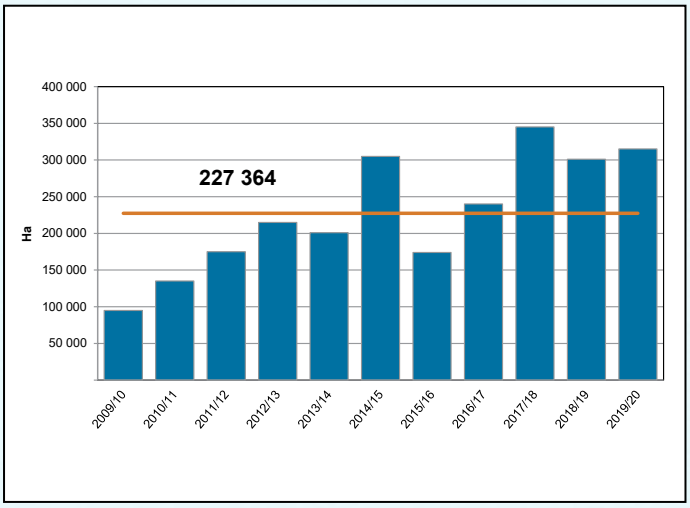


Graph 4: RSA soybean yield from 2009/10 to 2019/20

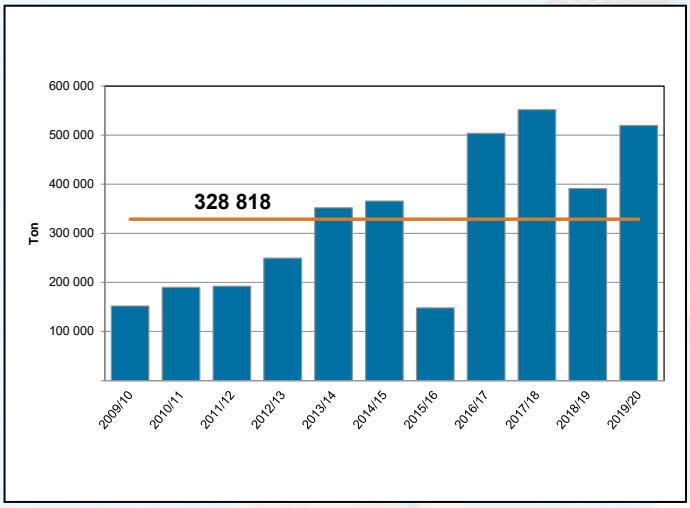


Figures provided by the CEC.

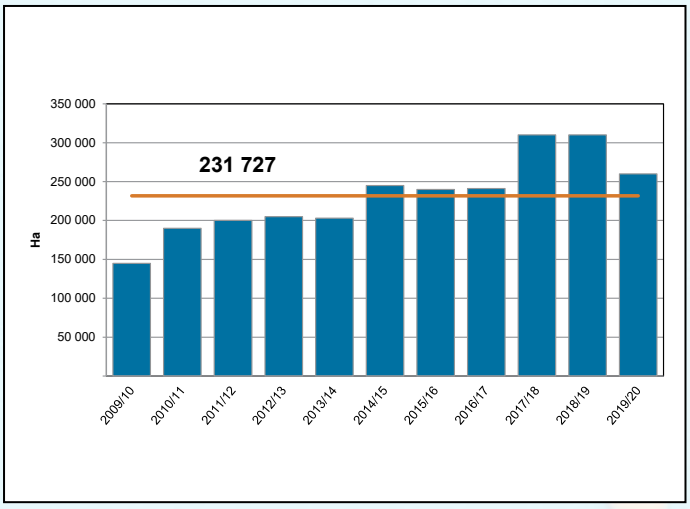
Graph 5: Area utilised for soybean production in the Free State since 2009/10



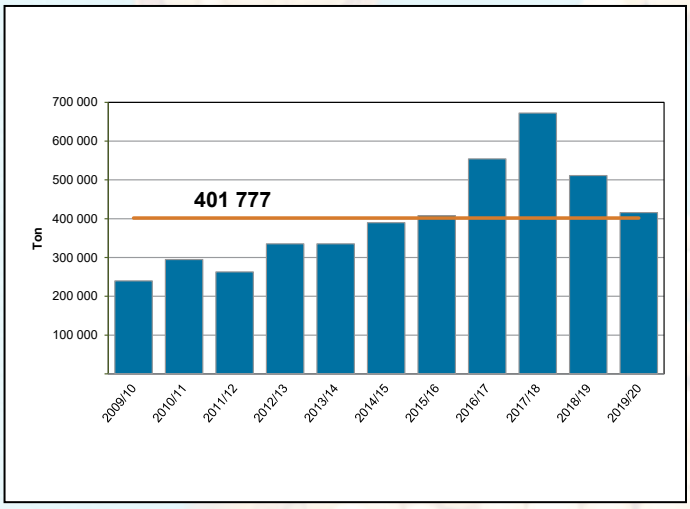
Graph 6: Soybean production in the Free State since 2009/10



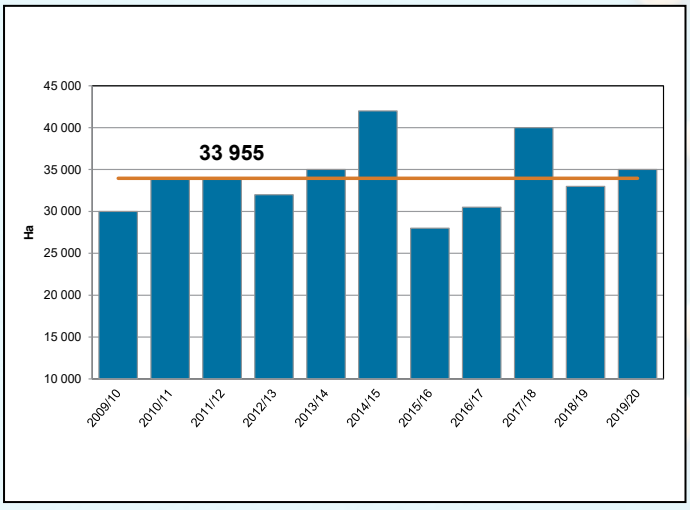
Graph 7: Area utilised for soybean production in Mpumalanga since 2009/10



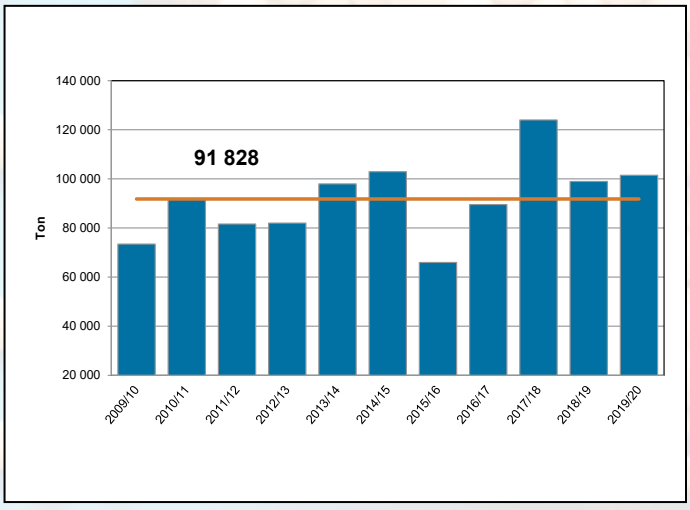
Graph 8: Soybean production in Mpumalanga since 2009/10



Graph 9: Area utilised for soybean production in KwaZulu-Natal since 2009/10



Graph 10: Soybean production in KwaZulu-Natal since 2009/10



Figures provided by the CEC.

Eleven season average

Supply and Demand

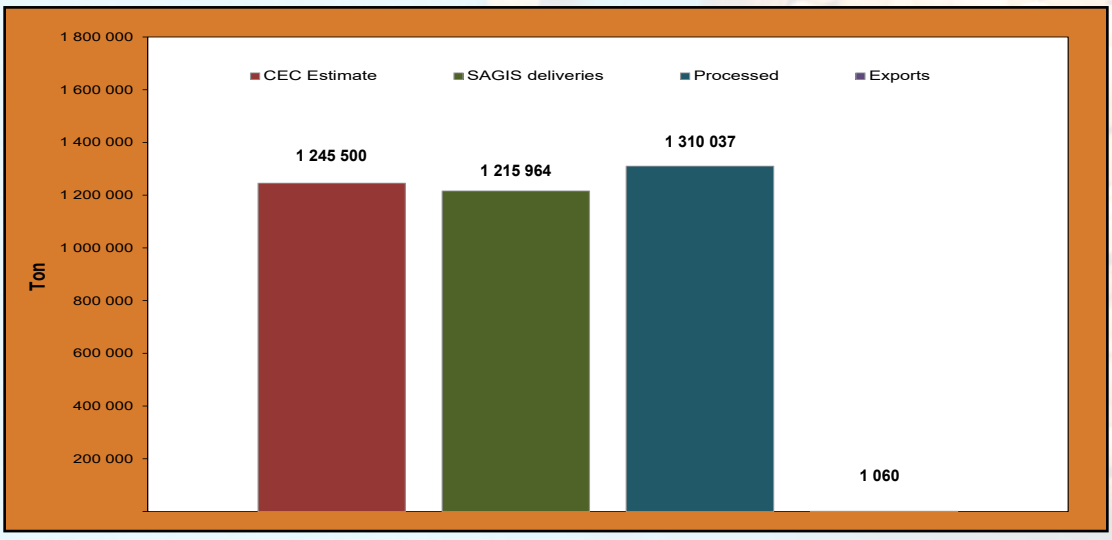
The soybean marketing season dates from March to end of February. According to SAGIS' supply and demand figures for the current marketing season to date (March 2020 to January 2021), the amount of soybeans imported (115 165 tons) increased significantly compared to the 9 098 and 6 945 tons of the previous two seasons. China remains the largest importer of soybeans worldwide, with 98.53 million metric tons during the 2019/20 season, followed by the European Union and the UK.

Of the 1.31 million tons of soybeans processed locally to date, 1.7% was used for human consumption, 10.3% 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 9% less than the total quantity crushed during the previous season and 56% more than the 10-year average. According to *BFAP Baseline*, soybean processing volumes are projected to increase by 63% over the next 10 years.

Over the past decade, the soybean industry has been one of the most dynamic sectors in local agriculture, now maturing, 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, resulting in a total combined capacity of more than 2 million tons. South Africa should therefore have ample capacity to process the projected volumes until 2026, provided that crush margins are sufficient to induce switching of dual plants into soybean crushing. Despite sufficient soybean production to supply an exportable surplus by the end of 2029, the high cost of transportation from SA's summer rainfall regions to the Western Cape in particular, implies that South Africa will continue to import soybean oilcake into the coastal regions. Reducing this cost, by investment in rail infrastructure, would enable South Africa to become self-sufficient. Vegetable oil consumption increased by 43% over the past 10 years but is however projected to increase by only 10% over the coming decade. Between 2007 and 2009 to 2019, soybean oil consumption increased by 17%. This growth is projected to slow to 9% by 2029, relative to the 2017-2019 base period.

1 060 tons of soybeans/products have been exported so far this season compared to the 5 336 and 32 810 tons of the previous two seasons respectively. The 10-year average is 38 746 tons. Globally, soybean exports during the 2019/20 season amounted to an estimated 165.18 million metric tons, with Brazil exporting 56% and the United States 28% of this figure. The projected world soybean exports for the 2020/21 season currently stands at 169.72 million metric tons. Argentina, followed by Brazil and the USA 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 2020 - Jan 2021)



Information provided by SAGIS.

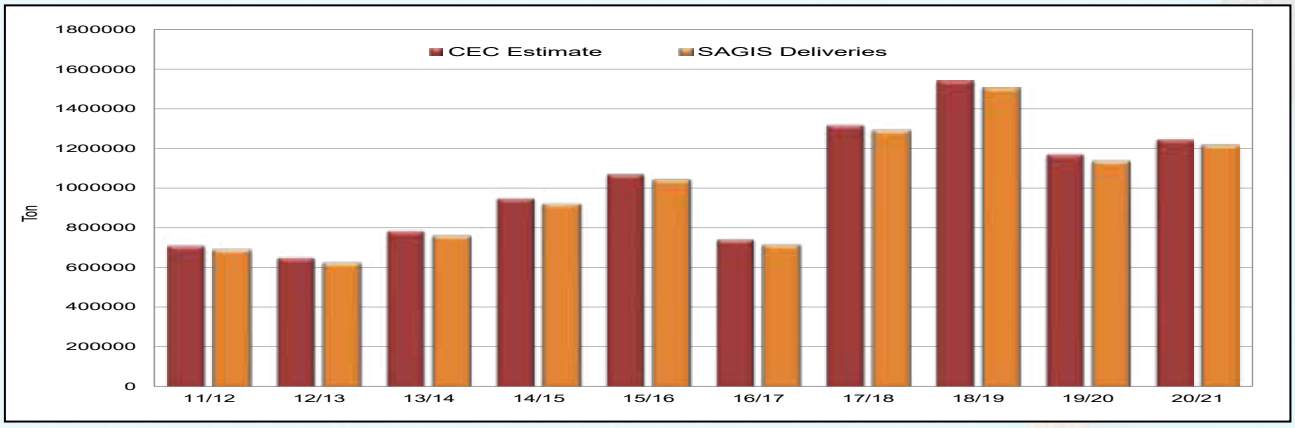
SAGIS South African Grain Information Service
Suid-Afrikaanse Graan Inligtingsdiens

SOYBEANS: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO (TON) — **Publication date: 2021-02-25**

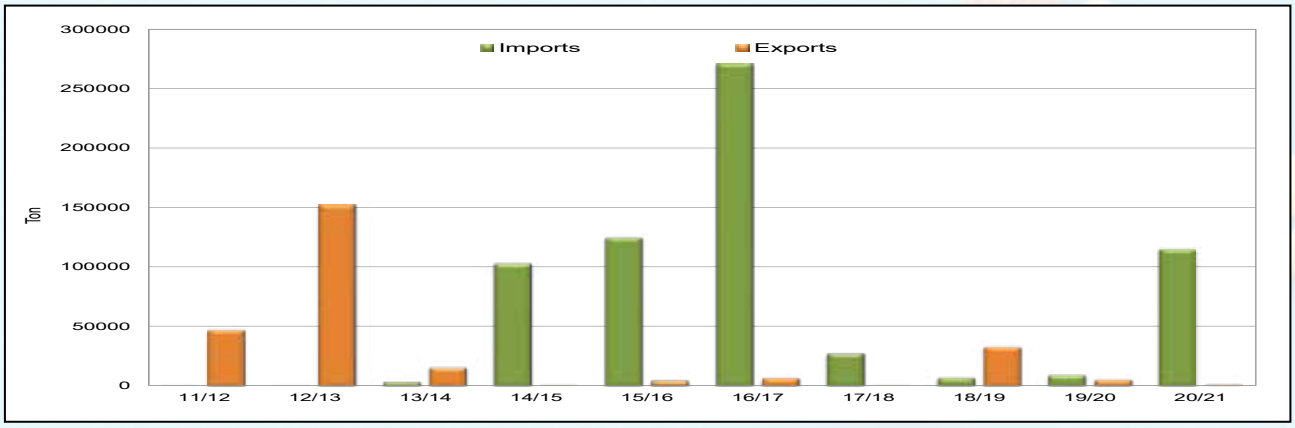
	Season (Mar - Feb)																Current Season Mar - Jan	10 Year average
	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21 *** *** 11	2010/11-2019/20
CEC (Crop Estimate)	220 000	272 500	424 000	205 000	282 000	516 000	566 000	710 000	650 000	784 500	948 000	1 070 000	742 000	1 316 000	1 540 000	1 170 345	1 245 500	949 685
SUPPLY																		
Opening stock (1 Mar)	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	138 455	152 885
Prod deliveries	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	1 135 145	1 215 964	920 669
Imports	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	115 165	54 706
Surplus	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	0	1 606	2 623
Total Supply	**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**	**1 646 484**	**1 471 190**	**1 130 883**
DEMAND																		
Processed	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	1 484 692	1 310 037	917 715
-human	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	23 759	22 008	26 011
-animal feed (full fat soya)	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	191 323	135 373	153 174
-crush (oil/oilcake)	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	1 269 610	1 152 656	738 531
Withdrawn by producers	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	489	2 405
Released to end-consumers	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	367	658	2 036
Seed for planting purposes	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	7 860	6 650
Net receipts(-)/disp(+)	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	1 107	395	1 041
Deficit	2 000	600	0	0	0	0	0	0	0	0	2 782	0	0	0	0	8 097	0	1 088
Exports	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	5 336	1 060	38 746
Total Demand	**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**	**1 507 915**	**1 320 499**	**969 717**
Ending Stock (28 Feb)	**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**	**138 569**	**150 691**	**161 166**
- processed p/month	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	123 724	119 094	76 477
- months' stock	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	1.1	1.3	2

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

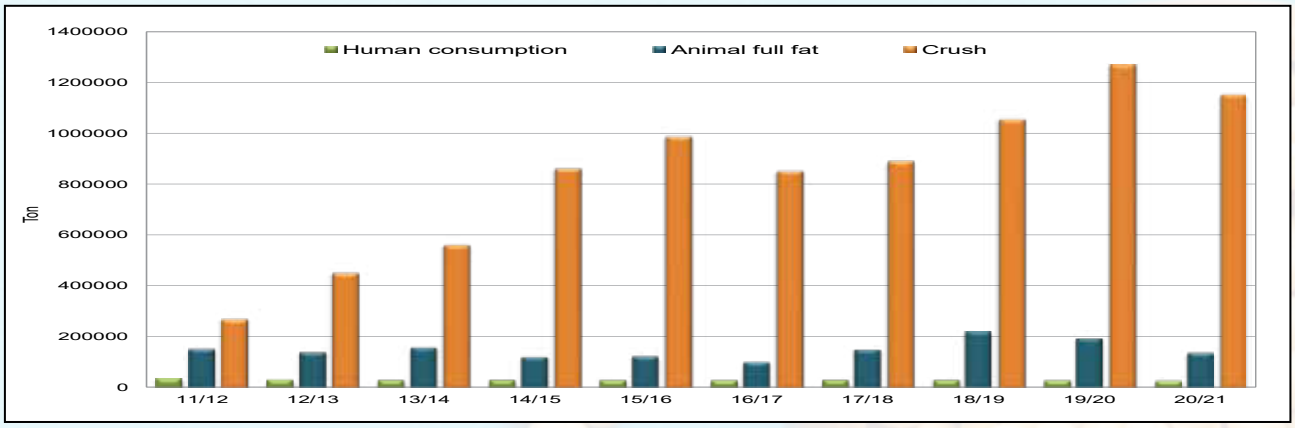
Graph 12: Soybeans: CEC Estimate vs SAGIS deliveries over 10 marketing seasons



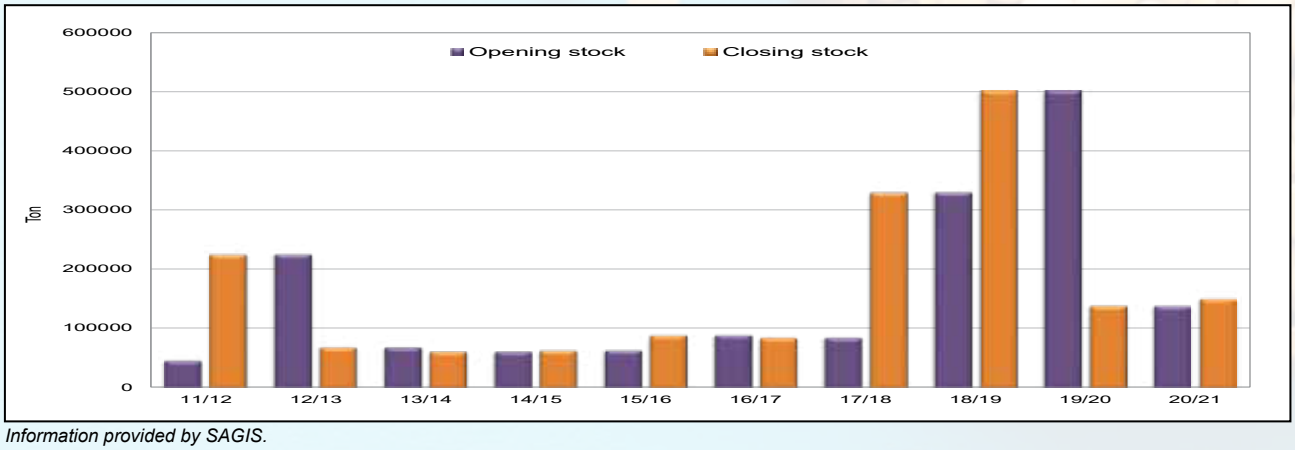
Graph 13: Soybeans: Imports and Exports over 10 marketing seasons



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.

