South African Soybean Crop

Quality Report
2021/2022 Season

Compiled and issued by:
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South African

COMMERCIAL SOYBEAN QUALITY FOR THE 2021/2022 SEASON

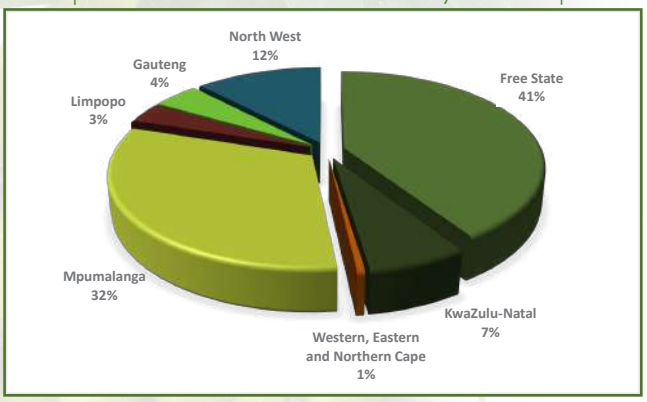
Acknowledgements
With gratitude to:

- ***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 2021/22 season, as overseen by the National Crop Estimates Liaison Committee (CELC), is 2 230 000 tons. This all-time high record crop represents an almost 18% increase year on year. The major soybean producing provinces, namely the Free State and Mpumalanga, contributed 73% of the total crop.

Graph 1: Provincial contribution to the production of the 2021/22 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 36. 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. Twenty-two samples, randomly selected to represent the different production regions, were submitted to Precision Oil Laboratories for fatty acid profile analyses.

This is the eleventh 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 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 2021/22 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	2021/22			2020/21		
		Hectares planted, ha	Production, tons	Yield, t/ha	Hectares planted, ha	Production, tons	Yield, t/ha
Western Cape	Dryland	-	-	-	-	-	-
	Irrigation	-	-	-	-	-	-
	Total	-	-	-	-	-	-
Northern Cape	Dryland	-	-	-	-	-	-
	Irrigation	800	3 000	3.75	1 000	3 500	3.50
	Total	800	3 000	3.75	1 000	3 500	3.50
Free State	Dryland	403 000	868 250	2.15	353 000	734 700	2.08
	Irrigation	12 000	44 250	3.69	12 000	31 800	2.65
	Total	415 000	912 500	2.20	365 000	766 500	2.10
Eastern Cape	Dryland	2 600	7 670	2.95	2 700	7 850	2.91
	Irrigation	400	1 330	3.33	400	1 450	3.63
	Total	3 000	9 000	3.00	3 100	9 300	3.00
KwaZulu-Natal	Dryland	26 000	93 000	3.58	20 500	71 500	3.49
	Irrigation	13 000	57 000	4.38	15 500	58 100	3.75
	Total	39 000	150 000	3.85	36 000	129 600	3.60
Mpumalanga	Dryland	292 000	680 400	2.33	282 000	614 550	2.18
	Irrigation	8 000	29 600	3.70	8 000	30 000	3.75
	Total	300 000	710 000	2.37	290 000	644 550	2.22
Limpopo	Dryland	4 500	11 700	2.60	4 000	10 700	2.68
	Irrigation	18 000	64 800	3.60	16 500	61 050	3.70
	Total	22 500	76 500	3.40	20 500	71 750	3.50
Gauteng	Dryland	41 500	86 750	2.09	38 500	92 400	2.40
	Irrigation	3 500	12 250	3.50	3 500	12 600	3.60
	Total	45 000	99 000	2.20	42 000	105 000	2.50
North West	Dryland	86 300	220 700	2.56	57 400	130 500	2.27
	Irrigation	13 700	49 300	3.60	12 100	36 300	3.00
	Total	100 000	270 000	2.70	69 500	166 800	2.40
RSA	Dryland	855 900	1 968 470	2.30	758 100	1 662 200	2.19
	Irrigation	69 400	261 530	3.77	69 000	234 800	3.40
	Total	925 300	2 230 000	2.41	827 100	1 897 000	2.29