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

Season	SOYBEANS: IMPORTS FOR RSA PER COUNTRY (Tons)											
	Australia	Brazil	Ethiopia	Malawi	Mozambique	Nigeria	Paraguay	Ukraine	USA	Zambia	Zimbabwe	Total
2015/16	0	59 998	1 648	862	0	0	59 697	0	0	2 776	0	124 981
2016/17	0	0	3 314	0	0	204	263 576	0	0	4 004	0	271 098
2017/18	0	0	371	3 153	0	0	0	0	0	22 912	1 072	27 508
2018/19	0	0	160	1 953	343	0	0	645	0	3 844	0	6 945
2019/20	343	0	0	2 492	2 151	0	0	0	0	4 112	0	9 098
2020/21	0	55 000	0	1 280	1 623	0	0	0	52 534	4 728	0	115 165

Season	SOYBEANS IMPORTS PER HARBOUR (Tons)				
	Harbours				
	East London	Durban	Cape Town	Port Elizabeth	Total
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
2020/21*	0	107 534	0	0	107 534

* Progressive March 2020 - January 2021
Note: Includes Imports for RSA and Other Countries

Season	SOYBEANS: RSA EXPORTS PER COUNTRY (Tons)						
	Botswana	Lesotho	Mozambique	Turkey	Eswatini	Zimbabwe	Total
2015/16	220	0	4 457	0	0	0	4 677
2016/17	0	0	2 614	0	0	4 131	6 745
2017/18	4	0	410	0	0	0	414
2018/19	17	0	160	27 660	0	4 973	32 810
2019/20	189	0	291	0	0	4 856	5 336
2020/21	744	9	298	0	7	2	1 060

Season	SOYBEANS EXPORTS PER HARBOUR (Tons)				
	Harbours				
	East London	Durban	Cape Town	Port Elizabeth	Total
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
2020/21*	0	0	0	0	0

* Progressive March 2020 - January 2021

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 2018 - Feb 2019 Progressive: 12 Months	**Marketing year Mar 2019 - Feb 2020** Progressive: 12 Months	**Mar 2020** Manufactured Tons	**Apr 2020** Manufactured Tons	**May 2020** Manufactured Tons	**Jun 2020** Manufactured Tons	**Jul 2020** Manufactured Tons	**Aug 2020** Manufactured Tons	**Sep 2020** Manufactured Tons	**Oct 2020** Manufactured Tons	**Nov 2019** Manufactured Tons	**Dec 2020** Manufactured Tons	**Jan 2021** Manufactured Tons	**Marketing year Mar 2020 - Feb 2021** Progressive: 11 Months
Palm Oil and Derivatives	**0**	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Soybean Oil	**180 325**	**220 307**	17 921	17 819	21 620	19 795	17 070	16 395	22 377	20 075	17 283	15 525	12 175	**198 055**
Sunflower Oil	**315 406**	**234 557**	17 896	13 828	25 570	28 315	28 375	28 484	28 410	33 509	33 930	25 941	19 781	**284 039**
Coconut Oil/ Groundnut Oil / Canola Oil / Corn (Maize) Oil / Blends or mixes of Oils which includes one of the above Oils / Biodiesel / Cottonseed Oil	**51 780**	**47 910**	3 581	3 249	3 472	4 608	3 610	4 161	3 103	4 650	5 523	4 112	4 261	**44 330**
Sunflower Oilcake	**379 395**	**276 766**	20 422	17 956	29 362	32 723	33 257	31 432	31 410	36 909	38 350	28 973	24 563	**325 357**
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 / Cottonseed Oilcake	**847 062**	**1 022 415**	76 838	77 603	98 410	93 328	80 868	84 658	102 121	95 313	83 197	75 556	59 870	**927 762**
Soybean Flours and Meals / Textured Vegetable Protein	**38 779**	**39 785**	3 941	3 676	3 809	3 779	3 544	3 445	3 397	3 357	2 263	1 307	2 771	**35 289**
Soybean Fullfat	**224 233**	**194 228**	14 285	12 396	13 687	14 375	14 749	13 586	15 321	13 173	10 780	8 924	9 130	**140 406**
Peanut Butter and Paste	**29 734**	**28 026**	3 099	2 828	3 261	3 305	2 945	3 110	3 915	3 475	3 181	2 655	2 589	**34 363**
Total	**2 066 714**	**2 063 994**	**157 983**	**149 355**	**199 191**	**200 228**	**184 418**	**185 271**	**210 054**	**210 461**	**194 507**	**162 993**	**135 140**	**1 989 601**

SAGIS South African Grain Information Service NPC
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Reg no. 1997/019186/08

	OIL SEEDS PRODUCTS PER MONTH IMPORTED													
	Marketing year Mar 2018 - Feb 2019 Progressive: 12 Months	**Marketing year Mar 2019 - Feb 2020** Progressive: 12 Months	**Mar 2020** Manufactured Tons	**Apr 2020** Manufactured Tons	**May 2020** Manufactured Tons	**Jun 2020** Manufactured Tons	**Jul 2020** Manufactured Tons	**Aug 2020** Manufactured Tons	**Sep 2020** Manufactured Tons	**Oct 2020** Manufactured Tons	**Nov 2019** Manufactured Tons	**Dec 2020** Manufactured Tons	**Jan 2021** Manufactured Tons	**Marketing year Mar 2020 - Feb 2021** Progressive: 11 Months
Palm Oil and Derivatives	**536 957**	**534 456**	52 663	42 626	44 007	37 715	48 105	42 488	46 811	51 691	35 277	63 920	18 697	**484 000**
Soybean Oil	**116 828**	**90 934**	8 995	4 300	12 486	12 598	5 000	14 504	5 000	13 938	13 150	13 388	9 920	**113 279**
Sunflower Oil	**143 635**	**244 099**	18 931	14 862	14 914	2 524	18 060	32 716	7 199	947	11 969	6 011	6 200	**134 333**
Coconut Oil/ Groundnut Oil / Canola Oil / Corn (Maize) Oil / Blends or mixes of Oils which includes one of the above Oils / Biodiesel / Cottonseed Oil	**15 891**	**14 386**	999	1 232	3 033	1 153	600	40	1 163	777	1 084	938	805	**11 824**
Sunflower Oilcake	**48 777**	**118 791**	0	6 783	0	0	0	0	0	0	0	0	0	**6 783**
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 / Cottonseed Oilcake	**358 850**	**463 478**	11 028	55 828	32 525	6 916	58 780	19 087	17 018	73 154	30 148	57	50 318	**354 859**
Soybean Flours and Meals / Textured Vegetable Protein	**0**	**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	**0**
Peanut Butter and Paste	**1 035**	**1 391**	148	110	54	0	195	75	0	0	265	197	55	**1 099**
Total	**1 221 973**	**1 467 535**	**92 764**	**125 741**	**107 019**	**60 906**	**130 740**	**108 910**	**77 191**	**140 507**	**91 893**	**84 511**	**85 995**	**1 106 177**

South African Grain Information Service NPC
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	OIL SEEDS PRODUCTS PER MONTH EXPORTED													
	Marketing year Mar 2018 - Feb 2019 Progressive: 12 Months	**Marketing year Mar 2019 - Feb 2020** Progressive: 12 Months	**Mar 2020** Manufactured Tons	**Apr 2020** Manufactured Tons	**May 2020** Manufactured Tons	**Jun 2020** Manufactured Tons	**Jul 2020** Manufactured Tons	**Aug 2020** Manufactured Tons	**Sep 2020** Manufactured Tons	**Oct 2020** Manufactured Tons	**Nov 2019** Manufactured Tons	**Dec 2020** Manufactured Tons	**Jan 2021** Manufactured Tons	**Marketing year Mar 2020 - Feb 2021** Progressive: 11 Months
Palm Oil and Derivatives	**15 771**	**16 078**	948	647	1 066	1 656	1 647	1 236	1 396	1 027	785	821	633	**11 862**
Soybean Oil	**29 459**	**17 619**	2 978	6 523	7 047	3 538	3 819	2 847	4 313	1 268	1 806	2 253	5 786	**42 178**
Sunflower Oil	**2 169**	**3 067**	150	70	227	271	464	434	588	254	281	234	136	**3 109**
Coconut Oil/ Groundnut Oil / Canola Oil / Corn (Maize) Oil / Blends or mixes of Oils which includes one of the above Oils / Biodiesel / Cottonseed Oil	**977**	**933**	451	288	228	791	369	876	911	544	577	720	316	**6 071**
Sunflower Oilcake	**3 464**	**3 006**	98	135	160	160	170	136	130	100	102	100	150	**1 441**
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 / Cottonseed Oilcake	**11 420**	**10 520**	1 131	588	879	907	1 117	697	1 020	1 751	1 348	1 096	246	**10 780**
Soybean Flours and Meals / Textured Vegetable Protein	**1 802**	**4 108**	235	262	375	0	204	204	918	646	703	578	870	**4 995**
Soybean Fullfat	**7 120**	**2 723**	196	235	163	34	204	96	272	544	298	164	335	**2 541**
Peanut Butter and Paste	**821**	**274**	26	27	23	16	23	19	19	17	24	2	12	**208**
Total	**73 003**	**58 328**	**6 213**	**8 775**	**10 168**	**7 373**	**8 017**	**6 545**	**9 567**	**6 151**	**5 924**	**5 968**	**8 484**	**83 185**

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.

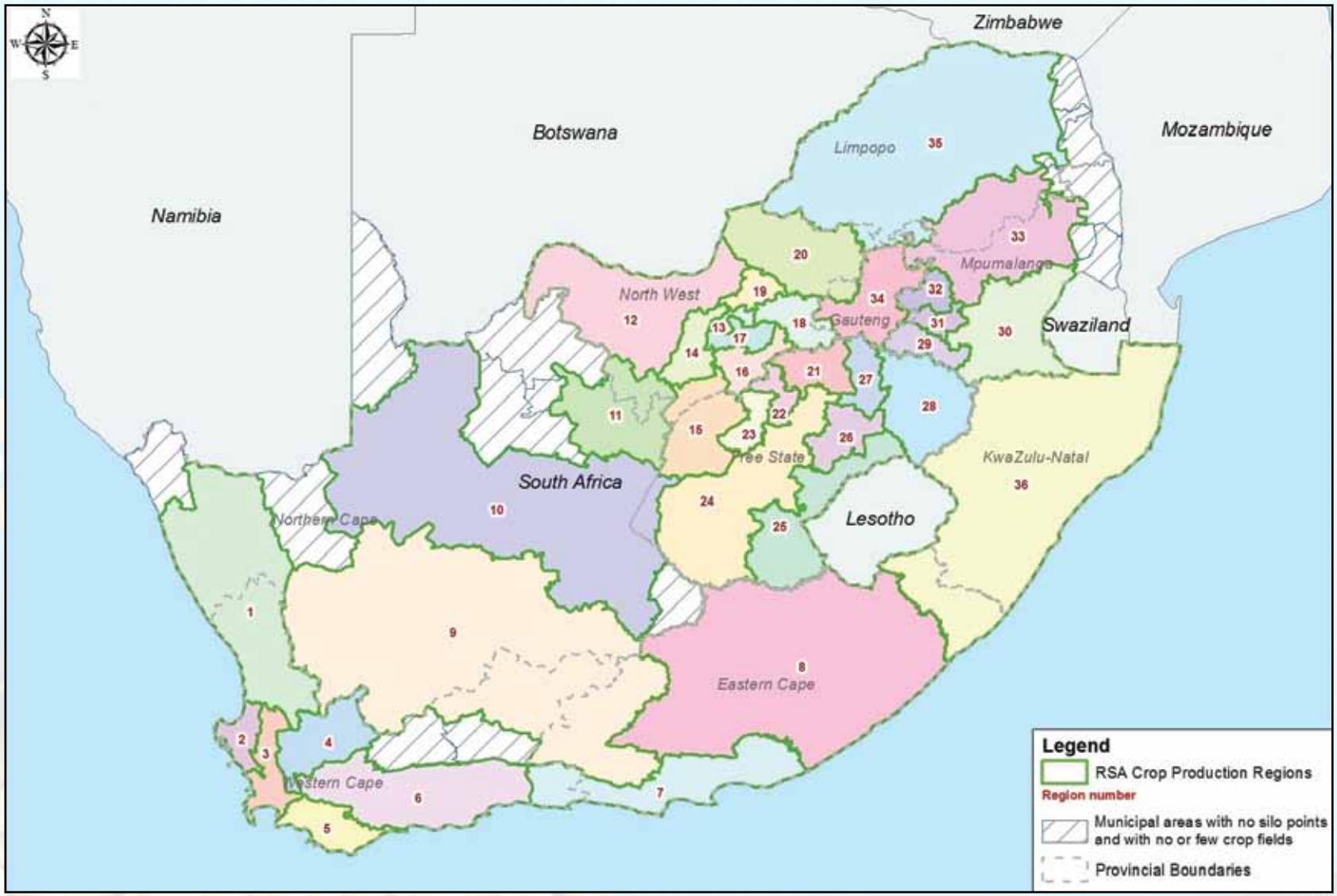
The 9 provinces are divided into 36 grain production regions.

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 2019/20 production season, are named and described on pages 22 to 25. 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 2019/20 – Summary of results

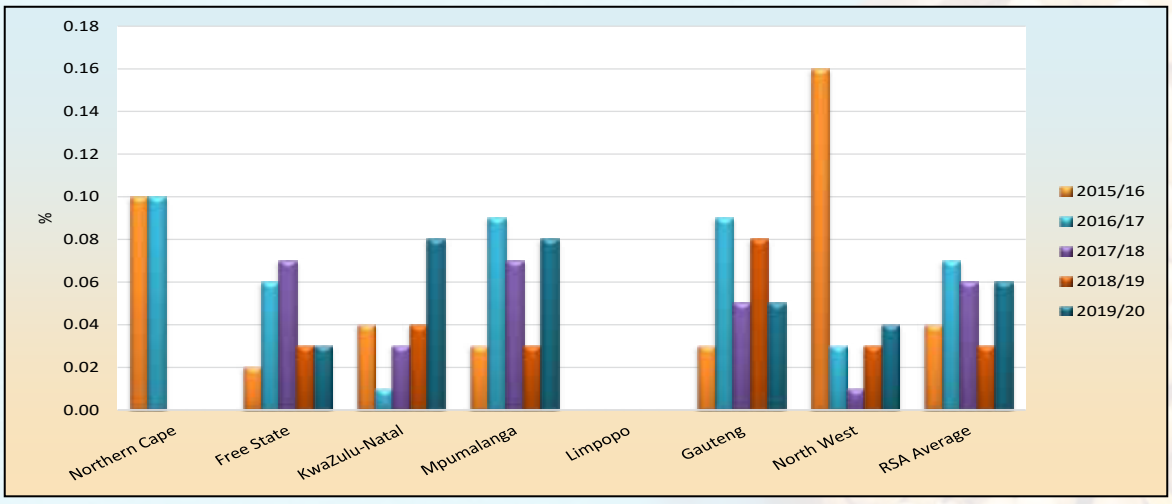
Seventy-three percent (109) of the 150 samples analysed for the purpose of this survey were graded as Grade SB1, while 41 (27%) of the samples were downgraded to COSB (Class Other Soya Beans). During the previous two seasons, 11% (2018/19) and 13% (2017/18) of the samples were downgraded to COSB.

- Four of the 41 samples were downgraded as a result of the percentage other grain exceeding the maximum permissible deviation of 0.5%.
- Eight of the samples were downgraded as a result of the percentage defective soybeans on the 4.75 mm round-hole sieve exceeding the maximum permissible deviation of 10%.
- Fifteen samples were downgraded as a result of the percentage soiled soybeans present in the samples exceeding the maximum permissible deviation of 10%.
- Six samples were downgraded as a result of the number of *Datura sp.* poisonous seeds present exceeding the maximum permissible number of 1 per 1000 g.
- The remaining eight samples were downgraded as a result of a combination of one or more of the following deviations exceeding the maximum permissible deviation: foreign matter, other grain, sunflower seed, stones, defective soybeans above the 4.75 mm sieve, soiled soybeans and poisonous seeds (*Datura* and *Ipomoea purpurea Roth.*)

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

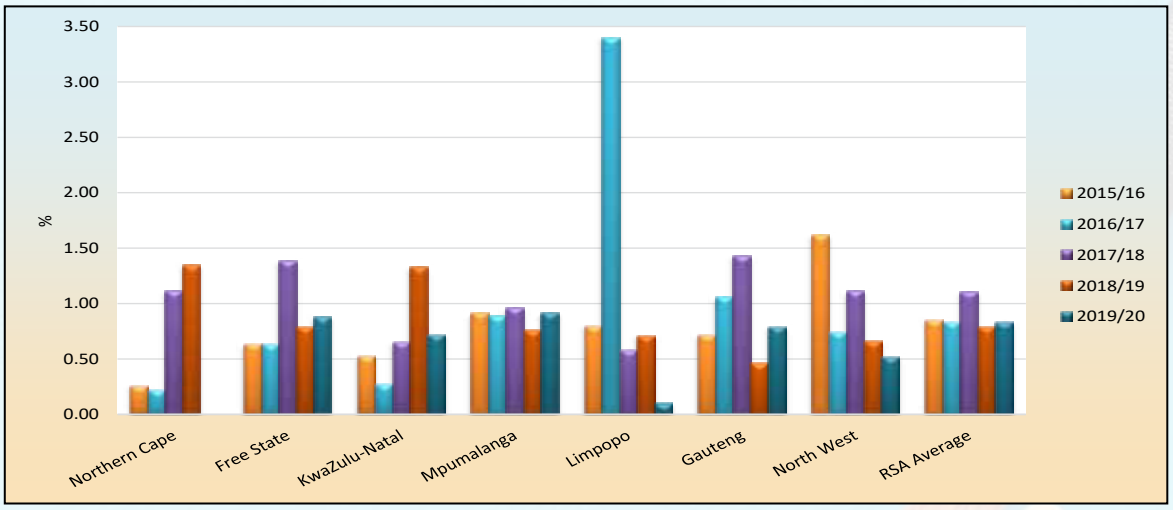
The percentage samples containing sclerotia from the fungus *Sclerotinia sclerotiorum*, increased from 27% (41 samples) in the previous season to 41% (62 samples) this season. In the 2017/18 season, 88 samples (59%) contained sclerotia. The three highest percentages sclerotia, 1.10%, 0.60% and 0.30% were all observed on samples originating in Mpumalanga. As a matter of fact, 52% of the samples that contained sclerotia originated in Mpumalanga. All these percentages sclerotia found to be present in the samples are however still well below the maximum permissible level of 4%. The national weighted average percentage this season was 0.06% compared to the 0.03% of the previous season. See Graph 16.

Graph 16: Average percentage sclerotia per province over five seasons



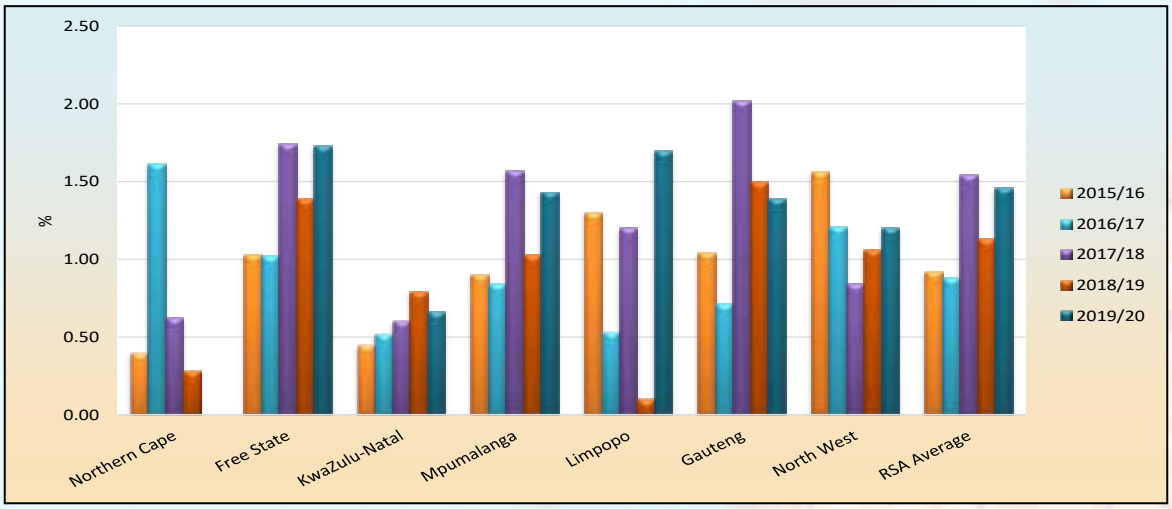
The samples received from Mpumalanga province (65 samples) had the highest percentage foreign matter (0.91%), followed closely by the 0.88% weighted average of the 51 samples from the Free State regions. The percentage foreign matter in the rest of the samples ranged from 0.10% in the sample from Limpopo to 0.79% in Gauteng (8 samples). The national weighted average of 0.83% was in line with previous seasons. Please refer to Graph 17.

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



The Free State reported the highest weighted average percentage soybeans and parts of soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, namely 1.73%, closely followed by the 1.70% from Limpopo. The lowest weighted average value reported was 0.66% on the nine samples from KwaZulu-Natal. The national weighted average percentage increased from 1.13% the previous season to 1.46% this season. The 2017/18 season's average was 1.54%. Please see Graph 18.

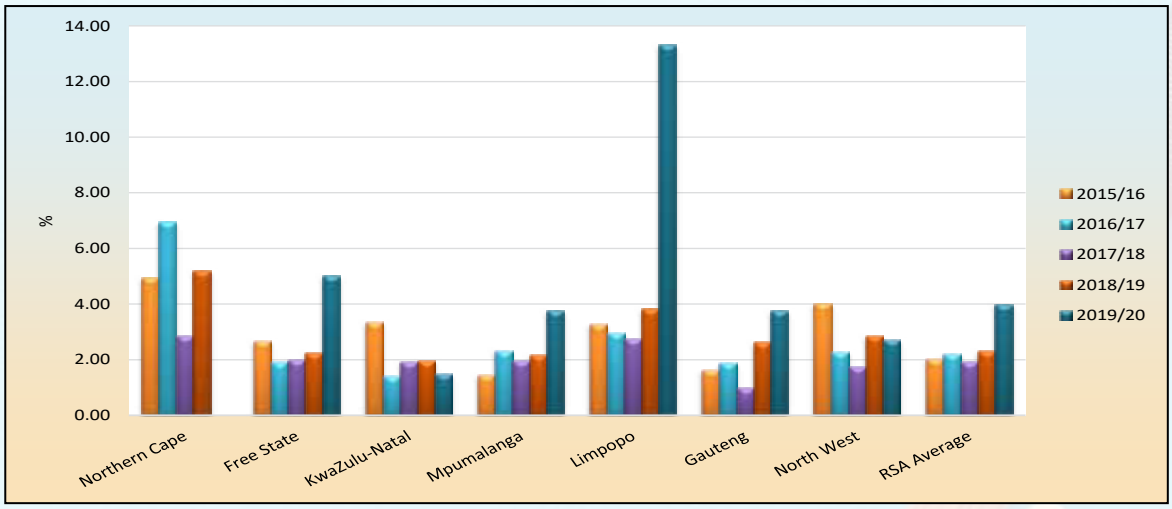
Graph 18: Average percentage soybeans and parts of soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve per province over five seasons



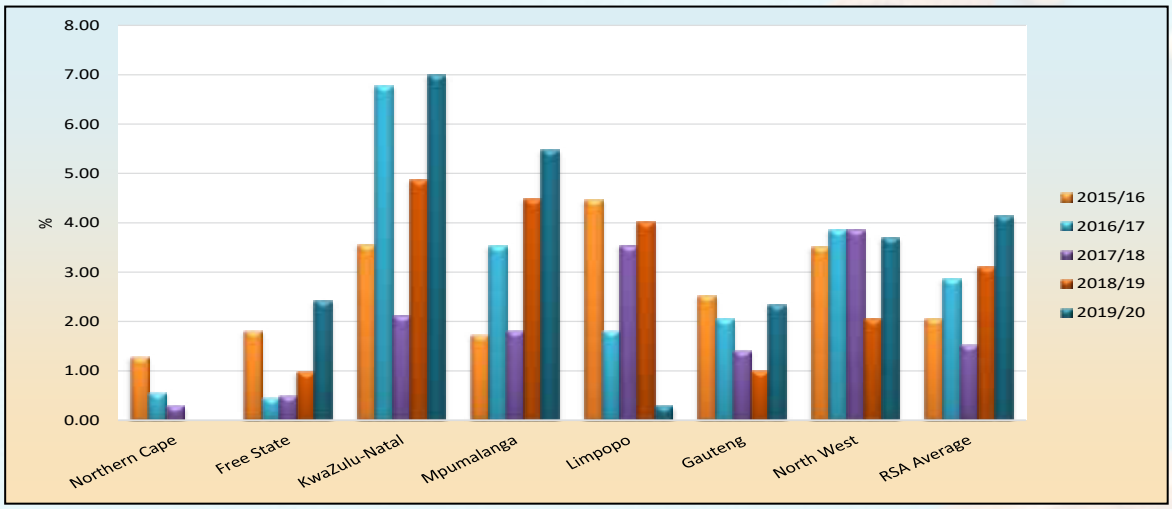
The lowest weighted average percentage defective soybeans on the 4.75 mm sieve was observed on the samples from KwaZulu-Natal, namely 1.47%. The sample from Limpopo province reported the highest percentage namely 13.30%. The averages in the other provinces ranged from 2.72% (North West N=16) to 4.99% in the Free State. The national weighted average increased from 2.30% last season to 3.98% this season. Please see Graph 19. This is the highest national average since the start of the crop surveys in the 2011/12 season.

The national weighted average percentage soiled soybeans was 4.13%, also the highest since the 2011/12 season. The previous two seasons averaged 3.10% and 1.53% respectively. Weighted average percentages per province ranged from 0.30% in Limpopo to 7.00% in KwaZulu-Natal. Please see Graph 20. 17 samples exceeded the maximum permissible deviation of 10% according to the grading regulations. The highest percentage reported was 20.50% on a sample from Mpumalanga. The rest of these samples originated in North West, the Free State, Mpumalanga and KwaZulu-Natal. Last season, six samples originating in Mpumalanga, exceeded the grading limit.

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



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



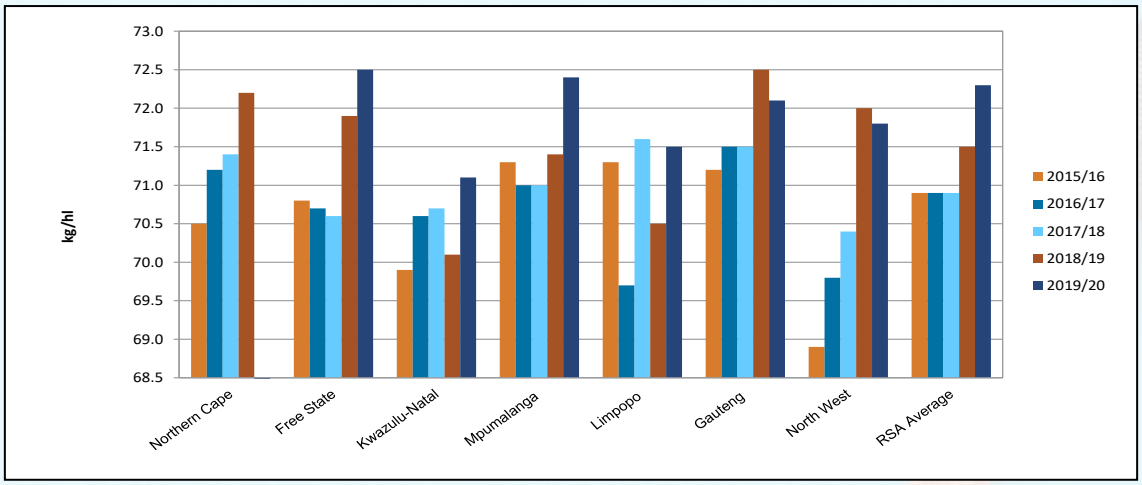
Test weight does not form part of the grading regulations for soybeans in South Africa. An approximation of the test weight of South African soybeans is provided in Table 2 for information purposes. The standard working procedure of the Kern 222 instrument, as described in ISO 7971-3:2019, was followed.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

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

Province	Test weight, kg/hl								
	2019/20 Season			2018/19 Season			2017/18 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
Free State (Regions 21 - 28)	72.5	70.3 - 74.4	51	71.9	69.4 - 74.2	42	70.6	67.2 - 73.6	*44
KwaZulu-Natal (Region 36)	71.1	70.0 - 72.3	9	70.1	68.2 - 72.4	12	70.7	70.0 - 71.6	9
Mpumalanga (Regions 29 - 33)	72.4	70.2 - 74.0	*64	71.4	67.8 - 74.6	73	71.0	68.2 - 72.5	71
Limpopo (Region 35)	71.5	-	1	70.5	68.9 - 73.2	3	71.6	71.4 - 72.1	4
Gauteng (Region 34)	72.1	71.0 - 73.2	8	72.5	71.7 - 73.8	12	71.5	70.3 - 74.0	11
North West (Region 12 - 20)	71.8	68.7 - 73.3	16	72.0	72.1 - 73.5	**5	70.4	69.0 - 72.5	8
RSA	***72.3***	***68.7 - 74.4***	***149***	***71.5***	***67.8 - 74.6***	***148***	***70.9***	***67.2 - 74.0***	***149***

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

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



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

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

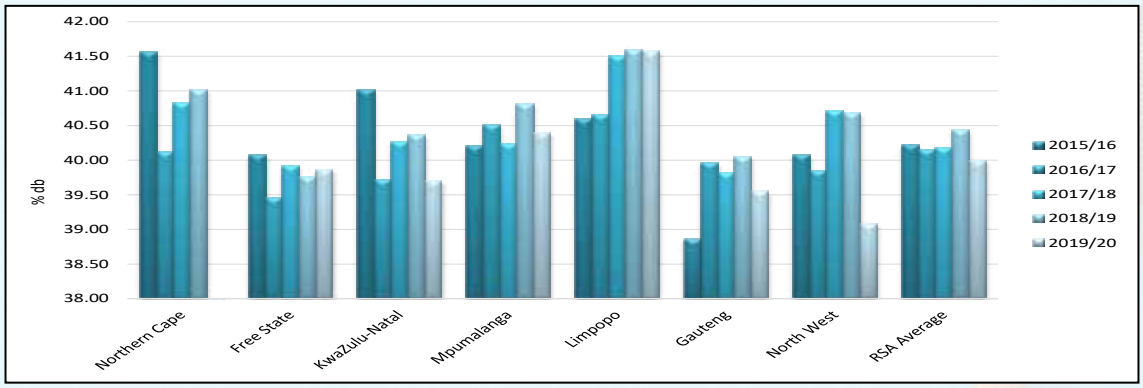
Season	2019/20		2018/19		2017/18		2016/17		2015/16	
Moisture, % (17hr, 103°C)	7.2		7.0		7.4		7.4		7.4	
Moisture basis	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**
Crude protein, %	39.99	37.12	40.43	37.60	40.18	37.40	40.15	37.20	40.22	37.22
Crude fat, %	18.0	16.7	19.1	17.8	19.3	18.0	19.8	18.5	19.4	17.9
Crude fibre, %	7.0	6.5	6.8	6.3	5.9	5.5	5.9	5.4	7.3	6.8
Ash, %	4.63	4.19	4.67	4.34	4.59	4.27	4.58	4.24	4.61	4.27
No. of samples	***150***		***150***		***150***		***150***		***150***	

The weighted average crude protein content this season was 39.99% compared to the 40.43% of the previous season. As in the previous three seasons, Limpopo had the highest weighted average crude protein content (41.58%). North West (39.08%) and Gauteng (39.55%) reported the lowest averages. The weighted average crude fat percentage of 18.0% was the lowest since the 2011/12 season. The samples from KwaZulu-Natal had (as in the previous season) the highest weighted average crude fat content, namely 20.0%. The lowest average fat contents were observed in the Limpopo and Free State provinces, with 16.6% and 17.5% respectively.

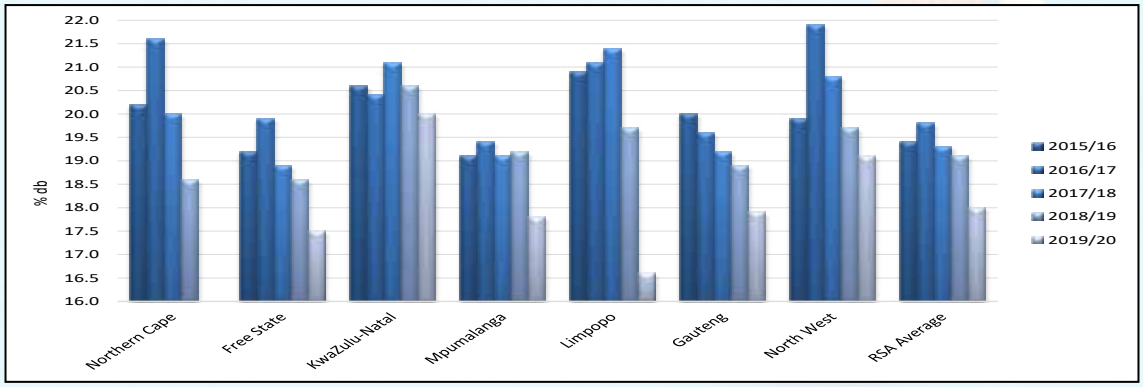
The weighted average percentage crude fibre varied from 6.2% in Gauteng to 7.5% in the Free State. The RSA weighted average, 7.0%, was the second highest of the annual surveys since the 7.3% reported in the 2015/16 season. A small variation of only 0.09% is observed with regards to the national weighted average ash content over the nine seasons that this survey has been conducted. This season, the average ash content was 4.63%. Last season this value was 4.67% and the highest of the nine seasons since 2011/12.

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

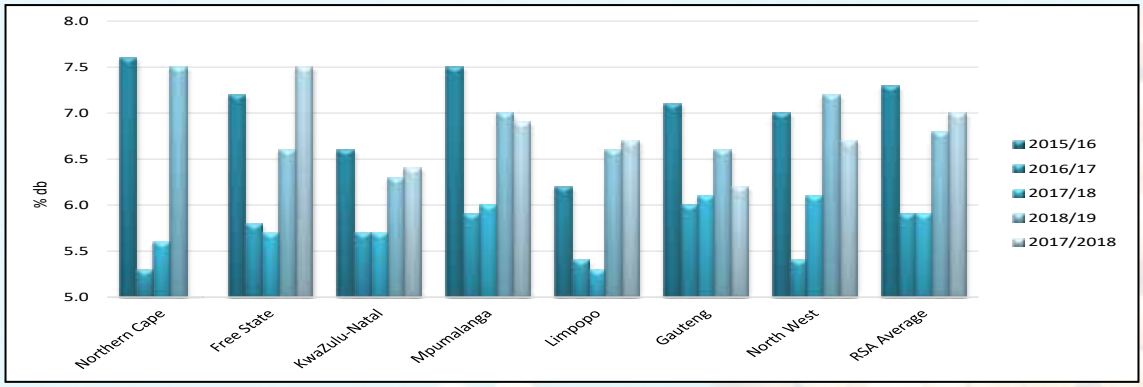
Graph 22: Average crude protein content per province over five seasons



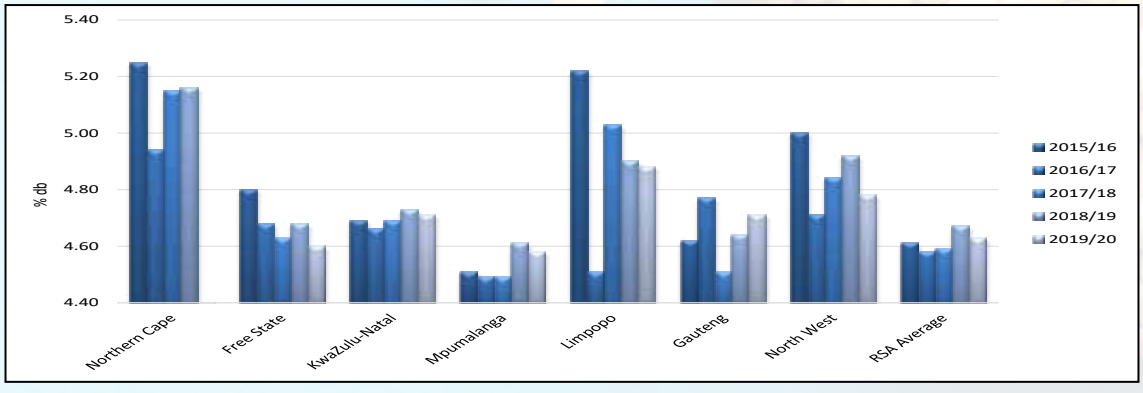
Graph 23: Average crude fat content per province over five seasons



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



Graph 25: Average ash content per province over five seasons



The 2019/20 season is the second 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 2019/20 season

Analysis	Moisture, % (17hr, 103°C)	Crude Protein, % (db)	Crude Protein, % (as is)	Crude Fat, % (db)	Crude Fat, % (as is)
Soybean Crop Quality Survey results					
Average	**7.2**	**39.99**	**37.12**	**18.0**	**16.7**
Minimum	6.4	33.81	31.54	15.4	14.3
Maximum	10.0	43.70	40.68	22.1	20.4
Standard Deviation	0.64	1.42	1.32	1.20	1.11
No. of samples	*150*	*150*	*150*	*150*	*150*
ARC Grain Crops Cultivar trial sample results					
Average	**7.8**	**40.87**	**37.68**	**19.9**	**18.4**
Minimum	6.9	38.47	35.33	15.8	14.6
Maximum	8.8	44.87	41.33	23.5	21.7
Standard Deviation	0.51	1.25	1.15	1.96	1.84
No. of samples	*84*	*84*	*84*	*84*	*84*
% Difference between crop and cultivar samples	***-0.6***	***-0.88***	***-0.56***	***-1.9***	***-1.7***

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 2019/20 season compared to those of the 2018/19 season, is provided in Table 6 on page 21.

Please see pages 26 to 33 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 2019/20 season

REGION	Class and grade	CP4 EPSPS, %
14	COSB	>3.0
20	COSB	>3.0
21	SB1	>3.0
22	SB1	>3.0
24	SB1	>3.0
26	COSB	>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	COSB	>3.0
36	SB1	>3.0
Average of samples		***>3.0***
Number of samples		***15***

Table 6: South African Soybean Crop Quality Averages 2019/20 vs 2018/19						
Class and Grade Soya	**2019/20**			**2018/19**		
	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), %	0.79	0.94	0.83	0.70	1.50	0.79
(C) Other grain, %	0.08	0.22	0.12	0.07	0.29	0.09
(D) Sunflower seed, %	0.01	0.02	0.01	0.01	0.01	0.01
(E) Stones, %	0.02	0.05	0.03	0.00	0.01	0.00
(F) Sclerotia, %	0.06	0.05	0.06	0.03	0.04	0.03
(G) Soybeans and parts of soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	1.58	1.15	1.46	1.12	1.18	1.13
(H) Defective soybeans on the 4.75 mm round hole sieve, %	3.47	5.35	3.98	2.20	3.13	2.30
(I) Soiled soybeans, %	3.02	7.09	4.13	2.36	9.33	3.10
(J) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.85	0.99	0.89	0.73	1.54	0.82
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	1	0	0	2	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	***109***	***41***	***150***	***134***	***16***	***150***
Nutritional analysis:						
Moisture, % (17 hr, 103 °C)	7.2	7.2	7.2	7.0	7.2	7.0
Crude Protein, % (db)	39.91	40.23	39.99	40.45	40.30	40.43
Crude Fat, % (db)	17.9	18.1	18.0	19.1	19.1	19.1
Crude Fibre, % (db)	7.0	7.2	7.0	6.8	6.9	6.8
Ash, % (db)	4.62	4.65	4.63	4.66	4.71	4.67
Number of samples	***109***	***41***	***150***	***134***	***16***	***150***

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 12: North-West Western Region

NWK	Blaauwbank (Bins)	NWK	Mareetsane (Bins)
NWK	Buhrmannsdrif (Bins)	Suidwes Landbou	Kameel (Bins)
NWK	Kameel (Bins)	Suidwes Landbou	Vryburg (Bins)

Region 13: North-West Central Region (Sannieshof)

NWK	Biesiesvlei (Bins)	NWK	Oppaslaagte (Bins)
NWK	Bossies (Bins)	NWK	Sannieshof (Bins)
NWK	Gerdau (Bins)		

Region 14: North-West Southern Region

NWK	Barberspan (Bins)	NWK	Taaibospan (Bins)
NWK	Delareyville (Bins)	Suidwes Landbou	Amalia (Bins)
NWK	Excelsior (Bins)	Suidwes Landbou	Hallatshope (Bins)
NWK	Geysdorp (Bins)	Suidwes Landbou	Migdol (Bins)
NWK	Migdol (Bins)	Suidwes Landbou	Schweizer-Reneke (Bins)
NWK	Nooitgedacht (Bins)		

Region 16: North-West Central Eastern Region

Senwes	Klerksdorp (Bins)	Suidwes Landbou	Makwassie (Bins)
Senwes	Regina (Bins)	Suidwes Landbou	Strydpoort (Bins)
Suidwes	Bamboesspruit (Bins)	Suidwes Landbou	Wolmaranstad (Bins)
Suidwes	Leeudoringstad (Bins)		

Region 18: North-West Central Region (Ventersdorp)

NWK	Bodenstein (Bins)	Senwes	Makokskraal (Bins)
NWK	Coligny (Bins)	Senwes	Potchefstroom (Bins)
Senwes	Buckingham (Bins)	Senwes	Ventersdorp Silo A (Bins)
Senwes	Enselspruit (Bins)	Senwes	Ventersdorp Silo B (Bins)

Region 19: North-West Central Region (Lichtenburg)

Afgri	Lichtenburg Bunker	NWK	Lottie Halte (Bins)
NWK	Grootpan 1 (Bins)	NWK	Lusthof (Bins)
NWK	Grootpan 2 (Bins)	NWK	Lichtenburg Silo 3 (Bins)
NWK	Halfpad (Bins)	NWK	Lichtenburg Silo 5 (Bins)
NWK	Hibernia (Bins)	NWK	Mafikeng (Bins)

Region 20: North-West Eastern Region

Afgri	Battery (Bins)	NWK	Derby (Bins)
Afgri	Brits (Bins)	NWK	Koster (Bins)
Afgri	Beestekraal (Bunkers)	NWK	Swartruggens (Bins)
NWK	Boons (Bins)	NWK	Syferbult (Bins)

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

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 22: Free State North-Western Region (Bothaville)

Senwes	Allanridge (Bins)	Senwes	Schoonspruit (Bins)
Senwes	Bothaville Silo A (Bins)	Senwes	Schuttesdraai (Bins)
Senwes	Bothaville Silo B (Bins)	Suidwes Landbou	Bothaville depot (Bins)
Senwes	Mirage (Bins)	Suidwes Landbou	Misgunst (Bunkers)
Senwes	Odendaalsrus (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)

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

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)

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)	Afgri	Vlakfontein (Bunkers)

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)

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

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	Mizpah (Bins)
Afgri	Bloedrivier (Bins)	Afgri	Paulpietersburg (Bins)
Afgri	Chelmsford Dam (Bunkers)	Afgri	Pietermaritzburg (Bins)
Afgri	Dannhauser (Bins)	Afgri	Vryheid (Bins)
Afgri	Dundee (Bins)	Afgri	Winterton (Bins/Bunkers)

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(12) North-West Western Region				(13) North-West Central Region (Sannieshof)				(14) North-West Southern 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
(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), %	0.50	-	-	-	0.96	-	-	-	0.41	0.10	1.02	0.53
(c) Other grain, %	0.00	-	-	-	0.00	-	-	-	0.00	0.00	0.00	0.00
(d) Sunflower seed, %	0.00	-	-	-	0.08	-	-	-	0.00	0.00	0.00	0.00
(e) Stones, %	0.00	-	-	-	0.00	-	-	-	0.00	0.00	0.00	0.00
(f) Sclerotia, %	0.00	-	-	-	0.12	-	-	-	0.06	0.00	0.18	0.10
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	1.00	-	-	-	2.55	-	-	-	1.25	0.10	2.69	1.32
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	6.28	-	-	-	2.20	-	-	-	2.52	2.00	3.04	0.52
(i) Soiled Soybeans, %	0.00	-	-	-	0.32	-	-	-	2.06	0.24	3.00	1.58
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.50	-	-	-	1.08	-	-	-	0.47	0.10	1.20	0.63
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	-	-	-	5	-	-	-	3	0	10	5.77
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	-	-	-	0	-	-	-	0	0	0	0.00
Number of samples	***1***				***1***				***3***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	6.5	-	-	-	6.7	-	-	-	7.6	6.8	8.8	1.08
Crude protein, % (db)	35.85	-	-	-	40.19	-	-	-	38.31	34.83	40.36	3.03
Crude fat, % (db)	19.3	-	-	-	17.9	-	-	-	19.9	18.3	21.5	1.60
Crude Fibre, % (db)	6.9	-	-	-	6.4	-	-	-	6.8	6.1	7.1	0.58
Ash, % (db)	4.82	-	-	-	4.48	-	-	-	4.81	4.47	5.09	0.31
Number of samples	***1***				***1***				***3***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(16) North-West Central-Eastern Region				(18) North-West Central Region (Ventersdorp)				(19) North-West Central Region (Lichtenburg)			
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), %	0.37	0.32	0.42	0.07	0.38	0.04	0.60	0.30	0.76	-	-	-
(c) Other grain, %	0.15	0.00	0.30	0.21	0.18	0.00	0.40	0.20	0.00	-	-	-
(d) Sunflower seed, %	0.00	0.00	0.00	0.00	0.03	0.00	0.10	0.06	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	0.05	0.00	0.10	0.05	0.18	-	-	-
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	2.01	1.72	2.30	0.41	0.70	0.12	1.48	0.70	1.64	-	-	-
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	2.99	2.18	3.80	1.15	1.71	0.94	2.44	0.75	3.00	-	-	-
(i) Soiled Soybeans, %	2.77	1.84	3.70	1.32	0.93	0.00	2.58	1.43	2.40	-	-	-
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.37	0.32	0.42	0.07	0.43	0.10	0.70	0.30	0.94	-	-	-
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	0	0	0.00	2	0	5	2.89	0	-	-	-
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	0	0	0.00	0	0	0	0.00	0	-	-	-
Number of samples	***2***				***3***				***1***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	6.8	6.7	6.8	0.07	7.3	6.8	7.9	0.57	9.0	-	-	-
Crude protein, % (db)	38.15	37.88	38.41	0.37	39.15	37.04	40.78	1.92	37.80	-	-	-
Crude fat, % (db)	19.6	19.1	20.1	0.71	18.6	18.2	19.0	0.40	19.5	-	-	-
Crude Fibre, % (db)	6.0	5.6	6.4	0.57	6.9	6.5	7.5	0.53	6.3	-	-	-
Ash, % (db)	4.90	4.88	4.91	0.02	4.80	4.51	5.14	0.32	4.87	-	-	-
Number of samples	***2***				***3***				***1***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(20) North-West Eastern Region				(21) Free State North-Western Region (Viljoenskroon)				(22) Free State North-Western Region (Bothaville)			
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), %	0.61	0.20	1.98	0.77	2.19	0.36	5.86	2.28	1.70	0.58	5.03	1.89
(c) Other grain, %	0.02	0.00	0.08	0.04	0.03	0.00	0.16	0.07	0.08	0.00	0.38	0.17
(d) Sunflower seed, %	0.02	0.00	0.08	0.04	0.03	0.00	0.08	0.04	0.00	0.00	0.00	0.00
(e) Stones, %	0.02	0.00	0.08	0.04	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	0.06	0.00	0.08	0.04	0.01	0.00	0.05	0.02
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	0.84	0.10	1.88	0.74	1.66	0.90	2.20	0.48	3.27	1.53	7.54	2.47
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	2.66	1.08	4.18	1.26	2.58	1.40	4.00	0.98	2.15	0.40	4.32	1.42
(i) Soiled Soybeans, %	8.37	0.00	18.28	7.88	1.06	0.00	1.80	0.87	0.76	0.00	1.88	0.84
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.61	0.20	1.98	0.77	2.25	0.44	5.86	2.24	1.71	0.58	5.08	1.91
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
Number of samples	***5***				***5***				***5***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	6.9	6.6	7.2	0.27	7.7	6.9	9.1	0.93	6.9	6.7	7.1	0.14
Crude protein, % (db)	40.55	40.05	40.90	0.32	39.62	38.54	40.83	0.84	37.28	34.31	40.93	3.03
Crude fat, % (db)	18.8	17.0	19.9	1.30	18.3	17.8	19.3	0.64	18.5	17.4	19.4	0.79
Crude Fibre, % (db)	6.8	5.8	7.6	0.64	7.4	6.1	8.5	0.92	7.9	7.0	9.2	0.87
Ash, % (db)	4.74	4.26	5.07	0.37	4.74	4.62	4.86	0.11	4.99	4.53	5.54	0.49
Number of samples	***5***				***5***				***5***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(23) Free State North-Western Region (Bultfontein)				(24) Free State Central Region				(25) Free State South-Western 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), %	0.93	0.10	1.76	1.17	0.80	0.20	1.80	0.73	0.34	-	-	-
(c) Other grain, %	0.00	0.00	0.00	0.00	0.18	0.00	0.70	0.35	0.12	-	-	-
(d) Sunflower seed, %	0.00	0.00	0.00	0.00	0.03	0.00	0.10	0.05	0.00	-	-	-
(e) Stones, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-
(f) Sclerotia, %	0.09	0.00	0.18	0.13	0.00	0.00	0.00	0.00	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, %	1.45	0.20	2.70	1.77	0.77	0.38	1.30	0.38	1.40	-	-	-
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	9.21	1.72	16.70	10.59	2.77	1.00	6.00	2.26	1.34	-	-	-
(i) Soiled Soybeans, %	1.91	0.00	3.82	2.70	0.19	0.00	0.74	0.37	0.00	-	-	-
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	1.02	0.10	1.94	1.30	0.80	0.20	1.80	0.73	0.40	-	-	-
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	3	0	5	3.54	1	0	5	2.50	0	-	-	-
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	0	0	0.00	0	0	0	0.00	0	-	-	-
Number of samples	***2***				***4***				***1***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	7.0	6.9	7.1	0.14	7.0	6.9	7.3	0.19	7.8	-	-	-
Crude protein, % (db)	40.38	38.50	42.25	2.65	39.18	38.64	39.98	0.63	42.20	-	-	-
Crude fat, % (db)	17.3	16.3	18.3	1.41	17.6	15.4	19.6	1.76	16.4	-	-	-
Crude Fibre, % (db)	7.7	7.3	8.0	0.49	8.0	7.8	8.4	0.28	7.6	-	-	-
Ash, % (db)	4.85	4.76	4.93	0.12	4.79	4.62	5.17	0.26	4.39	-	-	-
Number of samples	***2***				***4***				***1***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(26) Free State South-Eastern Region				(27) Free State Northern Region				(28) Free State 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), %	1.77	0.30	3.82	1.36	0.62	0.20	1.03	0.59	0.36	0.00	1.80	0.43
(c) Other grain, %	0.26	0.00	0.86	0.37	0.04	0.00	0.08	0.06	0.10	0.00	1.60	0.31
(d) Sunflower seed, %	0.14	0.00	0.46	0.18	0.03	0.00	0.06	0.04	0.00	0.00	0.00	0.00
(e) Stones, %	0.10	0.00	0.52	0.23	0.07	0.00	0.14	0.10	0.03	0.00	0.30	0.08
(f) Sclerotia, %	0.05	0.00	0.08	0.04	0.04	0.00	0.08	0.06	0.02	0.00	0.10	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, %	1.83	0.32	2.95	1.07	2.00	0.40	3.60	2.26	1.60	0.00	4.80	1.11
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	1.75	0.56	3.36	1.02	2.55	1.50	3.60	1.48	6.89	0.50	17.60	4.47
(i) Soiled Soybeans, %	0.26	0.00	0.86	0.36	2.57	0.00	5.14	3.63	3.80	0.00	16.60	4.45
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	1.82	0.30	3.90	1.39	0.66	0.28	1.03	0.53	0.37	0.00	1.80	0.44
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	1	0	5	2.24	0	0	0	0.00	0	0	0	0.00
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
Number of samples	***5***				***2***				***27***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	6.9	6.6	7.3	0.31	7.0	6.8	7.2	0.28	6.9	6.4	7.7	0.37
Crude protein, % (db)	39.22	38.49	40.13	0.66	38.86	37.81	39.90	1.48	40.55	39.56	41.18	0.45
Crude fat, % (db)	17.3	15.6	18.4	1.19	18.4	17.2	19.6	1.70	17.2	16.2	18.5	0.66
Crude Fibre, % (db)	7.0	6.4	7.4	0.41	8.0	6.8	9.1	1.63	7.5	5.4	8.9	0.79
Ash, % (db)	4.65	4.40	4.87	0.19	4.67	4.49	4.84	0.25	4.45	4.01	4.92	0.17
Number of samples	***5***				***2***				***27***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(29) Mpumalanga Southern Region				(30) Mpumalanga Eastern Region				(31) Mpumalanga Central 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), %	0.93	0.10	2.30	0.71	0.99	0.10	3.50	0.73	0.57	0.22	1.52	0.41
(c) Other grain, %	0.10	0.00	0.34	0.13	0.08	0.00	0.90	0.21	0.09	0.00	0.60	0.20
(d) Sunflower seed, %	0.02	0.00	0.10	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(e) Stones, %	0.03	0.00	0.10	0.04	0.02	0.00	0.10	0.04	0.01	0.00	0.10	0.03
(f) Sclerotia, %	0.02	0.00	0.10	0.04	0.10	0.00	1.10	0.22	0.02	0.00	0.10	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, %	1.54	0.30	2.22	0.64	1.79	0.34	5.30	1.11	0.98	0.20	2.20	0.74
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	2.97	0.76	7.20	2.42	4.65	0.10	13.20	2.94	3.52	1.00	7.30	2.10
(i) Soiled Soybeans, %	3.23	0.00	9.00	3.98	5.41	0.00	20.50	4.62	5.60	0.00	10.24	4.18
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.95	0.10	2.30	0.70	1.10	0.30	3.58	0.72	0.59	0.22	1.52	0.42
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	0	0	0.00	0	0	5	1.02	0	0	0	0.00
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	0	5	1.51	0	0	5	1.41	1	0	10	3.33
Number of samples	***11***				***24***				***9***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	7.2	6.7	8.0	0.51	7.5	6.6	10.0	1.00	7.1	6.7	7.7	0.31
Crude protein, % (db)	40.06	36.91	41.38	1.34	40.50	39.33	42.37	0.78	40.09	39.25	41.29	0.70
Crude fat, % (db)	17.9	16.3	18.8	0.80	17.5	16.2	19.4	0.74	18.2	16.9	19.8	0.90
Crude Fibre, % (db)	6.9	5.8	8.4	0.78	7.1	5.0	9.6	1.24	7.4	6.0	9.6	1.17
Ash, % (db)	4.56	4.27	4.82	0.21	4.50	4.22	4.89	0.19	4.58	4.36	4.90	0.16
Number of samples	***11***				***24***				***9***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(32) Mpumalanga Western Region				(33) Mpumalanga Northern Region				(34) Gauteng 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), %	1.13	0.25	3.40	1.14	0.79	0.15	2.30	0.67	0.79	0.25	1.70	0.48
(c) Other grain, %	0.15	0.00	1.30	0.41	0.20	0.00	0.60	0.24	0.22	0.00	0.90	0.31
(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, %	0.01	0.00	0.08	0.03	0.12	0.00	1.35	0.41	0.03	0.00	0.20	0.07
(f) Sclerotia, %	0.17	0.00	0.60	0.18	0.06	0.00	0.10	0.05	0.05	0.00	0.20	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, %	1.32	0.78	2.07	0.43	0.98	0.10	2.70	0.87	1.39	0.07	3.53	1.08
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	3.76	0.30	7.80	2.37	2.67	0.80	4.40	1.13	3.73	1.20	7.00	2.21
(i) Soiled Soybeans, %	5.15	0.00	9.90	2.90	8.11	0.20	17.80	5.88	2.34	0.10	7.10	2.29
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	1.29	0.38	3.50	1.11	0.84	0.23	2.30	0.66	0.84	0.25	1.90	0.55
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	1	0	5	1.58	0	0	0	0.00	0	0	0	0.00
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	1	0	5	1.58	0	0	5	1.51	0	0	0	0.00
Number of samples	***10***				***11***				***8***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	7.2	6.6	9.1	0.72	7.3	6.8	8.2	0.40	7.1	6.4	7.9	0.49
Crude protein, % (db)	40.41	39.07	41.10	0.66	40.77	39.78	43.70	1.11	39.55	33.81	41.16	2.41
Crude fat, % (db)	17.9	16.6	19.3	0.87	18.0	16.6	19.5	1.06	17.9	15.8	20.9	1.63
Crude Fibre, % (db)	6.3	5.6	7.4	0.48	6.7	4.6	7.8	0.94	6.2	5.0	8.5	1.10
Ash, % (db)	4.63	4.41	5.08	0.19	4.75	4.42	4.98	0.17	4.71	4.50	5.23	0.24
Number of samples	***10***				***11***				***8***			

SOUTH AFRICAN
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(35) Limpopo Region				(36) KwaZulu-Natal Region			
Grading:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
(a) Wet pods, %	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), %	0.10	-	-	-	0.72	0.10	1.58	0.60
(c) Other grain, %	0.00	-	-	-	0.20	0.00	1.00	0.32
(d) Sunflower seed, %	0.00	-	-	-	0.00	0.00	0.00	0.00
(e) Stones, %	0.00	-	-	-	0.00	0.00	0.00	0.00
(f) Sclerotia, %	0.00	-	-	-	0.08	0.00	0.20	0.08
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	1.70	-	-	-	0.66	0.00	1.64	0.61
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	13.30	-	-	-	1.47	0.40	4.34	1.26
(i) Soiled Soybeans, %	0.30	-	-	-	7.00	2.00	12.00	3.85
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.10	-	-	-	0.80	0.10	1.78	0.67
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	-	-	-	0	0	0	0.00
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	-	-	-	1	0	10	3.33
Number of samples	***1***				***9***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	6.5	-	-	-	7.3	6.6	8.3	0.56
Crude protein, % (db)	41.58	-	-	-	39.70	38.13	40.57	0.88
Crude fat, % (db)	16.6	-	-	-	20.0	18.12	22.1	1.14
Crude Fibre, % (db)	6.7	-	-	-	6.4	5.8	7.1	0.42
Ash, % (db)	4.88	-	-	-	4.71	4.57	4.93	0.12
Number of samples	***1***				***9***			

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 for the second consecutive season 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 35 to 38 for the results.

The following fatty acid were included in the profile analysis:

C14:0	Myristic acid	C18:3n3	n3 Linolenic acid
C16:0	Palmitic acid	C20:0	Arachidic acid
C16:1	Palmitoleic acid	C20:1	Eicosenoic acid
C17:0	Margaric acid	C20:2	Eicosadienoic acid
C17:1	Glinkgolic acid	C21:0	Heneicosanoic acid
C18:0	Stearic acid	C22:0	Behenic acid
C18:1 c	cis Oleic acid	C22:1	Erucic acid
C18:2 c	cis Linoleic acid	C24:0	Lignoceric acid
C18:3n6	n6 Linolenic acid		

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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 2019/20 season																		
Province	Region	g Fatty acids/100 g Fatty Acids																
		C14:0	C16:0	C16:1	C17:0	C17:1	C18:0	C18:1 c	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	13	ND	9.9	ND	<LOQ	ND	4.19	19.72	55.1	ND	9.91	0.429	<LOQ	ND	ND	0.377	ND	<LOQ	ND
	14	ND	9.9	ND	<LOQ	ND	5.02	21.27	53.0	ND	9.47	0.49	<LOQ	ND	ND	0.444	ND	<LOQ	ND
	16	ND	10.3	<LOQ	ND	ND	4.63	20.98	53.3	ND	9.51	0.46	<LOQ	ND	ND	0.426	ND	<LOQ	ND
	18	ND	9.7	ND	<LOQ	ND	4.68	20.39	53.7	ND	10.17	0.48	<LOQ	ND	ND	0.46	ND	<LOQ	ND
	20	ND	10.9	<LOQ	<LOQ	ND	5.31	23.17	51.4	ND	7.74	0.52	<LOQ	ND	ND	0.451	ND	<LOQ	ND
	Min	***-***	***9.7***	***-***	***-***	***-***	***4.19***	***19.72***	***51.4***	***-***	***7.74***	***0.429***	***-***	***-***	***-***	***0.377***	***-***	***-***	***-***
	Max	***-***	***10.9***	***-***	***-***	***-***	***5.31***	***23.17***	***55.1***	***-***	***10.17***	***0.52***	***-***	***-***	***-***	***0.46***	***-***	***-***	***-***
	N	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***
Free State	21	ND	9.5	ND	<LOQ	ND	4.89	20.77	53.7	ND	9.60	0.52	<LOQ	ND	ND	0.60	ND	<LOQ	ND
	22	ND	10.3	ND	<LOQ	ND	4.01	18.51	55.8	ND	10.19	0.429	<LOQ	ND	ND	0.422	ND	ND	ND
	23	ND	10.6	ND	<LOQ	ND	3.80	20.57	53.9	ND	9.78	0.418	<LOQ	ND	ND	0.409	ND	<LOQ	ND
	24	ND	10.2	ND	<LOQ	ND	4.53	20.08	53.9	ND	9.84	0.49	<LOQ	ND	ND	0.53	ND	<LOQ	ND
	26	ND	9.6	ND	<LOQ	ND	4.82	19.72	53.6	ND	10.50	0.56	<LOQ	ND	ND	0.76	ND	<LOQ	ND
	27	ND	9.2	ND	<LOQ	ND	5.46	22.02	53.2	ND	8.66	0.56	<LOQ	ND	ND	0.51	ND	<LOQ	ND
	28	ND	9.4	ND	ND	ND	5.68	20.89	52.5	ND	9.26	0.50	ND	ND	ND	1.61	ND	<LOQ	ND
	Min	***-***	***9.2***	***-***	***-***	***-***	***3.80***	***18.51***	***52.5***	***-***	***8.66***	***0.418***	***-***	***-***	***-***	***0.409***	***-***	***-***	***-***
	Max	***-***	***10.6***	***-***	***-***	***-***	***5.68***	***22.02***	***55.8***	***-***	***10.50***	***0.56***	***-***	***-***	***-***	***1.61***	***-***	***-***	***-***
	N	***7***	***7***	***7***	***7***	***7***	***7***	***7***	***7***	***7***	***7***	***7***	***7***	***7***	***7***	***7***	***7***	***7***	***7***
Mpumalanga	29	ND	9.1	ND	<LOQ	ND	5.03	19.57	54.0	ND	10.96	0.48	<LOQ	ND	ND	0.445	ND	<LOQ	ND
	30	ND	9.7	ND	<LOQ	ND	5.25	20.74	52.9	ND	9.75	0.47	<LOQ	ND	ND	0.88	ND	<LOQ	ND
	31	ND	9.7	ND	<LOQ	ND	5.38	23.73	51.0	ND	8.48	0.46	<LOQ	ND	ND	0.72	ND	<LOQ	ND
	32	ND	9.6	ND	<LOQ	ND	4.76	20.79	53.8	ND	9.81	0.451	<LOQ	ND	ND	0.363	ND	<LOQ	ND
	33	ND	9.5	ND	<LOQ	ND	5.02	20.47	53.6	ND	9.99	0.49	<LOQ	ND	ND	0.51	ND	<LOQ	ND
	Min	***-***	***9.1***	***-***	***-***	***-***	***4.76***	***19.57***	***51.0***	***-***	***8.48***	***0.451***	***-***	***-***	***-***	***0.363***	***-***	***-***	***-***
	Max	***-***	***9.7***	***-***	***-***	***-***	***5.38***	***23.73***	***54.0***	***-***	***10.96***	***0.49***	***-***	***-***	***-***	***0.88***	***-***	***-***	***-***
	N	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***	***5***
Gauteng	34	ND	10.0	ND	<LOQ	ND	4.38	19.44	54.6	ND	10.47	0.437	<LOQ	ND	ND	0.384	ND	<LOQ	ND
Limpopo	35	ND	11.2	<LOQ	<LOQ	ND	5.15	27.66	47.6	ND	6.73	0.55	<LOQ	ND	ND	0.48	ND	<LOQ	ND
KwaZulu-Natal	36	ND	10.6	ND	<LOQ	ND	4.56	19.67	54.3	ND	9.68	0.46	<LOQ	ND	ND	0.386	ND	<LOQ	ND
RSA	***Min***	***-***	***9.1***	***-***	***-***	***-***	***3.80***	***18.51***	***47.6***	***-***	***6.73***	***0.418***	***-***	***-***	***-***	***0.363***	***-***	***-***	***-***
	Max	***-***	***11.2***	***-***	***-***	***-***	***5.68***	***27.66***	***55.8***	***-***	***10.96***	***0.56***	***-***	***-***	***-***	***1.61***	***-***	***-***	***-***
		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.
Values below the limit of detection are reported as ND (not detected).
Limit of quantitation (LOQ) = 0.28 g Fatty acid/100 g Fatty acids.
Values below the limit of quantitation cannot be accurately quantified.

Table 8: Fatty acid profile results of a selection of cultivar samples per region from the 2019/20 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 c	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	Bethlehem	25	DM 5953 RSF	ND	10.2	ND	<LOQ	ND	5.82	20.69	51.4	ND	10.47	0.54	<LOQ	ND	ND	0.439	ND	<LOQ	ND
			LDC 5.3	ND	9.9	ND	<LOQ	ND	4.94	18.74	54.5	ND	10.61	0.53	<LOQ	ND	ND	0.46	ND	<LOQ	ND
			SSS 5052 (tuc)	ND	9.1	ND	<LOQ	ND	5.16	19.93	53.7	ND	10.71	0.54	<LOQ	ND	ND	0.49	ND	<LOQ	ND
			PAN 1521 R	ND	9.5	ND	ND	ND	5.44	20.03	52.5	ND	11.14	0.56	<LOQ	ND	ND	0.49	ND	<LOQ	ND
			P61T38 R	ND	8.5	ND	ND	ND	5.13	18.71	54.7	ND	11.65	0.51	<LOQ	ND	ND	0.56	ND	<LOQ	ND
			NS 6448 R	ND	9.2	ND	<LOQ	ND	5.21	19.61	54.0	ND	10.62	0.51	<LOQ	ND	ND	0.435	ND	<LOQ	ND
			LS 6868 R	ND	8.7	ND	ND	ND	4.19	19.99	55.1	ND	10.87	0.46	<LOQ	ND	ND	0.434	ND	<LOQ	ND
		Min		-	*8.5*	-	-	-	*4.19*	*18.71*	*51.4*	-	*10.47*	*0.46*	-	-	-	*0.434*	-	-	-
		Max		-	*10.2*	-	-	-	*5.82*	*20.69*	*55.1*	-	*11.65*	*0.56*	-	-	-	*0.56*	-	-	-
		N		*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*
Mpumalanga	Marble Hall	33	DM 5953 RSF	ND	11.2	<LOQ	<LOQ	ND	5.77	26.35	48.8	ND	6.36	0.50	<LOQ	ND	ND	0.371	ND	<LOQ	ND
			LDC 5.3	ND	11.2	ND	<LOQ	ND	5.59	25.26	49.7	ND	6.51	0.62	<LOQ	ND	ND	0.50	ND	<LOQ	ND
			SSS 5052 (tuc)	ND	10.7	ND	<LOQ	ND	4.91	23.76	51.4	ND	7.55	0.54	<LOQ	ND	ND	0.49	ND	<LOQ	ND
			PAN 1521 R	ND	10.6	ND	ND	ND	5.73	24.33	50.7	ND	7.03	0.61	<LOQ	ND	ND	0.50	ND	<LOQ	ND
			P61T38 R	ND	10.5	ND	<LOQ	ND	5.38	24.70	50.6	ND	7.10	0.56	<LOQ	ND	ND	0.50	ND	<LOQ	ND
			NS 6448 R	ND	11.0	ND	<LOQ	ND	5.58	24.89	50.2	ND	6.63	0.57	<LOQ	ND	ND	0.47	ND	<LOQ	ND
			LS 6868 R	ND	10.5	ND	<LOQ	ND	4.82	28.09	48.6	ND	6.26	0.56	<LOQ	ND	ND	0.53	ND	<LOQ	ND
		Min		-	*10.5*	-	-	-	*4.82*	*23.76*	*48.6*	-	*6.26*	*0.50*	-	-	-	*0.371*	-	-	-
		Max		-	*11.2*	-	-	-	*5.77*	*28.09*	*51.4*	-	*7.55*	*0.62*	-	-	-	*0.53*	-	-	-
		N		*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*
KwaZulu-Natal	Greytown	36	DM 5953 RSF	ND	10.7	<LOQ	<LOQ	ND	6.12	26.91	47.4	ND	7.35	0.51	<LOQ	ND	ND	0.50	ND	<LOQ	ND
			LDC 5.3	ND	11.0	ND	<LOQ	ND	5.19	21.83	52.9	ND	7.81	0.53	<LOQ	ND	ND	0.360	ND	<LOQ	ND
			SSS 5052 (tuc)	ND	10.5	<LOQ	<LOQ	ND	5.07	24.02	51.0	ND	7.90	0.52	<LOQ	ND	ND	0.47	ND	<LOQ	ND
			PAN 1521 R	ND	10.2	ND	ND	ND	5.91	23.80	51.1	ND	7.53	0.58	<LOQ	ND	ND	0.46	ND	<LOQ	ND
			P61T38 R	ND	9.9	<LOQ	<LOQ	ND	5.19	22.48	52.5	ND	8.36	0.52	<LOQ	ND	ND	0.48	ND	<LOQ	ND
			NS 6448 R	ND	10.7	ND	<LOQ	ND	5.27	21.40	53.3	ND	7.89	0.53	<LOQ	ND	ND	0.428	ND	<LOQ	ND
			LS 6868 R	ND	10.3	ND	<LOQ	ND	4.46	23.73	52.4	ND	7.69	0.48	<LOQ	ND	ND	0.430	ND	<LOQ	ND
		Min		-	*9.9*	-	-	-	*4.46*	*21.40*	*47.4*	-	*7.35*	*0.48*	-	-	-	*0.360*	-	-	-
		Max		-	*11.0*	-	-	-	*6.12*	*26.91*	*53.3*	-	*8.36*	*0.58*	-	-	-	*0.50*	-	-	-
		N		*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*	*7*
RSA	Min			-	*8.5*	-	-	-	*4.19*	*18.71*	*47.4*	-	*6.26*	*0.46*	-	-	-	*0.360*	-	-	-
	Max			-	*11.2*	-	-	-	*6.12*	*28.09*	*55.1*	-	*11.65*	*0.62*	-	-	-	*0.56*	-	-	-
	N			*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.
Values below the limit of detection are reported as ND (not detected).
Limit of quantitation (LOQ) = 0.28 g Fatty acid/100 g Fatty acids.
Values below the limit of quantitation cannot be accurately quantified.

Table 9: Fatty acid profile results per cultivar from the 2019/20 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 c	C18:2 c	C18:3n6	C18:3n3	C20:0	C20:1	C20:2	C21:0	C22:0	C22:1	C24:0	C24:1
DM 5953 RSF	Bethlehem	25	ND	10.2	ND	<LOQ	ND	5.82	20.69	51.4	ND	10.47	0.54	<LOQ	ND	ND	0.439	ND	<LOQ	ND
	Marble Hall	33	ND	11.2	<LOQ	<LOQ	ND	5.77	26.35	48.8	ND	6.36	0.50	<LOQ	ND	ND	0.371	ND	<LOQ	ND
	Greytown	36	ND	10.7	<LOQ	<LOQ	ND	6.12	26.91	47.4	ND	7.35	0.51	<LOQ	ND	ND	0.50	ND	<LOQ	ND
	Min		-	*10.2*	-	-	-	*5.77*	*20.69*	*47.4*	-	*6.36*	*0.50*	-	-	-	*0.371*	-	-	-
	Max		-	*11.2*	-	-	-	*6.12*	*26.91*	*51.4*	-	*10.47*	*0.54*	-	-	-	*0.50*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
LDC 5.3	Bethlehem	25	ND	9.9	ND	<LOQ	ND	4.94	18.74	54.5	ND	10.61	0.53	<LOQ	ND	ND	0.46	ND	<LOQ	ND
	Marble Hall	33	ND	11.2	ND	<LOQ	ND	5.59	25.26	49.7	ND	6.51	0.62	<LOQ	ND	ND	0.50	ND	<LOQ	ND
	Greytown	36	ND	11.0	ND	<LOQ	ND	5.19	21.83	52.9	ND	7.81	0.53	<LOQ	ND	ND	0.360	ND	<LOQ	ND
	Min		-	*9.9*	-	-	-	*4.94*	*18.74*	*49.7*	-	*6.51*	*0.53*	-	-	-	*0.360*	-	-	-
	Max		-	*11.2*	-	-	-	*5.59*	*25.26*	*54.5*	-	*10.61*	*0.62*	-	-	-	*0.50*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
SSS 5052 (tuc)	Bethlehem	25	ND	9.1	ND	<LOQ	ND	5.16	19.93	53.7	ND	10.71	0.54	<LOQ	ND	ND	0.49	ND	<LOQ	ND
	Marble Hall	33	ND	10.7	ND	<LOQ	ND	4.91	23.76	51.4	ND	7.55	0.54	<LOQ	ND	ND	0.49	ND	<LOQ	ND
	Greytown	36	ND	10.5	<LOQ	<LOQ	ND	5.07	24.02	51.0	ND	7.90	0.52	<LOQ	ND	ND	0.47	ND	<LOQ	ND
	Min		-	*9.1*	-	-	-	*4.91*	*19.93*	*51.0*	-	*7.55*	*0.52*	-	-	-	*0.47*	-	-	-
	Max		-	*10.7*	-	-	-	*5.16*	*24.02*	*53.7*	-	*10.71*	*0.54*	-	-	-	*0.49*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
PAN 1521 R	Bethlehem	25	ND	9.5	ND	ND	ND	5.44	20.03	52.5	ND	11.14	0.56	<LOQ	ND	ND	0.49	ND	<LOQ	ND
	Marble Hall	33	ND	10.6	ND	ND	ND	5.73	24.33	50.7	ND	7.03	0.61	<LOQ	ND	ND	0.50	ND	<LOQ	ND
	Greytown	36	ND	10.2	ND	ND	ND	5.91	23.80	51.1	ND	7.53	0.58	<LOQ	ND	ND	0.46	ND	<LOQ	ND
	Min		-	*9.5*	-	-	-	*5.44*	*20.03*	*50.7*	-	*7.03*	*0.56*	-	-	-	*0.46*	-	-	-
	Max		-	*10.6*	-	-	-	*5.91*	*24.33*	*52.5*	-	*11.14*	*0.61*	-	-	-	*0.50*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
P61T38R	Bethlehem	25	ND	8.5	ND	ND	ND	5.13	18.71	54.7	ND	11.65	0.51	<LOQ	ND	ND	0.56	ND	<LOQ	ND
	Marble Hall	33	ND	10.5	ND	<LOQ	ND	5.38	24.70	50.6	ND	7.10	0.56	<LOQ	ND	ND	0.50	ND	<LOQ	ND
	Greytown	36	ND	9.9	<LOQ	<LOQ	ND	5.19	22.48	52.5	ND	8.36	0.52	<LOQ	ND	ND	0.48	ND	<LOQ	ND
	Min		-	*8.5*	-	-	-	*5.13*	*18.71*	*50.6*	-	*7.10*	*0.51*	-	-	-	*0.48*	-	-	-
	Max		-	*10.5*	-	-	-	*5.38*	*24.70*	*54.7*	-	*11.65*	*0.56*	-	-	-	*0.56*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
NS 6448 R	Bethlehem	25	ND	9.2	ND	<LOQ	ND	5.21	19.61	54.0	ND	10.62	0.51	<LOQ	ND	ND	0.435	ND	<LOQ	ND
	Marble Hall	33	ND	11.0	ND	<LOQ	ND	5.58	24.89	50.2	ND	6.63	0.57	<LOQ	ND	ND	0.47	ND	<LOQ	ND
	Greytown	36	ND	10.7	ND	<LOQ	ND	5.27	21.40	53.3	ND	7.89	0.53	<LOQ	ND	ND	0.428	ND	<LOQ	ND
	Min		-	*9.2*	-	-	-	*5.21*	*19.61*	*50.2*	-	*6.63*	*0.51*	-	-	-	*0.428*	-	-	-
	Max		-	*11.0*	-	-	-	*5.58*	*24.89*	*54.0*	-	*10.62*	*0.57*	-	-	-	*0.47*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*

Table 9: Fatty acid profile results per cultivar from the 2019/20 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 c	C18:2 c	C18:3n6	C18:3n3	C20:0	C20:1	C20:2	C21:0	C22:0	C22:1	C24:0	C24:1
LS 6868 R	Bethlehem	25	ND	8.7	ND	ND	ND	4.19	19.99	55.1	ND	10.87	0.46	<LOQ	ND	ND	0.434	ND	<LOQ	ND
	Marble Hall	33	ND	10.5	ND	<LOQ	ND	4.82	28.09	48.6	ND	6.26	0.56	<LOQ	ND	ND	0.53	ND	<LOQ	ND
	Greytown	36	ND	10.3	ND	<LOQ	ND	4.46	23.73	52.4	ND	7.69	0.48	<LOQ	ND	ND	0.430	ND	<LOQ	ND
	Min		-	*8.7*	-	-	-	*4.19*	*19.99*	*48.6*	-	*6.26*	*0.46*	-	-	-	*0.430*	-	-	-
	Max		-	*10.5*	-	-	-	*4.82*	*28.09*	*55.1*	-	*10.87*	*0.56*	-	-	-	*0.53*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
RSA	Min		-	*8.5*	-	-	-	*4.19*	*18.71*	*47.4*	-	*6.26*	*0.46*	-	-	-	*0.360*	-	-	-
	Max		-	*11.2*	-	-	-	*6.12*	*28.09*	*55.1*	-	*11.65*	*0.62*	-	-	-	*0.56*	-	-	-
	N		*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.
Values below the limit of detection are reported as ND (not detected).
Limit of quantitation (LOQ) = 0.28 g Fatty acid/100 g Fatty acids.
Values below the limit of quantitation cannot be accurately quantified.

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 85 to 94 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 7971-3:2019, was followed. The g/1 L filling mass of the soybean samples was determined and divided by two. The test weight was then extrapolated by means of the following formulas obtained from the Test Weight Conversion Chart for Soybean of the Canadian Grain Commission: $y = 0.1898x + 2.2988$ (291 to 350 g/0.5 L) and $y = 0.1895x + 2.3964$ (351 to 410 g/0.5 L).

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 (H2SO4) 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.

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:

Southern African Grain Laboratory NPC
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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/ 2019/20

REPORT OF THE NATIONAL SOYBEAN CULTIVAR TRIALS

Verantwoordelike beampte:
Responsible officer:
AS de Beer
L Bronkhorst
N Cochrane

BEDANKINGS

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

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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:

1 All the collaborators and co-operators as listed on page 11.

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.

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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 42th successive year this past growing season. A total of 18 trials (of the planned 21 trials) were planted at 18 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 and 28 cultivars. 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.

Three (3) of the 18 trials planted could not be included (16.7%) in the report compared to the eight (8) out of 22 trials (36.4%) in the 2018/19 season.

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

1 Delmas – Not harvested due to Covid 19 restrictions.
2 Brits – Flooding. Trial terminated.
3 Potchefstroom (Seed Co) – Not harvested due to Covid 19 restrictions.

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 Schweizer Reneke) and the longest in the cooler areas (80 days at Clarens).

The number of days to physiological maturity is shown in Table 5. The longest average days to maturity was experienced at Clarens (143 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 103 cm (highest) in the cool area compared to 46 cm (lowest) of the determinate cultivar P61T38 R (MG 6.1) in the warm region.

The average plant height between localities varied from a mean of 55 cm at Stoffberg to 98 cm at Bergville.

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 cultivar LS 6860 R (MG 6.0; indeterminate), had a mean pod height of 16 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), PAN 1521 R (MG 5.7; indeterminate), LS 6161 R (MG 6.1; indeterminate), PAN 1555 R (MG 5.7, indeterminate), DM 6.8i RR (MG 6.8; indeterminate) and DM 6968 RSF (MG 6.9; indeterminate).

P48T48 R (MG 4.8; indeterminate), DM 5953 RSF (MG 4.8; indeterminate) and LDC 5.3 (MG 5.3; indeterminate) and LS 6851 R (VG 5.5) (determinate) had the lowest reading of 4 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 DM 6968 RSF, NA 5509 R, PAN 1663 R, LS 6868 R at Bergville in the moderate area.

3.2.5 Green stem (Table 10)

A high percentage of green stem, was recorded at Stoffberg and Hoopstad while the cultivars DM 5351 RSF, PAN 1575 R, DM 6968 RSF and NS 5909 R showed an above average tendency for green stem for all the climatic regions. Plants also retained their leaves that could hamper the harvesting process.

3.2.6 Shattering with harvesting (Table 11)

The highest shattering occurred at Stoffberg in the moderate 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. The lowest plants ha^{-1} count were recorded at Clarens due to a dry spell just after planting.

3.2.8 Percentage undesirable seed (Table 13)

The lowest mean of 0.17% undesirable seeds was recorded for the cool region. The range varied from 0.66% at Stoffberg 0.07% at Kinross.

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

The variation in seed mass among localities ranged between 13.57 g 100^{-1} seeds at Clarens to 20.12 g 100^{-1} seeds at Cedara. The highest seed mass was recorded for PAN 1555 R in the moderate region, while SSS 5449 (tuc), had the smallest seed in all the climate regions.

3.2.10 Oil percentage (Table 15)

The cultivar PAN 1663 R had, the highest average oil percentage for all the regions (21.02% cool, 22.08% moderate, 22.54% warm). The average oil percentage are 20.85% for the warm, 20.44% for the moderate and 19.82% for the cool area.

3.2.11 Crude Protein percentage (Table 16)

The cultivar DM 5302 RSF, as the previous seasons had the highest values for all the climate regions (40.20% cool, 41.43% moderate, 42.28% warm). The overall average are 39.67% for the warm, 39.53% for the moderate and 37.99% 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 seasons, 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.

DM 5351 RSF and PAN 1521 R showed an above average yield probability (Table 19) for all the yield potentials in the cool area. For the moderate area LS 6860 R and DM 6.8i RR showed above average figures over the whole production potential range (Table 21 and 23). P61T38 R also performed above average for the warm areas (Table 23).

Localities, co-operators and addresses of the cultivar trials, 2019/20

Nr No	Lokaliteit Locality	Adres van proeflokaliteit Adress of trial locality	Tel. no. Tel. nr.	Verantwoordelike beampte Responsible officer
1	Bapsfontein	Corteva Agriscience Research Centre Farm Olifantsfontein R50 Modderfontein Road Delmas 2210	013 665 2251/082 969 1981	A Mathebula
2	Belfast	G Roos Geluk Belfast 1100	082 375 8999	L Bronkhorst
3	Bergville	J Jackson Shamrock H4 Bergville 3350	082 388 0311	R Wessels
4	Bethlehem	Kleingraan Instituut Bethlehem 9700	082 375 8999	L Bronkhorst
5	Bossies	-	082 375 8999/083 660 2521	G de Beer & L Bronkhorst
6	Brits K2	K2 Navorsingstasie Brits 0250	071 601 5092	D Leeuwner
7	Cedara	Cedara P/bag X9059 Pietermaritzburg 3200	033-355 9495/079 898 5522	J Arathoon
8	Clarens	D Terblanche Taillefert Clarens 9707	082 388 0311	R Wessels
9	Delmas-Pannar	Pannar Saad Navorsingsplaas Posbus 439 Delmas 2210	013-665 8524/082 969 1981	A Mathebula
10	Greytown	Pannar Proefplaas Posbus 19 Greytown 3250	033-413 9639	A Jarvie
11	Groblersdal (Agricol)	R Louw De Wagensrift B5 Suite 38 postnet Groblersdal 0470	083 625 4906/081 016 7848	R van Niekerk & C Schoeman
12	Hoopstad	R Taljaard Posbus 120 Hoopstad 9479	082 375 8999/083 660 2521	G de Beer & L Bronkhorst
13	Kinross	Vosstoffel Boerdery Posbus 80 Kinross 2270	082 375 8999	L Bronkhorst
14	Kroonstad	Hoërskool Kroonstad Kroonstad 9500	082 375 8999	L Bronkhorst
15	Leeudoringstad	H Fouche Sonderhout Leeudoringstad 2640	082 375 8999/083 660 2521	G de Beer & L Bronkhorst
16	Lichtenburg Wes	-	082 375 8999/083 660 2521	G de Beer & L Bronkhorst
17	Marble Hall	P Louw Marble Hall 0450	071 601 5092	D Leeuwner
18	Potchefstroom Seed Co	Seed Co Research Station Potchefstroom 2520	082 314 0959	Khuliso
19	Schweizer Reneke	J du Plessis Schweizer Reneke 2780	082 375 8999/083 660 2521	G de Beer & L Bronkhorst
20	Stoffberg	P Prinsloo Blinkwater Posbus 6 Stoffberg 1056	083 625 4906/081 016 7848	R van Niekerk & C Schoeman
21	Winterton	Terry Muirhead Gouton Farm Partnership, Winterton 3340	084 701 9915	F Middleton

Tabel 1 Sojaboonsaad eienskappe en inligting oor verskaffers, 2019/20
Table 1 Soybean seed characteristics and information about agents, 2019/20

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	BL	W	T	JA/YES	Pioneer	JA/YES
DM 5351 RSF	4.8	I	IB	W	T	JA/YES	GDM Seeds	JA/YES
DM 5953 RSF	4.8	I	IB	P	T	JA/YES	GDM Seeds	JA/YES
SSS 5449 (tuc)	4.9	I	B	P	G	JA/YES	Sensako	JA/YES
DM 5302 RSF	5.3	I	LB	P	G	JA/YES	GDM Seeds	JA/YES
LDC 5.3	5.3	I	B	W	G	JA/YES	Louise Dreyfus	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 1575 R	5.5	I	BL	P	T	JA/YES	Pannar	JA/YES
PAN 1521 R	5.7	I	IB	P	G	JA/YES	Pannar	JA/YES
PAN 1555 R	5.7	I	B	P	T	JA/YES	Pannar	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	I	LB	W	G	JA/YES	Link Seed	JA/YES
PAN 1663 R	6.0	I	IB	P	G	JA/YES	Pannar	JA/YES
P61T38 R	6.1	D	LB	W	G	JA/YES	Pannar	JA/YES
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
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
PAN 1644 R	6.7	I	IB	P	G	JA/YES	Pannar	NEE/NO
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, 2019/20
Table 2 General information in connection with soil and cultivation practices at the different trial localities, 2019/20

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	04/11/2019	-	-	-	-	-	-	-	90	Metagan Gold, Karate, Touchdown, Functional	-26.0871 S	28.5798 O
Belfast	15/11/2019	-	-	-	-	Farmer applied fertiliser			75	Farmer sprayed	25°49'58.9" S	030°04'51.3" O
Bergville/B/I	21/11/2019	-	-	-	-	-	-	-	90	-	28°44'03.6" S	29°18'48.5" O
Bethlehem/D	12/11/2019 02/12/2019	Avalon	6.98	81	325	3,92	2,1	0	75	Strongarm, Alachlor	28°09'41.9" S	028°18'16.3" O
Bossies/D		Not planted	5.73	13	268	-	-	-	75	-	-26.531064 S	25.516492 O
Brits K2/B/I	03/12/2019	Katspruit	-	-	-	-	-	-	75	-	-25.5255210 S	27.6985630 O
Cedara/D	26/11/2019	Hutton	4.31	10	315	-	19.53	-	45	Metalachlor 915 S, Bateleur Gold,Round-up Power Max	29.542 S	30.265 O
Clarens/D	13/11/2019	-	5.3	30	152	7,56	7,245	0	90	Strongarm, Alachlor	28°19'39.6" S	028°27'25.5" O
Delmas/D	20/11/2019	Sandy loam (Davidson)	-	-	-	-	-	-	90	-	-26.1427 S	28.7215 O
Greytown/D	27/11/2019	Hutton	0	20	0	22.22	33.33	44.44	75	Glyphosate	29°4'56.51" S	30°36'14.39" O
Groblersdal/B/I		Not planted	-	-	-	-	-	-	76	-	-	-
Hoopstad/D	11/12/2019	-	5.95	64	113	6,44	2,1	7,5	75	Round-up	-27.888914 S	25.823288 O
Kinross/D	05/11/2019	-	5.51	70	168	3,36	2,1	0	75	Strongarm, Alachlor	26°22"22.3" S	029°08'53.4" O
Kroonstad/D	13/12/2019	-	-	-	-	7,56	21,735	27	75	Strongarm, Alachlor	27°36'28.4" S	027°13'47.1" O
Leeudoringstad/D	22/11/2019 12/12/2019	-	6.75	14	90	5,32	9,66	10,5	75	Strongarm, Alachlor	27°17'06.3" S	026°16'35.8" O
Lichtenburg Wes/D		Not planted	-	-	-	-	-	-	75	-	-	-
Marble Hall/B/I	20/12/2019	Avalon	6.36	40	60	7,56	2,1	12	75	Farmer sprayed	25°04'10.5" S	029°08'55.2" O
Potchefstroom Seed Co/D	27/11/2019	-	-	-	-	-	-	-	75	-	-26.786 S	27.100 O
Schweizer Reneke/D	23/11/2019 12/12/2019	-	6.49	29	183	5,32	7,245	0	110	Farmer sprayed	26°57'25.9" S	025°21'13.6" O
Stoffberg/D	26/11/2019	Hutton	0	0	0	0	0	0	76	Round-up Power max	-25.436646 S	29.853606 O
Winterton/D	07/12/2019	Oxidic-Hutton	4.4	12	143	13,94	31,35	62,71	75	Round-up	28°55'35.89" S	29°33'08.38" O

Tabel 3 Reënval en besproeiing vir die verskillende lokaliteite (mm), 2019/20
Table 3 Rainfall and irrigation at the different localities (mm), 2019/20

Lokaliteit	Maandelikse reënval (mm)/							Totaal	Besproeiing	Totaal
Locality	Monthly rainfall (mm)							Total	Irrigation	Total
	Okt	Nov	Des	Jan	Feb	Mrt	Apr	*		**
Bethlehem	3,56	42,93	129,54	109,22	71,12	58,67	73,15	488,19	300	788,19
Cedara	29,97	131,31	116,58	155,95	147,31	104,64	76,71	762,47	0	762,47
Greytown	-	-	85,2	96,36	73,29	71,31	70,86	397,02	0	397,02
Schweizer Reneke	0	62	124	91	60	123	70	530	0	530
Stoffberg	0	126	202	144	90	115	78	755	0	755
Winterton	11	52	102	194	95	99	76	629	0	629

* 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, 2019/20
Table 4 The number of days from planting to 50% flowering stage of the different soybean cultivars at the different trial localities, 2019/20

Kultivar Cultivar	Koel/Cool						Matig/Moderate						Warm		
	Bapsfontein	Bethlehem	Clarens	Kinross	Winterton	Gem/Mean	Bergville	Cedara	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Schweizer-Reneke	Gem/Mean
P48T48 R	60	49	56	71	44	56	42	55	33	47	44	44	39	41	40
DM 5351 RSF	60	49	56	71	44	56	42	55	33	44	44	44	39	35	37
DM 5953 RSF	60	49	63	71	47	58	42	55	33	41	46	43	37	40	38
SSS 5449 (tuc)	69	63	73	71	57	67	49	65	47	47	47	51	52	41	46
DM 5302 RSF	70	63	73	74	55	67	42	64	39	49	53	49	54	45	50
LDC 5.3	71	75	73	71	57	69	56	63	47	49	47	52	41	44	42
SSS 5052 (tuc)	71	70	77	76	60	71	56	67	64	57	54	60	49	46	48
NA 5509 R	71	70	89	73	63	73	63	68	47	58	52	58	52	49	51
LS 6851 R	69	63	73	71	58	67	49	64	47	49	51	52	50	51	51
PAN 1575 R	71	70	77	71	59	70	49	64	64	49	51	55	55	48	52
PAN 1521 R	73	70	77	80	62	72	66	68	64	55	61	63	54	52	53
PAN 1555 R	74	75	77	80	65	74	56	69	64	58	64	62	54	49	51
NS 5909 R	75	75	94	82	67	79	67	68	59	58	48	60	57	46	52
LDC 5.9	70	75	77	71	62	71	63	68	64	58	52	61	52	46	49
DM 5901 RSF	73	70	73	73	59	70	49	67	64	52	63	59	52	49	51
LS 6860 R	76	75	94	73	65	77	70	72	64	59	63	65	53	54	54
LS 6164 R	72	70	89	76	59	73	70	67	64	53	60	63	52	49	51
PAN 1663 R	73	70	82	76	66	73	56	69	64	56	64	62	53	49	51
P61T38 R	73	75	77	76	60	72	63	69	64	59	65	64	56	49	53
LS 6161 R	72	75	77	79	64	73	56	67	64	60	57	61	56	47	52
SSS 6560 (tuc)	72	75	77	80	60	73	63	66	64	52	56	60	57	51	54
NS 6448 R	74	70	77	76	59	71	63	70	52	61	66	62	56	51	54
P64T39 R	73	75	94	76	63	76	67	70	64	58	59	64	57	51	54
PAN 1644 R	73	75	94	79	66	77	63	69	64	59	66	64	56	53	54
LS 6868 R	74	70	94	80	66	77	67	73	52	55	65	62	59	41	50
DM 6.8i RR	72	70	77	80	65	73	67	70	59	59	66	64	58	52	55
DM 6968 RSF	76	70	94	79	66	77	70	68	64	57	66	65	57	48	52
P71T74 R	75	75	94	80	66	78	67	69	64	61	66	65	60	57	58
Gem/Mean	71	69	80	76	60	71	58	66	56	54	57	58	52	48	50

Tabel 5 Die aantal dae vanaf plant tot fisiologiesrypstadium van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2019/20

Table 5 The number of days from planting to physiological maturity of the different soybean cultivars at the different trial localities, 2019/20

Kultivar Cultivar	Koel/Cool				Matig/Moderate					Warm		
	Bethlehem	Clarens	Winterton	Gem/Mean	Bergville	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Schweizer-Reneke	Gem/Mean
P48T48 R	109	128	104	114	118	98	122	118	114	120	121	120
DM 5351 RSF	109	128	114	117	130	98	121	119	117	120	121	120
DM 5953 RSF	109	128	108	115	118	98	120	119	114	117	120	119
SSS 5449 (tuc)	130	140	116	129	118	119	122	123	121	127	120	124
DM 5302 RSF	130	140	114	128	118	115	120	121	119	118	122	120
LDC 5.3	126	145	123	131	125	126	128	125	126	120	121	120
SSS 5052 (tuc)	130	145	123	133	125	126	126	131	127	128	125	126
NA 5509 R	126	145	125	132	125	119	129	128	125	127	125	126
LS 6851 R	130	149	118	132	125	126	124	130	126	131	121	126
PAN 1575 R	130	140	120	130	125	119	130	124	125	122	121	122
PAN 1521 R	121	140	118	126	130	119	121	128	125	120	127	123
PAN 1555 R	136	149	126	137	125	126	129	130	127	121	121	121
NS 5909 R	151	149	128	143	130	126	133	131	130	131	123	127
LDC 5.9	130	149	126	135	130	126	133	131	130	129	129	129
DM 5901 RSF	145	140	122	136	125	126	128	126	126	131	125	128
LS 6860 R	151	154	127	144	130	126	132	130	130	134	125	129
LS 6164 R	135	145	125	135	137	126	126	128	129	133	123	128
PAN 1663 R	146	128	128	134	126	126	124	130	127	134	125	129
P61T38 R	126	145	130	134	123	126	134	132	129	130	123	126
LS 6161 R	140	140	125	135	130	126	129	131	129	131	125	128
SSS 6560 (tuc)	135	140	126	134	130	126	129	128	128	127	123	125
NS 6448 R	126	145	130	134	130	126	137	132	131	135	125	130
P64T39 R	151	154	128	144	130	126	133	131	130	137	121	129
PAN 1644 R	136	145	127	136	126	126	132	135	130	137	133	135
LS 6868 R	140	154	132	142	-	126	136	134	132	138	128	133
DM 6.8i RR	145	149	130	141	137	126	136	135	133	140	127	134
DM 6968 RSF	156	149	133	146	137	126	138	136	134	138	128	133
P71T74 R	151	154	132	146	137	126	144	137	136	142	137	140
Gem/Mean	134	143	123	134	127	122	129	129	127	129	124	127

Tabel 6 Die aantal dae vanaf plant tot oesstadium van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2019/20
Table 6 The number of days from planting to maturity of the different soybean cultivars at the different trial localities, 2019/20

Kultivar Cultivar	Koel/Cool					Matig/Moderate					Warm		
	Belfast	Bethlehem	Clarens	Kinross	Gem/Mean	Bergville	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Schweizer-Reneke	Gem/Mean
P48T48 R	154	136	154	173	154	125	125	131	133	129	134	130	132
DM 5351 RSF	154	136	154	162	152	144	125	131	133	133	131	130	131
DM 5953 RSF	154	136	154	173	154	125	125	131	133	129	131	130	131
SSS 5449 (tuc)	176	156	174	163	167	125	143	131	135	134	140	130	135
DM 5302 RSF	154	156	174	173	164	125	143	131	135	134	131	130	131
LDC 5.3	186	163	181	163	173	144	143	139	135	140	131	130	131
SSS 5052 (tuc)	186	163	174	173	174	144	158	139	139	145	140	140	140
NA 5509 R	186	156	189	186	179	144	143	139	142	142	140	140	140
LS 6851 R	186	156	181	163	172	144	165	139	135	146	140	140	140
PAN 1575 R	165	156	118	163	150	144	143	139	135	140	140	140	140
PAN 1521 R	165	156	174	173	167	144	143	131	142	140	140	130	135
PAN 1555 R	186	163	171	182	176	144	143	139	139	141	140	140	140
NS 5909 R	187	177	189	192	186	144	158	139	142	146	152	140	146
LDC 5.9	186	170	196	182	184	144	143	152	142	145	152	140	146
DM 5901 RSF	186	170	189	192	184	144	143	152	139	145	142	152	147
LS 6860 R	186	177	196	192	188	144	165	152	139	150	152	140	146
LS 6164 R	186	177	189	192	186	151	134	139	142	142	152	140	146
PAN 1663 R	176	163	181	192	178	144	143	139	142	142	152	140	146
P61T38 R	186	177	189	173	181	144	143	152	142	145	140	140	140
LS 6161 R	186	156	181	179	176	144	143	139	147	143	142	140	141
SSS 6560 (tuc)	186	177	189	182	184	144	143	139	147	143	140	130	135
NS 6448 R	187	177	189	182	184	144	143	152	147	147	152	140	146
P64T39 R	186	177	196	192	188	144	158	152	156	152	152	140	146
PAN 1644 R	187	177	196	192	188	144	150	152	156	151	152	140	146
LS 6868 R	186	177	196	192	188	154	165	152	156	157	152	140	146
DM 6.8i RR	186	177	196	192	188	154	165	152	156	157	152	152	152
DM 6968 RSF	186	177	196	192	188	154	165	152	156	157	152	140	146
P71T74 R	187	177	196	192	188	144	165	152	156	154	152	152	152
Gem/Mean	179	165	181	181	176	143	147	142	143	144	144	138	141

Tabel 7 Die planthoogte van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2019/20
Table 7 The plant height of the different soybean cultivars at the different trial localities, 2019/20

Kultivar Cultivar	Koel/Cool							Matig/Moderate							Warm			
	Bapsfontein	Belfast	Bethlehem	Clarens	Kinross	Winterton	Gem/Mean	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Marble Hall	Schweizer-Reneke	Gem/Mean
P48T48 R	52	62	53	57	43	53	53	70	72	64	50	26	40	54	75	47	22	48
DM 5351 RSF	69	73	72	62	53	67	66	100	90	84	57	50	45	71	65	62	56	61
DM 5953 RSF	66	68	83	65	62	60	67	90	83	73	62	60	45	69	65	60	48	58
SSS 5449 (tuc)	85	90	90	68	70	67	78	95	85	83	68	55	55	73	56	58	54	56
DM 5302 RSF	76	88	82	63	63	60	72	85	75	70	55	45	50	63	80	57	44	60
LDC 5.3	73	88	92	73	63	67	76	105	83	80	65	42	50	71	71	50	49	57
SSS 5052 (tuc)	91	92	93	68	73	77	82	110	88	81	68	70	70	81	90	60	55	68
NA 5509 R	87	88	100	75	77	73	83	95	92	87	67	56	56	75	100	60	61	74
LS 6851 R	59	77	80	57	42	60	62	60	70	73	52	42	35	55	66	52	43	54
PAN 1575 R	80	92	95	72	62	77	80	95	92	82	72	45	55	74	90	63	48	67
PAN 1521 R	87	97	108	85	90	70	90	105	90	79	72	75	62	80	98	62	49	70
PAN 1555 R	86	100	90	75	70	73	82	110	96	85	73	75	60	83	100	65	69	78
NS 5909 R	80	95	95	72	75	70	81	110	92	82	78	70	65	83	100	62	70	77
LDC 5.9	83	103	110	73	88	70	88	100	91	89	78	80	58	83	75	65	68	69
DM 5901 RSF	86	93	90	75	68	63	79	95	84	78	60	71	70	76	90	63	60	71
LS 6860 R	100	102	103	80	77	83	91	110	98	92	80	65	75	87	116	68	86	90
LS 6164 R	99	102	112	77	83	80	92	105	110	91	68	87	60	87	85	72	62	73
PAN 1663 R	80	90	98	73	65	73	80	105	85	82	73	58	52	76	96	65	71	77
P61T38 R	71	77	78	63	47	67	67	65	76	78	57	45	28	58	65	45	29	46
LS 6161 R	95	102	103	83	70	83	89	90	87	94	78	75	63	81	90	63	76	76
SSS 6560 (tuc)	90	88	113	78	80	70	87	105	99	89	72	80	61	84	95	70	78	81
NS 6448 R	78	82	93	70	60	77	77	95	90	89	67	55	60	76	90	58	67	72
P64T39 R	91	102	107	77	93	73	90	110	102	90	78	80	68	88	106	67	78	83
PAN 1644 R	94	97	82	77	80	70	83	100	90	89	67	70	61	80	66	63	71	67
LS 6868 R	87	98	95	70	63	83	83	105	80	85	67	56	44	73	65	58	50	58
DM 6.8i RR	107	118	120	92	92	87	103	110	120	106	63	80	56	89	113	85	90	96
DM 6968 RSF	95	97	97	67	83	87	88	110	100	92	80	50	59	82	85	77	90	84
P71T74 R	107	103	103	84	93	73	94	110	102	96	82	45	48	81	122	83	71	92
Gem/Mean	84	92	94	73	71	72	81	98	90	84	68	61	55	76	86	63	61	70

Tabel 8 Die peulhoogte van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2019/20
Table 8 The pod height of the different soybean cultivars at the different trial localities, 2019/20

Kultivar Cultivar	Koel/Cool							Matig/Moderate							Warm			
	Bapsfontein	Belfast	Bethlehem	Clarens	Kinross	Winterton	Gem/Mean	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Marble Hall	Schweizer-Reneke	Gem/Mean
P48T48 R	6	9	1	1	4	5	4	5	10	9	1	1	4	5	11	2	1	5
DM 5351 RSF	6	6	4	1	6	5	5	10	11	15	2	5	5	8	4	5	5	5
DM 5953 RSF	7	9	6	2	8	8	7	8	10	11	3	5	5	7	4	4	2	4
SSS 5449 (tuc)	9	8	9	5	9	11	9	8	12	14	4	5	3	8	5	5	4	5
DM 5302 RSF	6	9	7	3	5	6	6	8	13	14	3	3	6	8	9	2	4	5
LDC 5.3	11	9	10	5	6	5	8	13	10	13	3	4	6	8	6	3	3	4
SSS 5052 (tuc)	14	10	10	8	11	13	11	10	15	19	6	6	15	12	15	8	7	10
NA 5509 R	14	12	11	6	9	9	10	10	16	16	3	5	3	9	14	6	6	9
LS 6851 R	9	8	12	3	3	7	7	5	16	18	2	5	1	8	6	4	1	4
PAN 1575 R	12	12	8	1	6	11	8	10	15	16	3	4	7	9	13	7	5	8
PAN 1521 R	8	13	13	7	12	13	11	10	19	18	7	10	11	12	16	7	4	9
PAN 1555 R	15	13	12	6	6	16	12	18	19	20	8	5	13	14	14	7	5	9
NS 5909 R	13	11	16	10	12	18	13	11	19	21	14	14	13	15	14	9	4	9
LDC 5.9	8	14	15	6	5	7	9	10	15	14	6	11	4	10	11	6	10	9
DM 5901 RSF	10	11	11	7	7	9	9	10	14	14	3	5	8	9	12	9	5	9
LS 6860 R	15	11	14	9	8	17	13	10	15	21	9	5	15	13	20	9	19	16
LS 6164 R	15	12	13	7	10	15	12	15	16	21	5	9	5	12	9	8	4	7
PAN 1663 R	10	10	9	5	7	11	9	15	14	15	5	9	6	11	10	8	10	10
P61T38 R	17	12	13	6	6	13	11	10	18	21	9	5	2	11	10	7	1	6
LS 6161 R	17	12	12	10	7	19	13	10	15	18	9	10	8	12	11	7	11	9
SSS 6560 (tuc)	10	12	14	8	9	10	11	18	17	21	7	8	7	13	9	8	8	8
NS 6448 R	13	11	13	10	6	10	11	10	16	21	8	5	5	11	11	4	5	7
P64T39 R	13	13	14	6	11	11	11	19	17	16	8	5	6	12	12	3	8	8
PAN 1644 R	11	11	10	5	4	8	8	12	15	20	3	6	9	11	6	3	5	5
LS 6868 R	12	14	11	6	7	13	11	16	14	20	6	5	3	11	9	4	4	6
DM 6.8i RR	15	13	14	8	11	9	12	17	15	17	9	9	7	12	17	7	11	11
DM 6968 RSF	20	15	14	8	14	16	15	17	15	21	13	5	8	13	9	10	11	10
P71T74 R	19	12	15	9	13	14	14	10	16	19	8	4	4	10	20	8	6	11
Gem/Mean	12	11	11	6	8	11	10	12	15	17	6	6	7	10	11	6	6	8

Tabel 9 Omvalwaarnemings (1-5) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2019/20
Table 9 Lodging dat (1-5) of the different soybean cultivars at the different trial localities, 2019/20

Kultivar Cultivar	Koel/Cool							Matig/Moderate						Warm			
	Bapsfontein	Belfast	Bethlehem	Clarens	Kinross	Winterton	Gem/Mean	Bergville	Greytown	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Marble Hall	Schweizer-Reneke	Gem/Mean
P48T48 R	1,67	1,00	1,00	1,00	1,00	1,00	1,11	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
DM 5351 RSF	3,00	1,00	1,00	1,00	1,00	1,00	1,33	4,00	1,00	1,00	1,00	1,00	1,60	1,00	1,00	1,00	1,00
DM 5953 RSF	2,00	1,00	1,00	1,00	1,00	1,00	1,17	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
SSS 5449 (tuc)	2,67	1,00	1,00	1,00	1,00	1,00	1,28	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
DM 5302 RSF	2,67	1,00	1,00	1,00	1,00	1,00	1,28	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LDC 5.3	2,33	1,00	1,00	1,00	1,00	1,00	1,22	1,00	1,33	1,00	1,00	1,00	1,07	1,00	1,00	1,00	1,00
SSS 5052 (tuc)	2,67	1,00	1,00	1,00	1,00	1,00	1,28	1,00	1,33	1,00	1,00	2,00	1,27	1,00	1,00	1,00	1,00
NA 5509 R	2,67	1,00	1,00	1,00	1,00	1,00	1,28	5,00	1,00	1,00	1,00	2,00	2,00	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	1,33	1,00	1,00	1,00	1,07	1,00	1,33	1,00	1,11
PAN 1575 R	2,00	1,00	1,00	1,00	1,00	1,00	1,17	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PAN 1521 R	3,00	1,00	2,00	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	1,00
PAN 1555 R	3,00	1,00	1,00	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	1,00
NS 5909 R	3,33	1,00	1,00	1,00	1,00	1,00	1,39	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LDC 5.9	3,00	1,00	2,00	1,00	1,00	1,00	1,50	4,00	1,00	1,00	1,00	1,00	1,60	1,00	1,00	1,00	1,00
DM 5901 RSF	2,33	1,00	1,00	1,00	1,00	1,00	1,22	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LS 6860 R	3,33	1,00	1,00	1,00	1,00	1,00	1,39	4,00	1,67	1,00	1,00	2,00	1,93	1,00	1,00	1,00	1,00
LS 6164 R	3,33	1,00	2,33	1,00	1,00	1,00	1,61	3,00	1,00	1,00	1,00	2,00	1,60	1,00	1,00	1,00	1,00
PAN 1663 R	2,33	1,00	1,00	1,00	1,00	1,00	1,22	5,00	1,00	1,00	1,00	1,00	1,80	1,00	1,00	1,00	1,00
P61T38 R	2,00	1,00	1,00	1,00	1,00	1,00	1,17	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LS 6161 R	3,00	1,00	1,00	1,00	1,00	1,00	1,33	3,00	1,00	1,00	1,00	2,00	1,60	1,00	1,00	1,00	1,00
SSS 6560 (tuc)	3,00	1,00	2,33	1,00	1,00	1,00	1,56	2,33	1,00	1,00	1,00	2,00	1,47	1,00	1,00	1,00	1,00
NS 6448 R	2,33	1,00	1,00	1,00	1,00	1,00	1,22	3,00	1,00	1,00	1,00	1,00	1,40	1,00	1,00	1,00	1,00
P64T39 R	3,33	1,00	3,00	1,00	1,00	1,00	1,72	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PAN 1644 R	3,00	1,00	1,00	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	1,00
LS 6868 R	2,67	1,00	1,00	1,00	1,00	1,00	1,28	5,00	1,00	1,00	1,00	1,00	1,80	1,00	1,00	1,00	1,00
DM 6.8i RR	3,33	1,00	1,33	1,00	1,00	1,67	1,56	4,00	1,67	1,00	1,00	1,00	1,73	1,00	1,00	1,00	1,00
DM 6968 RSF	4,00	1,67	1,33	1,00	1,00	1,00	1,67	5,00	1,00	1,00	1,00	1,00	1,80	1,00	1,00	1,00	1,00
P71T74 R	3,67	1,00	1,33	1,00	1,00	1,33	1,56	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Gem/Mean	2,74	1,02	1,27	1,00	1,00	1,04	1,35	2,26	1,08	1,00	1,00	1,21	1,31	1,00	1,01	1,00	1,00

Tabel 10 Groenstam (1-5) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2019/20
Table 10 Greenstem (1-5) of the different soybean cultivars at the different trial localities, 2019/20

	Koel/Cool							Matig/Moderate						Warm			
Kultivar Cultivar	Bapsfontein	Belfast	Bethlehem	Clarens	Kinross	Winterton	Gem/Mean	Bergville	Cedara	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Marble Hall	Schweizer-Reneke	Gem/Mean
P48T48 R	1,33	5,00	1,00	1,00	1,00	1,00	1,72	1,00	1,00	2,33	1,00	1,00	1,27	3,00	3,67	1,00	2,56
DM 5351 RSF	1,67	3,33	1,00	1,00	1,00	1,00	1,50	4,00	1,00	1,00	3,00	3,00	2,40	2,00	2,67	1,00	1,89
DM 5953 RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,33	1,00	1,00	1,07	1,00	1,00	1,00	1,00
SSS 5449 (tuc)	1,33	2,00	1,00	1,00	1,00	1,00	1,22	1,00	1,00	1,00	1,00	4,00	1,60	3,00	1,00	1,00	1,67
DM 5302 RSF	1,33	3,00	1,00	1,00	1,00	1,00	1,39	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LDC 5.3	2,33	2,67	1,00	1,00	1,00	1,00	1,50	1,00	1,00	1,00	3,00	3,00	1,80	3,00	1,00	1,00	1,67
SSS 5052 (tuc)	2,00	2,00	1,33	1,00	2,00	1,00	1,56	1,00	1,33	1,00	1,00	2,00	1,27	1,00	1,33	1,00	1,11
NA 5509 R	2,33	1,00	1,00	1,00	1,00	1,00	1,22	1,00	1,00	1,00	1,00	2,00	1,20	1,00	2,00	1,00	1,33
LS 6851 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,67	1,00	5,00	1,93	5,00	2,67	2,67	3,44
PAN 1575 R	1,33	3,67	1,00	1,00	1,00	1,00	1,50	2,00	1,00	1,00	1,00	5,00	2,00	5,00	1,00	1,00	2,33
PAN 1521 R	1,00	3,00	1,00	1,00	1,00	1,00	1,33	1,00	1,00	1,00	1,00	5,00	1,80	1,00	1,33	1,00	1,11
PAN 1555 R	2,33	1,00	1,33	1,00	1,00	1,00	1,28	1,00	1,00	1,00	2,00	2,00	1,40	5,00	1,00	1,00	2,33
NS 5909 R	2,67	2,67	1,00	1,00	1,00	1,00	1,56	1,00	2,00	1,00	1,00	5,00	2,00	5,00	2,00	1,00	2,67
LDC 5.9	2,00	1,33	1,00	1,00	2,00	1,00	1,39	1,00	1,00	1,00	1,00	5,00	1,80	1,00	1,00	1,67	1,22
DM 5901 RSF	2,33	3,00	1,00	1,00	1,00	1,00	1,56	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,33	1,00	1,44
LS 6860 R	3,00	2,33	1,00	1,00	1,33	1,00	1,61	1,00	1,00	1,33	1,00	3,00	1,47	1,00	1,33	1,00	1,11
LS 6164 R	3,00	1,00	1,00	1,00	1,00	1,00	1,33	1,00	1,00	1,00	2,00	2,00	1,40	3,33	2,33	1,00	2,22
PAN 1663 R	1,67	1,00	1,00	1,00	1,00	1,00	1,11	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
P61T38 R	2,33	2,00	1,00	1,00	2,00	1,00	1,56	1,00	1,33	1,00	1,00	1,00	1,07	4,00	1,67	1,00	2,22
LS 6161 R	3,00	1,00	1,67	1,00	1,33	1,00	1,50	3,00	1,00	1,00	1,00	1,00	1,40	1,00	3,00	1,00	1,67
SSS 6560 (tuc)	2,33	1,00	1,00	1,00	2,00	1,00	1,39	1,00	1,00	1,00	2,00	4,00	1,80	3,00	2,33	1,00	2,11
NS 6448 R	2,00	1,00	1,00	1,00	2,00	1,00	1,33	1,00	1,00	1,00	1,00	4,00	1,60	1,00	1,00	1,00	1,00
P64T39 R	3,67	1,67	1,00	1,00	1,00	1,00	1,56	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PAN 1644 R	2,33	1,00	1,00	1,00	1,00	1,00	1,22	1,00	1,00	1,00	1,00	1,00	1,00	3,33	1,33	1,00	1,89
LS 6868 R	3,67	3,00	1,00	1,00	1,00	1,00	1,78	1,00	1,00	1,00	1,00	2,00	1,20	3,67	1,67	2,00	2,44
DM 6.8i RR	3,33	2,00	1,00	1,00	1,00	1,00	1,56	1,00	1,00	1,00	1,00	1,00	1,00	2,33	3,67	1,00	2,33
DM 6968 RSF	3,67	3,67	1,00	1,00	2,00	1,00	2,06	1,00	2,33	2,00	2,00	1,00	1,67	1,00	2,67	2,00	1,89
P71T74 R	3,00	4,00	1,00	1,00	2,00	1,00	2,00	1,00	1,00	1,00	3,00	1,00	1,40	5,00	3,67	1,00	3,22
Gem/Mean	2,25	2,15	1,05	1,00	1,27	1,00	1,45	1,21	1,11	1,13	1,36	2,43	1,45	2,45	1,85	1,15	1,82

Tabel 11 Oopspring (1-5) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2019/20
Table 11 Shattering (1-5) of the different soybean cultivars at the different trial localities, 2019/20

Kultivar Cultivar	Koel/Cool							Matig/Modeerate					Warm			
	Bapsfontein	Belfast	Bethlehem	Clarens	Kinross	Winterton	Gem/Mean	Cedara	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Marble Hall	Schweizer-Reneke	Gem/Mean
P48T48 R	1,33	1,00	1,00	1,00	1,67	1,00	1,17	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
DM 5351 RSF	1,33	1,00	1,00	1,00	2,00	1,00	1,22	1,00	1,00	1,00	2,00	1,25	1,00	1,00	1,00	1,00
DM 5953 RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	1,25	1,00	1,00	1,00	1,00
SSS 5449 (tuc)	1,67	1,00	1,00	1,00	1,00	1,00	1,11	1,00	1,00	1,00	3,00	1,50	1,00	1,67	1,00	1,22
DM 5302 RSF	1,67	1,00	1,00	1,00	1,33	1,00	1,17	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LDC 5.3	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
SSS 5052 (tuc)	1,33	1,00	1,00	1,00	1,00	1,00	1,06	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	1,00	1,00	1,00	1,00
LS 6851 R	1,33	1,00	1,00	1,00	1,00	1,00	1,06	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PAN 1575 R	1,33	1,00	1,00	1,00	1,00	1,00	1,06	1,00	1,00	1,00	2,00	1,25	1,00	1,00	1,00	1,00
PAN 1521 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	1,25	1,00	1,00	1,00	1,00
PAN 1555 R	1,33	1,00	1,00	1,00	1,00	1,00	1,06	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
NS 5909 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	1,00	1,00	1,00	1,00
LDC 5.9	1,00	1,00	1,00	1,00	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 5901 RSF	1,33	1,00	1,00	1,00	1,00	1,00	1,06	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
LS 6860 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	1,25	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	1,00	1,00	1,00	1,00	1,00	1,00
PAN 1663 R	1,33	1,00	1,00	1,00	1,00	1,00	1,06	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
P61T38 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	1,25	1,00	1,00	1,00	1,00
LS 6161 R	1,00	1,00	1,00	1,00	1,67	1,00	1,11	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
SSS 6560 (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	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	1,00	1,00	2,00	1,25	1,00	1,00	1,00	1,00
P64T39 R	1,33	1,00	1,00	1,00	1,00	1,00	1,06	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
PAN 1644 R	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	3,00	1,50	1,00	1,00	1,00	1,00
LS 6868 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	1,00	1,00	1,00	1,00
DM 6.8i RR	1,00	1,00	1,00	1,00	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 6968 RSF	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
P71T74 R	1,33	1,00	1,00	1,00	1,00	1,00	1,06	1,00	1,00	1,00	3,00	1,50	1,00	1,00	1,00	1,00
Gem/Mean	1,17	1,00	1,00	1,00	1,10	1,00	1,04	1,00	1,00	1,00	1,46	1,12	1,00	1,02	1,00	1,01

Tabel 12 Die planttelling geoes (x 1000) van die verskillende sojaboonkultivars by die verskillende proeflokaliteite, 2019/20
Table 12 The number of plant harvested (x 1000) of the different soybean cultivars at the different trial localities, 2019/20

Kultivar Cultivar	Koel/Cool							Matig/Moderaste					Warm			
	Bapsfontein	Belfast	Bethlehem	Clarens	Kinross	Winterton	Gem/Mean	Cedara	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Marble Hall	Schweizer-Reneke	Gem/Mean
P48T48 R	123	117	285	82	205	259	178	197	179	145	127	162	172	256	111	180
DM 5351 RSF	93	211	312	99	217	267	200	258	141	162	126	172	165	246	105	172
DM 5953 RSF	79	226	333	146	212	312	218	247	204	210	120	196	155	249	108	171
SSS 5449 (tuc)	149	223	298	168	201	299	223	253	170	197	125	186	170	256	160	195
DM 5302 RSF	152	217	306	151	206	304	223	236	154	233	132	189	168	245	161	192
LDC 5.3	122	201	269	169	202	218	197	215	163	207	123	177	167	245	98	170
SSS 5052 (tuc)	182	195	278	134	236	278	217	257	186	165	125	183	203	292	138	211
NA 5509 R	153	183	249	90	202	249	188	230	136	167	126	165	178	257	135	190
LS 6851 R	177	200	313	154	187	301	222	260	162	160	112	174	202	277	151	210
PAN 1575 R	99	117	211	75	178	177	143	197	157	162	119	159	125	256	128	170
PAN 1521 R	141	219	318	143	204	301	221	235	215	203	122	194	173	272	148	198
PAN 1555 R	104	196	293	121	195	252	194	218	188	133	125	166	197	243	69	170
NS 5909 R	176	181	286	129	212	269	209	237	172	192	119	180	155	238	231	208
LDC 5.9	145	183	297	172	193	190	197	206	127	145	120	149	137	239	101	159
DM 5901 RSF	159	192	304	80	213	235	197	181	168	140	123	153	165	254	160	193
LS 6860 R	149	168	277	104	217	263	196	181	160	122	133	149	148	259	116	174
LS 6164 R	144	191	308	146	231	287	218	252	142	158	123	169	200	277	169	216
PAN 1663 R	163	157	277	95	196	280	195	201	148	138	123	153	88	249	117	151
P61T38 R	172	183	307	134	233	270	217	233	154	160	117	166	143	264	172	193
LS 6161 R	190	223	288	166	209	309	231	218	160	195	131	176	153	276	127	186
SSS 6560 (tuc)	157	194	317	125	194	312	217	258	188	215	120	195	157	269	113	179
NS 6448 R	145	176	269	145	224	290	208	250	129	123	124	157	167	258	119	181
P64T39 R	137	201	330	145	209	293	219	269	252	203	123	212	190	260	138	196
PAN 1644 R	109	189	297	106	147	270	186	249	167	170	120	176	125	262	111	166
LS 6868 R	124	171	308	74	192	251	187	174	171	165	127	159	142	256	114	170
DM 6.8i RR	132	209	311	147	222	311	222	279	191	198	122	198	185	279	148	204
DM 6968 RSF	141	92	252	70	181	227	161	140	162	98	116	129	167	254	109	177
P71T74 R	172	195	321	151	224	273	223	218	173	190	116	174	173	257	123	184
Gem/Mean	142	186	293	126	205	270	204	227	169	170	123	172	163	259	131	184

Tabel 13 Persentasie ongewenste sade van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2019/20
Table 13 Percentage undesirable seed of the different soybean cultivars at the different trial localities, 2019/20

Kultivar Cultivar	Koel/Cool							Matig/Moderate						Warm			
	Bapsfontein	Belfast	Bethlehem	Clarens	Kinross	Winterton	Gem/Mean	Cedara	Greytown	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Marble Hall	Schweizer-Reneke	Gem/Mean
P48T48 R	0,00	0,00	0,00	0,00	0,00	0,23	0,04	0,00	0,38	0,00	0,00	0,11	0,10	0,19	0,00	0,41	0,20
DM 5351 RSF	0,00	0,00	0,10	0,00	0,00	0,05	0,03	0,30	0,36	0,08	0,00	0,73	0,29	0,35	0,00	0,16	0,17
DM 5953 RSF	0,00	0,00	0,22	0,36	0,13	0,56	0,21	0,00	0,23	0,00	0,15	0,00	0,08	0,32	0,00	0,19	0,17
SSS 5449 (tuc)	0,00	0,16	0,56	0,31	0,00	0,12	0,19	0,21	0,18	0,00	0,00	0,52	0,18	0,35	0,00	0,20	0,18
DM 5302 RSF	0,08	0,09	0,14	0,48	0,00	0,26	0,18	0,16	0,58	0,00	0,55	0,26	0,31	0,10	0,36	0,47	0,31
LDC 5.3	0,12	0,30	0,21	0,59	0,14	0,40	0,29	0,00	0,31	0,26	0,37	0,27	0,24	0,24	0,00	0,49	0,24
SSS 5052 (tuc)	0,26	0,00	0,15	0,81	0,00	0,10	0,22	0,00	0,55	0,00	0,24	0,00	0,16	0,00	0,00	0,21	0,07
NA 5509 R	0,16	0,18	0,21	0,43	0,00	0,12	0,18	0,00	0,30	0,00	0,06	1,55	0,38	0,07	0,00	0,30	0,12
LS 6851 R	0,49	0,12	0,45	0,67	0,50	0,00	0,37	0,00	0,55	0,07	0,34	0,75	0,34	0,00	0,00	0,30	0,10
PAN 1575 R	0,27	0,00	0,34	0,09	0,13	0,14	0,16	0,40	0,23	0,00	0,17	1,12	0,38	0,00	0,00	0,33	0,11
PAN 1521 R	0,34	0,15	0,24	0,25	0,00	0,05	0,17	0,22	0,58	0,08	0,10	0,61	0,32	0,00	0,27	0,25	0,17
PAN 1555 R	0,07	0,12	0,00	0,32	0,00	0,11	0,10	0,20	0,32	0,34	0,00	0,37	0,25	0,23	0,00	0,36	0,20
NS 5909 R	0,19	0,64	0,00	0,22	0,00	0,37	0,24	0,00	0,38	0,36	0,11	0,45	0,26	0,11	0,27	0,83	0,40
LDC 5.9	0,08	0,00	0,00	0,13	0,00	0,05	0,04	0,20	0,40	0,00	0,03	0,88	0,30	0,00	0,00	0,61	0,20
DM 5901 RSF	0,07	0,00	0,00	0,36	0,00	0,24	0,11	0,00	0,50	0,26	0,00	0,64	0,28	0,09	0,00	0,32	0,14
LS 6860 R	0,10	0,61	0,22	0,73	0,09	0,07	0,30	0,42	0,77	0,00	0,16	1,22	0,51	0,05	0,00	0,45	0,17
LS 6164 R	0,00	0,00	0,89	0,25	0,00	0,11	0,21	0,31	0,51	0,20	0,18	0,66	0,37	0,09	0,16	0,47	0,24
PAN 1663 R	0,43	0,00	0,00	0,43	0,21	0,24	0,22	0,06	0,83	0,28	0,24	1,69	0,62	0,38	0,00	0,25	0,21
P61T38 R	0,00	0,00	0,00	0,08	0,13	0,22	0,07	0,72	0,42	0,12	0,03	0,59	0,38	0,67	0,00	0,31	0,33
LS 6161 R	0,13	0,00	0,21	0,32	0,00	0,10	0,13	0,33	0,91	0,23	0,13	0,39	0,40	0,00	0,00	0,24	0,08
SSS 6560 (tuc)	0,03	0,00	0,31	0,15	0,00	0,26	0,13	0,18	0,25	0,00	0,07	0,54	0,21	0,28	0,21	0,20	0,23
NS 6448 R	0,16	0,00	0,00	0,17	0,00	0,10	0,07	0,00	0,55	0,00	0,18	0,90	0,33	0,21	0,00	0,25	0,15
P64T39 R	0,33	0,24	0,23	0,39	0,10	0,26	0,26	0,46	0,55	0,11	0,21	0,81	0,43	0,09	0,20	0,02	0,10
PAN 1644 R	0,19	0,00	0,00	0,23	0,09	0,18	0,12	0,22	0,50	0,25	0,00	0,20	0,23	0,00	0,00	0,14	0,05
LS 6868 R	0,18	0,00	0,19	1,40	0,07	0,37	0,37	0,21	0,69	0,09	0,05	0,83	0,37	0,00	0,15	0,15	0,10
DM 6.8i RR	0,21	0,00	0,00	0,46	0,00	0,19	0,14	0,39	0,82	0,14	0,19	0,49	0,41	0,06	0,46	0,16	0,23
DM 6968 RSF	0,18	0,00	0,13	0,21	0,11	0,05	0,11	0,27	0,69	0,28	0,09	1,18	0,50	0,00	0,32	0,47	0,26
P71T74 R	0,40	0,00	0,25	0,31	0,20	0,25	0,24	0,32	0,45	0,35	0,24	0,77	0,43	0,77	0,22	0,04	0,34
Gem/Mean	0,16	0,09	0,18	0,36	0,07	0,19	0,17	0,20	0,49	0,13	0,14	0,66	0,32	0,17	0,09	0,31	0,19

Tabel 14 Massa van 100 sade (g) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2019/20
Table 14 Mass 100 seeds (g) of the different soybean cultivars at the different trial localities, 2019/20

Kultivar Cultivar	Koel/Cool							Matig/Moderate						Warm			
	Bapsfontein	Belfast	Bethlehem	Clarens	Kinross	Winterton	Gem/Mean	Cedara	Greytown	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Marble Hall	Schweizer-Reneke	Gem/Mean
P48T48 R	17,99	18,13	18,69	16,66	19,05	20,08	18,43	20,09	21,07	19,71	18,80	17,27	19,39	19,27	18,96	18,20	18,81
DM 5351 RSF	14,70	17,61	16,34	14,31	15,94	17,11	16,00	18,65	17,23	16,43	16,33	14,83	16,70	17,33	17,36	16,53	17,07
DM 5953 RSF	13,75	15,85	17,24	14,47	16,81	16,58	15,78	17,54	16,40	16,46	14,13	17,84	16,48	15,93	17,69	16,13	16,59
SSS 5449 (tuc)	13,41	14,19	14,24	11,71	14,81	13,73	13,68	14,25	14,23	14,14	16,00	12,93	14,31	15,53	15,36	13,93	14,94
DM 5302 RSF	15,98	14,19	14,44	13,99	18,08	15,90	15,43	15,92	16,70	16,83	17,20	13,54	16,04	18,07	16,96	17,87	17,63
LDC 5.3	14,47	14,71	14,46	12,80	14,90	15,95	14,55	16,39	15,22	15,11	15,53	14,25	15,30	17,93	14,88	15,73	16,18
SSS 5052 (tuc)	14,52	15,24	12,63	12,09	14,87	14,45	13,97	14,80	15,03	15,53	17,07	12,87	15,06	16,80	16,68	15,47	16,32
NA 5509 R	15,81	15,98	14,47	13,48	16,56	17,15	15,57	16,85	17,91	16,12	18,73	13,98	16,72	18,93	18,08	16,73	17,91
LS 6851 R	13,37	14,82	13,19	12,76	14,93	13,98	13,84	14,62	13,66	16,11	14,00	12,89	14,26	16,60	16,24	17,60	16,81
PAN 1575 R	16,18	17,62	15,97	13,82	15,93	16,53	16,01	18,40	17,51	17,00	16,93	14,39	16,85	19,53	16,87	16,20	17,54
PAN 1521 R	16,06	15,86	14,94	13,73	18,26	16,77	15,94	17,13	16,17	17,22	16,33	14,21	16,21	18,87	18,75	17,13	18,25
PAN 1555 R	16,87	17,47	16,63	15,13	17,55	17,56	16,87	61,73	17,32	17,99	13,80	15,33	25,24	18,33	17,56	17,53	17,81
NS 5909 R	16,06	16,58	14,85	12,70	17,31	16,00	15,58	16,57	17,52	16,18	14,73	14,60	15,92	16,27	17,44	16,60	16,77
LDC 5.9	17,73	17,99	15,59	15,52	19,60	16,97	17,23	19,17	18,22	18,39	16,27	16,45	17,70	16,13	16,94	17,73	16,93
DM 5901 RSF	16,32	15,52	14,52	13,41	18,76	16,23	15,79	61,21	17,13	15,42	17,73	12,74	24,85	17,13	18,08	17,27	17,49
LS 6860 R	18,49	17,85	16,42	15,18	19,24	17,40	17,43	18,31	17,38	18,52	15,47	16,49	17,23	17,47	20,84	18,67	18,99
LS 6164 R	14,64	14,25	13,27	12,41	16,38	16,10	14,51	15,59	15,47	13,75	16,47	14,76	15,21	15,87	16,91	16,27	16,35
PAN 1663 R	15,18	16,93	14,73	14,28	16,55	15,22	15,48	16,57	17,32	15,70	17,80	14,48	16,37	18,67	16,02	16,13	16,94
P61T38 R	14,94	15,34	15,25	13,02	16,51	15,16	15,04	16,26	16,19	16,56	19,40	13,59	16,40	19,20	16,93	16,20	17,44
LS 6161 R	15,93	15,41	14,41	12,85	15,80	15,17	14,93	16,08	16,21	15,55	18,00	14,19	16,00	15,40	16,94	15,13	15,83
SSS 6560 (tuc)	15,31	15,72	13,44	12,69	15,44	15,08	14,61	16,05	15,88	15,10	15,80	12,98	15,16	16,27	17,27	15,60	16,38
NS 6448 R	15,40	15,60	13,14	12,63	16,96	16,16	14,98	16,98	16,48	15,91	18,00	11,40	15,75	20,20	17,60	16,33	18,04
P64T39 R	16,16	16,25	14,80	13,38	18,19	15,84	15,77	16,84	17,05	15,99	15,67	15,13	16,14	19,20	16,53	17,27	17,67
PAN 1644 R	16,01	15,65	15,04	13,34	18,83	15,39	15,71	17,14	17,90	15,57	16,13	15,19	16,39	18,20	16,67	18,13	17,67
LS 6868 R	14,85	14,07	12,91	12,08	15,09	13,43	13,74	14,64	15,64	14,83	19,07	13,26	15,49	18,00	16,15	15,80	16,65
DM 6.8i RR	18,24	17,09	15,52	13,61	18,35	18,36	16,86	17,86	16,61	17,32	18,80	15,98	17,31	17,27	19,98	16,13	17,79
DM 6968 RSF	19,68	17,18	17,04	15,25	20,09	19,49	18,12	20,51	20,60	18,62	16,80	17,34	18,77	16,40	22,35	18,80	19,18
P71T74 R	16,89	16,89	14,78	12,69	18,10	16,61	16,00	17,07	17,19	15,76	15,53	14,65	16,04	18,00	19,62	17,00	18,21
Gem/Mean	15,89	16,07	14,96	13,57	17,10	16,23	15,64	20,12	16,83	16,35	16,66	14,56	16,90	17,60	17,56	16,72	17,29

Tabel 18 Die graanopbrengs van elke kultivar by die verskillende lokaliteite, 2019/20
Table 18 The grain yield of the cultivars at the different localities, 2019/20

Kultivar Cultivar	Koel/Cool							Matig/Moderate							Warm			
	Bapsfontein	Belfast	Bethlehem	Clarens	Kinross	Winterton	Gem/Mean	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean	Hoopstad	Marble Hall	Schweizer-Reneke	Gem/Mean
P48T48 R	4074	2627	3039	2309	2079	4354	3080	3718	3777	3645	3394	1057	1563	2859	2864	2673	1062	2199
DM 5351 RSF	3909	3761	4113	2506	2780	4807	3646	3274	4286	4183	2720	2669	1204	3056	2824	2797	2426	2682
DM 5953 RSF	3952	3535	4871	3500	5325	4434	4269	4682	3532	3635	3249	2710	1243	3175	3688	3012	2334	3012
SSS 5449 (tuc)	4178	2976	3555	1878	3442	3768	3300	4041	3899	3662	2535	2204	2132	3079	2417	2226	1595	2079
DM 5302 RSF	3578	3664	3086	1966	3677	3954	3321	4284	3883	3713	2312	1981	1593	2961	3257	3415	1779	2817
LDC 5.3	3505	2931	2710	2444	4994	4413	3500	5315	3856	3776	2692	2755	2933	3555	2596	2091	2153	2280
SSS 5052 (tuc)	5309	2420	2675	1525	4446	4407	3464	3422	3447	3121	2804	2642	2155	2932	2949	3012	2197	2719
NA 5509 R	4130	2881	2968	1661	4385	4614	3440	4318	3737	3683	3249	2590	1301	3146	3458	3113	1905	2825
LS 6851 R	3899	3217	2894	2058	2757	4586	3235	4344	3370	3978	2428	2359	1630	3018	3512	3012	2099	2875
PAN 1575 R	3959	3323	2927	1689	4114	4379	3399	3775	4177	3242	2704	1853	1734	2914	2816	3143	1341	2434
PAN 1521 R	3778	3199	3727	3049	5101	4653	3918	3424	3147	3944	2836	2662	1744	2960	3506	3222	2368	3032
PAN 1555 R	3760	3252	2435	1753	4053	4287	3257	4793	4235	3773	2800	2773	1761	3356	3190	2754	2147	2697
NS 5909 R	4112	3355	2407	1806	5136	4816	3605	4270	3747	3806	2647	2493	1650	3102	3785	3139	2601	3175
LDC 5.9	4574	3026	2430	1907	5425	4183	3591	4588	3709	3496	2707	3637	1138	3213	3482	3035	1846	2788
DM 5901 RSF	4855	3077	2818	1825	3990	4556	3520	4837	3801	4257	2779	3413	1856	3491	3497	3478	2542	3173
LS 6860 R	4436	2310	1923	1597	3661	4686	3102	3748	3898	3642	2757	3071	1795	3152	4160	3541	1937	3213
LS 6164 R	3877	3336	2071	1871	3698	4467	3220	3670	3452	3666	2577	2758	2577	3117	2625	3549	2146	2773
PAN 1663 R	4140	3235	2871	1620	3976	4672	3419	4133	3025	3067	2545	1316	1512	2600	3187	3232	1664	2694
P61T38 R	5470	3020	2341	1755	3431	4933	3492	4001	4143	4078	2606	2617	1410	3143	2697	3447	2183	2776
LS 6161 R	4103	2632	2596	1781	3506	4507	3188	3557	3559	3957	2749	2395	1563	2963	3069	3239	2242	2850
SSS 6560 (tuc)	3971	3083	2199	2124	4483	4687	3425	4078	3342	3976	2611	2493	1360	2977	2947	3578	1947	2824
NS 6448 R	4310	3393	2207	1903	2480	4129	3070	4825	4692	3867	2573	3420	1662	3506	3018	3446	2120	2861
P64T39 R	4132	3031	2640	2040	5588	4715	3691	4347	3630	4071	3025	3143	1501	3286	4202	2955	2912	3356
PAN 1644 R	3986	2741	2288	2073	4504	4444	3339	4344	3998	4076	2910	3480	1524	3389	3991	3429	2458	3292
LS 6868 R	3905	2342	2411	1177	3475	4411	2954	3857	3347	3782	2222	2257	1874	2890	2547	1725	1186	1819
DM 6.8i RR	4568	3244	2623	1977	5116	4604	3689	4982	4417	4095	2755	3507	1522	3546	3395	4496	2093	3328
DM 6968 RSF	3667	2464	2304	1380	5016	4468	3216	3184	4400	3812	3008	2250	3056	3285	3034	3733	2456	3074
P71T74 R	4270	3138	2490	1458	5680	4938	3662	3908	3564	4316	3176	2471	991	3071	2954	5001	1851	3269
Gem/Mean	4157	3043	2772	1951	4154	4495	3429	4133	3788	3797	2763	2606	1714	3134	3202	3196	2057	2818
CV	17,6	21,9	16,4	25,9	18,3	9,2		17,3	15,3	7,2	14,9	4,9	3,8		6,3	20,6	5,3	

Tabel 19 Opbrengswaarskynlikheid (%) van kultivars geëvalueer in 2017/18, 2018/19 en 2019/20 vir die koeler droëland produksiegebiede by verskillende opbrengspotensiaal
Table 19 Yield probability (%) of cultivars in the 2017/18, 2018/19 and 2019/20 for the cooler dryland production areas as 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
P48T48 R	66	60	54	48	42	36	31	26
DM 5351 RSF	73	73	73	72	71	70	68	66
DM 5953 RSF	88	86	82	78	72	65	57	50
SSS 5449 (tuc)	62	58	52	46	39	34	28	25
DM 5302 RSF	69	66	62	57	52	47	42	38
SSS 5052 (tuc)	51	52	54	56	57	59	60	61
NA 5509 R	18	21	24	29	34	41	48	54
LS 6851 R	23	28	34	42	50	59	67	73
PAN 1521 R	75	71	64	57	49	41	34	28
NS 5909 R	78	77	75	73	70	66	62	59
LS 6860 R	12	17	24	34	46	59	70	79
P61T38 R	33	38	44	51	58	65	70	75
LS 616 1R	42	43	44	45	47	49	50	52
NS 6448 R	16	17	19	22	26	31	36	42
P64T39 R	51	49	48	46	44	42	41	40
LS 6868 R	30	31	32	34	36	38	40	43

Tabel 20 Graanopbrengs (kg/ha^{-1}) van kultivars gedurende die 2018/19 en 2019/20 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 2018/19 and 2019/20 growing season for the various localities situated in the cooler production areas

Kultivar Cultivar	2018/19						2019/20						
	Bapsfontein	Bethlehem	Clarens	Kinross	Kokstad	Gem/Mean	Bapsfontein	Belfast	Bethlehem	Clarens	Kinross	Winterton	Gem/Mean
P48T48 R	4375	2716	1929	3621	2056	2939	4074	2627	3039	2309	2079	4354	3080
DM 5351 RSF	5214	2324	2131	4544	3991	3641	3909	3761	4113	2506	3885	4807	3830
DM 5953 RSF	4782	3167	2345	4300	2241	3367	3952	3535	4871	3500	4183	4434	4079
SSS 5449 (tuc)	4767	2492	1791	3302	2917	3054	4178	2976	3555	1878	3442	3768	3300
DM 5302 RSF	5947	2710	2174	3926	2972	3546	3578	3664	3086	1966	3677	3954	3321
LDC 5.3	5657	2770	2444	3241	3176	3458	3505	2931	2710	2444	4994	4413	3500
SSS 5052 (tuc)	6108	3063	2234	2847	2278	3306	3817	2420	2675	1525	4446	4407	3215
NA 5509 R	4944	3845	1814	3137	2917	3331	4130	2881	2968	1661	4385	4614	3440
LS 6851 R	5389	2901	2560	3136	3435	3484	3899	3217	2894	2058	2757	4586	3235
PAN 1575 R	-	-	-	-	-	-	3959	3323	2927	1689	4114	4379	3399
PAN 1521 R	5821	2824	2274	3215	3009	3429	3778	3199	3727	3049	5101	4653	3918
PAN 1555 R	-	-	-	-	-	-	3760	3252	2435	1753	4053	4287	3257
NS 5909 R	6140	2801	1929	2800	2639	3262	4112	3355	2407	1806	5136	4816	3605
LDC 5.9	6077	3964	1680	3284	3907	3783	4574	3026	2430	1907	5425	4183	3591
DM 5901 RSF	5588	2882	2436	3092	3000	3400	4855	3077	2818	1825	3990	4556	3520
LS 6860 R	5391	2737	2142	2719	2796	3157	4436	2310	1923	1597	3661	4686	3102
LS 6164 R	4867	3389	2496	2724	2898	3275	3877	3336	2071	1871	3698	4467	3220
PAN 1663 R	-	-	-	-	-	-	4140	3235	2871	1620	3976	4672	3419
P61T38 R	5452	2353	2372	2600	2991	3153	4194	3020	2341	1755	3431	4933	3279
LS 6161 R	5245	3315	2056	2961	3185	3352	4103	2632	2596	1781	3506	4507	3188
SSS 6560 (tuc)	-	-	-	-	-	-	3971	3083	2199	2124	4483	4687	3425
NS 6448 R	5232	3202	2129	3313	3167	3409	4310	3393	2207	1903	2480	4129	3070
P64T39 R	5624	4671	2895	3366	3056	3922	4132	3031	2640	2040	5588	4715	3691
PAN 1644 R	5167	2788	2169	3436	3565	3425	3986	2741	2288	2073	4504	4444	3339
LS 6868 R	5459	2721	2600	2516	2435	3146	3905	2342	2411	1177	3475	4411	2954
DM 6.8i RR	-	-	-	-	-	-	4568	3244	2623	1977	5116	4604	3689
DM 6968 RSF	-	-	-	-	-	-	3667	2464	2304	1380	5016	4468	3216
P71T74 R	-	-	-	-	-	-	4270	3138	2490	1458	5680	4938	3662
LS 6248 R	5001	2642	2017	2611	2713	2997	-	-	-	-	-	-	-
NS 5009 R	4032	2770	1249	2653	2287	2598	-	-	-	-	-	-	-
NS 5258 R	3229	2084	1914	3507	3435	2834	-	-	-	-	-	-	-
PAN 1532 R	5017	2674	2325	2788	3407	3242	-	-	-	-	-	-	-
Y 540	-	-	1631	2263	1667	1854	-	-	-	-	-	-	-
PAN 1653 R	5183	3089	2073	2519	3028	3178	-	-	-	-	-	-	-
Gem/Mean	5220	2957	2141	3127	2932	3242	4059	3043	2772	1951	4153	4495	3412

Tabel 21 Opbrengswaarskynlikheid (%) van kultivars geëvalueer in 2017/18, 2018/19 en 2019/20 vir die matige produksiegebiede by verskillende opbrengspotensiaal
Table 21 Yield probability (%) of cultivars in the 2017/18, 2018/19 and 2019/20 for the moderate production areas as 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
P48T48 R	24	25	26	27	29	31	33	36
DM 5351 RSF	19	24	29	36	43	52	59	66
DM 5953 RSF	55	51	46	42	37	33	28	26
SSS 5449 (tuc)	60	54	46	39	32	26	20	16
DM 5302 RSF	71	62	50	39	27	18	11	8
SSS 5052 (tuc)	83	78	71	63	54	45	36	29
NA 5509 R	71	69	66	63	59	56	51	48
LS 6851 R	9	14	21	31	43	57	69	79
PAN 1521 R	90	87	82	76	67	58	48	39
NS 5909 R	20	28	36	48	58	70	78	85
LS 6860 R	84	81	78	74	69	63	57	51
P61T38 R	30	38	47	58	68	77	83	88
LS 6161 R	63	58	52	45	39	32	27	23
NS 6448 R	43	49	56	63	70	76	81	84
P64T39 R	49	56	63	70	76	82	85	88
LS 6868 R	17	17	18	20	21	24	27	30
DM 6.8i RR	71	74	75	77	78	80	80	81

Tabel 22 Graanopbrengs (kg/ha^{-1}) van kultivars gedurende die 2017/18 en 2018/19 groeiseisoen ten opsigte van die verskillende lokaliteite wat in die matige produksiegebiede geleë is
Table 22 Grain yield (kg/ha^{-1}) of cultivars during the 2017/18 and 2018/19 growing season for the various localities situated in the moderate production areas

Kultivar Cultivar	2018/19							2019/20						
	Bergville	Cedara	Greytwon	Kroonstad	Potchefstroom B/I	Stoffberg	Gem/Mean	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Stoffberg	Gem/Mean
P48T48 R	3892	4848	4089	1744	-	923	3099	3718	3777	3645	2795	1057	1563	2759
DM 5351 RSF	3712	5818	4426	1751	3977	1524	3535	3274	4286	4183	2720	2669	1204	3056
DM 5953 RSF	3890	4644	3888	2155	3078	1545	3200	4682	3532	3635	3249	2710	1243	3175
SSS 5449 (tuc)	4188	4246	4246	2006	2900	1719	3217	4041	3173	3662	2535	2204	2132	2958
DM 5302 RSF	3611	4375	4300	1974	3107	1973	3223	4284	3132	3713	2312	1981	1593	2836
LDC 5.3	3872	4650	4736	1603	3219	1811	3315	5315	3856	3776	2692	2755	2198	3432
SSS 5052 (tuc)	4045	4568	4609	2605	2996	1878	3450	3422	3447	3121	2804	2642	2072	2918
NA 5509 R	4123	4896	5019	2380	3557	1993	3661	4318	3737	3683	3249	2590	1301	3146
LS 6851 R	4286	5374	4642	1833	3425	1589	3525	4344	3370	3978	2428	2359	1630	3018
PAN 1575 R	-	-	-	-	-	-	-	3775	4177	3242	2704	1853	1734	2914
PAN 1521 R	4060	4715	4637	2945	3181	1444	3497	3424	3147	3944	2836	2662	1744	2960
PAN 1555 R	-	-	-	-	-	-	-	4793	4235	3773	2800	2773	1761	3356
NS 5909 R	4179	5124	5343	1956	3249	1680	3588	4270	3747	3806	2647	2493	1650	3102
LDC 5.9	4102	5563	4725	2395	3562	2707	3842	4588	3709	3496	2707	3637	1138	3213
DM 5901 RSF	4122	4752	5006	2037	3781	2284	3664	4837	3801	4257	2779	3413	1856	3491
LS 6860 R	3011	4709	5026	2331	3111	1672	3310	3748	3898	3642	2757	3071	1795	3152
LS 6164 R	4043	3930	5234	2074	3405	1864	3425	3670	3452	3666	2577	2758	2577	3117
PAN 1663 R	-	-	-	-	-	-	-	4133	3025	3067	2545	1316	1512	2600
P61T38 R	4323	4801	5202	2450	3304	1427	3585	4001	4143	4078	2606	2617	1410	3143
LS 6161 R	3812	4546	5006	1950	3333	1767	3402	3557	3559	3957	2749	2395	1563	2963
SSS 6560 (tuc)	4667	4857	5632	2429	3493	1552	3772	4078	3342	3976	2611	2493	1360	2977
NS 6448 R	4213	5133	5329	2564	3775	1865	3813	4825	4692	3867	2573	3420	1662	3506
P64T39 R	4344	4555	4969	2142	3001	1938	3492	4347	3630	4071	3025	3143	1501	3286
PAN 1644 R	3778	5359	5080	2192	3517	1473	3566	4344	3998	3634	2910	3480	1524	3315
LS 6868 R	3223	4465	4592	1393	2552	1393	2936	3857	3347	3782	2222	2257	1874	2890
DM 6.8i RR	3110	4901	4972	2600	3276	2014	3479	4982	4417	4095	2755	3507	1522	3546
DM 6968 RSF	-	-	-	-	-	-	-	3184	4400	3812	3008	2250	2563	3203
P71T74 R	3902	5195	5206	2474	3435	2042	3709	3908	3564	4316	3176	2471	991	3071
LS 6248 R	3564	4672	4144	2020	3334	1270	3167	-	-	-	-	-	-	-
NS 5009 R	3659	4259	4129	954	2678	1392	2845	-	-	-	-	-	-	-
NS 5258 R	4216	4685	4481	1390	3233	1529	3256	-	-	-	-	-	-	-
PAN 1532 R	3957	4474	4794	2308	4224	1766	3587	-	-	-	-	-	-	-
Y605	-	-	-	-	-	1832	1832	-	-	-	-	-	-	-
Y 627	3738	4725	5422	2376	3494	2249	3667	-	-	-	-	-	-	-
DM 6663 RSF	2966	4678	5355	1816	3165	1913	3315	-	-	-	-	-	-	-
Y 657	4055	4968	5107	2252	3575	2475	3739	-	-	-	-	-	-	-
Gem/Mean	3892	4790	4818	2100	3331	1766	3397	4133	3736	3781	2742	2606	1667	3111

Tabel 23 Opbrengswaarskynlikheid (%) van kultivars geëvalueer in 2017/18, 2018/19 en 2019/20 vir die warm besproeiing produksiegebiede by verskillende opbrengspotensiaal
Table 23 Yield probability (%) of cultivars in the 2017/18, 2018/19 and 2019/20 for the warm irrigation production areas as different yield potentials

Kultivar	Opbrengspotensiaal/Yield potential (t/ha)						
Cultivar	2,0	2,5	3,0	3,5	4,0	4,5	5,0
DM 5351 RSF	19	24	31	40	52	62	70
DM 5953 RSF	83	75	63	47	31	20	12
SSS 5449 (tuc)	27	27	28	30	33	37	41
DM 5302 RSF	19	23	29	37	47	57	64
SSS 5052 (tuc)	20	27	36	49	63	74	81
NA 5509 R	71	68	64	59	52	46	41
LS 6851 R	32	32	32	33	34	36	38
PAN 1521 R	46	52	59	67	73	77	80
NS 5909 R	55	53	51	49	46	44	42
LS 6860 R	66	63	59	53	48	43	39
P 61T38 R	85	83	79	74	67	58	51
LS 6161 R	13	18	26	37	50	63	72
SSS 6560 (tuc)	43	47	52	58	63	67	70
NS 6448 R	91	88	83	74	62	48	37
P64T39 R	45	52	59	67	74	79	82
LS 6868 R	15	17	19	24	31	38	46
DM 6.8i RR	96	93	85	70	48	29	16

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	2018/19				2019/20			
	Brits K2	Groblersdal-Agricol	Marble Hall	Gem/Mean	Hoopstad	Marble Hall	Schweizer-Reneke	Gem/Mean
P48T48 R	-	-	-	-	2864	2673	1062	2199
DM 5351 RSF	3933	3900	3751	3861	2824	2797	2426	2682
DM 5953 RSF	3678	4492	4301	4157	3688	3012	2334	3012
SSS 5449 (tuc)	4366	2833	3091	3430	2417	2226	1595	2079
DM 5302 RSF	3570	3825	3090	3495	3257	3415	1779	2817
LDC 5.3	3916	3952	3599	3822	2596	2091	2153	2280
SSS 5052 (tuc)	4197	4386	3667	4083	2949	3012	2197	2719
NA 5509 R	3282	4683	3551	3838	3458	3113	1905	2825
LS 6851 R	3603	3770	3630	3667	3512	3012	2099	2875
PAN 1575 R	-	-	-	-	2816	3143	1341	2434
PAN 1521 R	3848	4592	3497	3979	3506	3222	2368	3032
PAN 1555 R	-	-	-	-	3190	2754	2147	2697
NS 5909 R	3797	3854	3815	3822	3785	3139	2601	3175
LDC 5.9	3828	4027	3846	3901	3482	3035	1846	2788
DM 5901 RSF	3374	4158	3350	3627	3497	3478	2542	3173
LS 6860 R	3385	4039	2240	3222	4160	3541	1937	3213
LS 6164 R	3207	4514	3531	3751	2625	3549	2146	2773
PAN 1663 R	-	-	-	-	3187	3232	1664	2694
P61T38 R	2523	4257	3583	3455	2697	3447	2183	2776
LS 6161 R	3263	4132	3447	3614	3069	3239	2242	2850
SSS 6560 (tuc)	3225	4382	3825	3811	2947	3578	1947	2824
NS 6448 R	4319	3910	2724	3651	3018	3446	2120	2861
P64T39 R	3482	4601	3890	3991	4202	2955	2912	3356
PAN 1644 R	3448	4233	3323	3668	3991	3429	2458	3292
LS 6868 R	4060	2786	2991	3279	2547	1725	1186	1819
DM 6.8i RR	3735	3855	3474	3688	3395	4496	2093	3328
DM 6968 RSF	3655	3454	4180	3763	3034	3733	2456	3074
P71T74 R	4652	4334	3648	4211	2954	5001	1851	3269
LS 6248 R	3578	3716	3212	3502	-	-	-	-
NS 5009 R	2980	4194	3083	3419	-	-	-	-
NS 5258 R	3763	4242	3360	3788	-	-	-	-
PAN 1532 R	3323	2919	3728	3323	-	-	-	-
Y 627	3740	4121	3652	3838	-	-	-	-
DM 6663 RSF	4111	4239	3506	3952	-	-	-	-
Y 657	3666	4229	3948	3948	-	-	-	-
PAN 1653 R	3704	4189	3702	3865	-	-	-	-
Gem/Mean	3663	4026	3507	3732	3202	3196	2057	2818

Tabel 25 Saamgevatte inligting van al die lokaliteite in die koel produksiegebiede, 2019/20
Table 25 Summerised information for all the localities in the cool production areas, 2019/20

Kultivar/Cultivar	Dae tot blom/ Days to flowe-ring	Fisiologies ryp/ Physological 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	Opbrengs/ Yield
P48T48 R	56	114	154	53	4	1,11	1,72	1,17	178	0,04	18,43	3080
DM 5351 RSF	56	117	152	66	5	1,33	1,50	1,22	200	0,03	16,00	3830
DM 5953 RSF	58	115	154	67	7	1,17	1,00	1,00	218	0,21	15,78	4079
SSS 5449 (tuc)	67	129	167	78	9	1,28	1,22	1,11	223	0,19	13,68	3300
DM 5302 RSF	67	128	164	72	6	1,28	1,39	1,17	223	0,18	15,43	3321
LDC 5,3	69	131	173	76	8	1,22	1,50	1,00	197	0,29	14,55	3500
SSS 5052 (tuc)	71	133	174	82	11	1,28	1,56	1,06	217	0,22	13,97	3215
NA 5509 R	73	132	179	83	10	1,28	1,22	1,00	188	0,18	15,57	3440
LS 6851 R	67	132	172	62	7	1,00	1,00	1,06	222	0,37	13,84	3235
PAN 1575 R	70	130	150	80	8	1,17	1,50	1,06	143	0,16	16,01	3399
PAN 1521 R	72	126	167	90	11	1,50	1,33	1,00	221	0,17	15,94	3918
PAN 1555 R	74	137	176	82	12	1,33	1,28	1,06	194	0,10	16,87	3257
NS 5909 R	79	143	186	81	13	1,39	1,56	1,00	209	0,24	15,58	3605
LDC 5,9	71	135	184	88	9	1,50	1,39	1,00	197	0,04	17,23	3591
DM 5901 RSF	70	136	184	79	9	1,22	1,56	1,06	197	0,11	15,79	3520
LS 6860 R	77	144	188	91	13	1,39	1,61	1,00	196	0,30	17,43	3102
LS 6164 R	73	135	186	92	12	1,61	1,33	1,00	218	0,21	14,51	3220
PAN 1663 R	73	134	178	80	9	1,22	1,11	1,06	195	0,22	15,48	3419
P61T38 R	72	134	181	67	11	1,17	1,56	1,00	217	0,07	15,04	3279
LS 6161 R	73	135	176	89	13	1,33	1,50	1,11	231	0,13	14,93	3188
SSS 6560 (tuc)	73	134	184	87	11	1,56	1,39	1,00	217	0,13	14,61	3425
NS 6448 R	71	134	184	77	11	1,22	1,33	1,00	208	0,07	14,98	3070
P64T39 R	76	144	188	90	11	1,72	1,56	1,06	219	0,26	15,77	3691
PAN 1644 R	77	136	188	83	8	1,33	1,22	1,00	186	0,12	15,71	3339
LS 6868 R	77	142	188	83	11	1,28	1,78	1,00	187	0,37	13,74	2954
DM 6,8i RR	73	141	188	103	12	1,56	1,56	1,00	222	0,14	16,86	3689
DM 6968 RSF	77	146	188	88	15	1,67	2,06	1,00	161	0,11	18,12	3216
P71T74 R	78	146	188	94	14	1,56	2,00	1,06	223	0,24	16,00	3662
Gem/Mean	71	134	176	81	10	1,35	1,45	1,04	204	0,17	15,64	3412

Tabel 26 Saamgevatte inligting van al die lokaliteite in die matige produksiegebiede, 2019/20

Table 26 Summerised information for all the localities in the moderate production areas, 2019/20

Kultivar/Cultivar	Dae tot blom/ Days to flowe-ring	Fisiologies ryp/ Physological 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	Opbrengs/ Yield
P48T48 R	44	114	129	54	5	1,00	1,27	1,00	162	0,10	19,39	2759
DM 5351 RSF	44	117	133	71	8	1,60	2,40	1,25	172	0,29	16,70	3056
DM 5953 RSF	43	114	129	69	7	1,00	1,07	1,25	196	0,08	16,48	3175
SSS 5449 (tuc)	51	121	134	73	8	1,00	1,60	1,50	186	0,18	14,31	2958
DM 5302 RSF	49	119	134	63	8	1,00	1,00	1,00	189	0,31	16,04	2836
LDC 5,3	52	126	140	71	8	1,07	1,80	1,00	177	0,24	15,30	3432
SSS 5052 (tuc)	60	127	145	81	12	1,27	1,27	1,00	183	0,16	15,06	2918
NA 5509 R	58	125	142	75	9	2,00	1,20	1,00	165	0,38	16,72	3146
LS 6851 R	52	126	146	55	8	1,07	1,93	1,00	174	0,34	14,26	3018
PAN 1575 R	55	125	140	74	9	1,00	2,00	1,25	159	0,38	16,85	2914
PAN 1521 R	63	125	140	80	12	1,00	1,80	1,25	194	0,32	16,21	2960
PAN 1555 R	62	127	141	83	14	1,00	1,40	1,00	166	0,25	25,24	3356
NS 5909 R	60	130	146	83	15	1,00	2,00	1,00	180	0,26	15,92	3102
LDC 5,9	61	130	145	83	10	1,60	1,80	1,00	149	0,30	17,70	3213
DM 5901 RSF	59	126	145	76	9	1,00	1,00	1,00	153	0,28	24,85	3491
LS 6860 R	65	130	150	87	13	1,93	1,47	1,25	149	0,51	17,23	3152
LS 6164 R	63	129	142	87	12	1,60	1,40	1,00	169	0,37	15,21	3117
PAN 1663 R	62	127	142	76	11	1,80	1,00	1,00	153	0,62	16,37	2600
P61T38 R	64	129	145	58	11	1,00	1,07	1,25	166	0,38	16,40	3143
LS 6161 R	61	129	143	81	12	1,60	1,40	1,00	176	0,40	16,00	2963
SSS 6560 (tuc)	60	128	143	84	13	1,47	1,80	1,00	195	0,21	15,16	2977
NS 6448 R	62	131	147	76	11	1,40	1,60	1,25	157	0,33	15,75	3506
P64T39 R	64	130	152	88	12	1,00	1,00	1,00	212	0,43	16,14	3286
PAN 1644 R	64	130	151	80	11	1,00	1,00	1,50	176	0,23	16,39	3315
LS 6868 R	62	132	157	73	11	1,80	1,20	1,00	159	0,37	15,49	2890
DM 6,8i RR	64	133	157	89	12	1,73	1,00	1,00	198	0,41	17,31	3546
DM 6968 RSF	65	134	157	82	13	1,80	1,67	1,00	129	0,50	18,77	3203
P71T74 R	65	136	154	81	10	1,00	1,40	1,50	174	0,43	16,04	3071
Gem	58	127	144	76	10	1,31	1,45	1,12	172	0,32	16,90	3111

Tabel 27 Saamgevatte inligting van al die lokaliteite in die warmer produksiegebiede, 2019/20
Table 27 Summerised information for all the localities in the warmer production areas, 2019/20

Kultivar/Cultivar	Dae tot blom/ Days to flowe-ring	Fisiologies ryp/ Physological 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	Opbrengs/ Yield
P48T48 R	40	120	132	48	5	1,00	2,56	1,00	180	0,20	18,81	2199
DM 5351 RSF	37	120	131	61	5	1,00	1,89	1,00	172	0,17	17,07	2682
DM 5953 RSF	38	119	131	58	4	1,00	1,00	1,00	171	0,17	16,59	3012
SSS 5449 (tuc)	46	124	135	56	5	1,00	1,67	1,22	195	0,18	14,94	2079
DM 5302 RSF	50	120	131	60	5	1,00	1,00	1,00	192	0,31	17,63	2817
LDC 5,3	42	120	131	57	4	1,00	1,67	1,00	170	0,24	16,18	2280
SSS 5052 (tuc)	48	126	140	68	10	1,00	1,11	1,00	211	0,07	16,32	2719
NA 5509 R	51	126	140	74	9	1,00	1,33	1,00	190	0,12	17,91	2825
LS 6851 R	51	126	140	54	4	1,11	3,44	1,00	210	0,10	16,81	2875
PAN 1575 R	52	122	140	67	8	1,00	2,33	1,00	170	0,11	17,54	2434
PAN 1521 R	53	123	135	70	9	1,00	1,11	1,00	198	0,17	18,25	3032
PAN 1555 R	51	121	140	78	9	1,00	2,33	1,00	170	0,20	17,81	2697
NS 5909 R	52	127	146	77	9	1,00	2,67	1,00	208	0,40	16,77	3175
LDC 5,9	49	129	146	69	9	1,00	1,22	1,00	159	0,20	16,93	2788
DM 5901 RSF	51	128	147	71	9	1,00	1,44	1,00	193	0,14	17,49	3173
LS 6860 R	54	129	146	90	16	1,00	1,11	1,00	174	0,17	18,99	3213
LS 6164 R	51	128	146	73	7	1,00	2,22	1,00	216	0,24	16,35	2773
PAN 1663 R	51	129	146	77	10	1,00	1,00	1,00	151	0,21	16,94	2694
P61T38 R	53	126	140	46	6	1,00	2,22	1,00	193	0,33	17,44	2776
LS 6161 R	52	128	141	76	9	1,00	1,67	1,00	186	0,08	15,83	2850
SSS 6560 (tuc)	54	125	135	81	8	1,00	2,11	1,00	179	0,23	16,38	2824
NS 6448 R	54	130	146	72	7	1,00	1,00	1,00	181	0,15	18,04	2861
P64T39 R	54	129	146	83	8	1,00	1,00	1,00	196	0,10	17,67	3356
PAN 1644 R	54	135	146	67	5	1,00	1,89	1,00	166	0,05	17,67	3292
LS 6868 R	50	133	146	58	6	1,00	2,44	1,00	170	0,10	16,65	1819
DM 6,8i RR	55	134	152	96	11	1,00	2,33	1,00	204	0,23	17,79	3328
DM 6968 RSF	52	133	146	84	10	1,00	1,89	1,00	177	0,26	19,18	3074
P71T74 R	58	140	152	92	11	1,00	3,22	1,00	184	0,34	18,21	3269
Gem	50	127	141	70	8	1,00	1,82	1,01	184	0,19	17,29	2818

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%