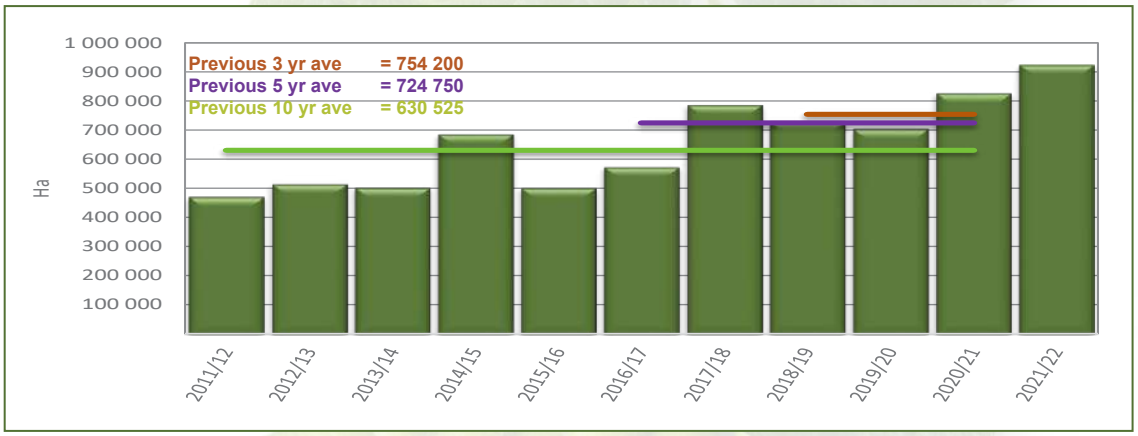
Figures provided by the CEC.

Compared to the 2020/21 production season, the area utilised for commercial soybean crop production increased by 12% (98 200 hectares). Both the area planted as well as the production figures, are the highest figures on record for the second consecutive year. The average national yield increased by 5% from 2.29 t/ha to 2.41 t/ha, again a national record.

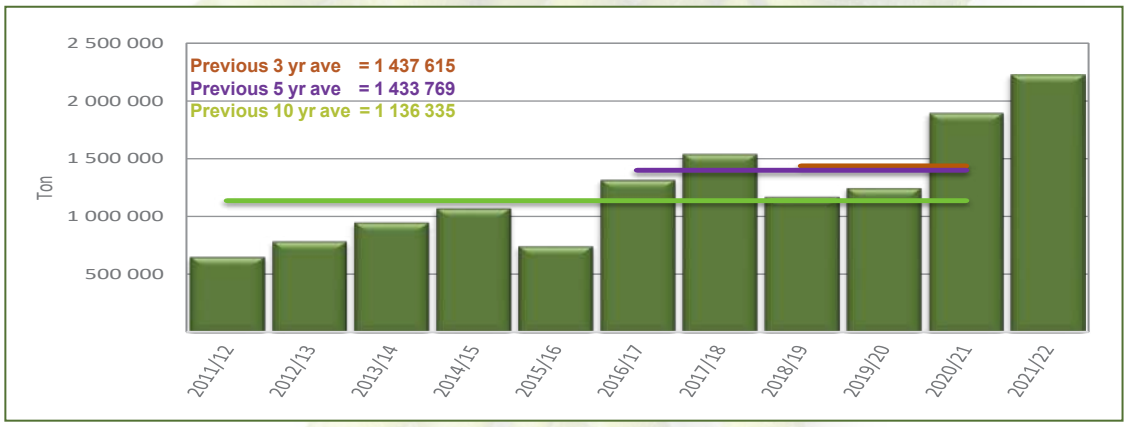
According to *The BFAP Baseline, Agricultural Outlook 2022 – 2031*, the area planted to soybeans is expected to increase by a further 41% compared to the average between 2019 to 2021. Soybean area could exceed a million hectares in 2023 and is expected to remain above a million hectares for most of the projection period to 2031. Over the same period, moderate yield gains of 14% are expected, supported by the release of the latest seed technologies (improved germplasm and GM traits), following the introduction of the breeding technology levy.

Soybeans account for half of the world oilseed production. According to the *World Agricultural Supply and Demand Estimates Report (WASDE – 634)* an estimated 358.14 million metric tons of soybeans were produced during the 2021/22 season. Brazil (36%) and the United States (34%) are by far the biggest contributors to this total. The world soybean production for the 2022/23 season is projected to be 375.15 million metric tons.

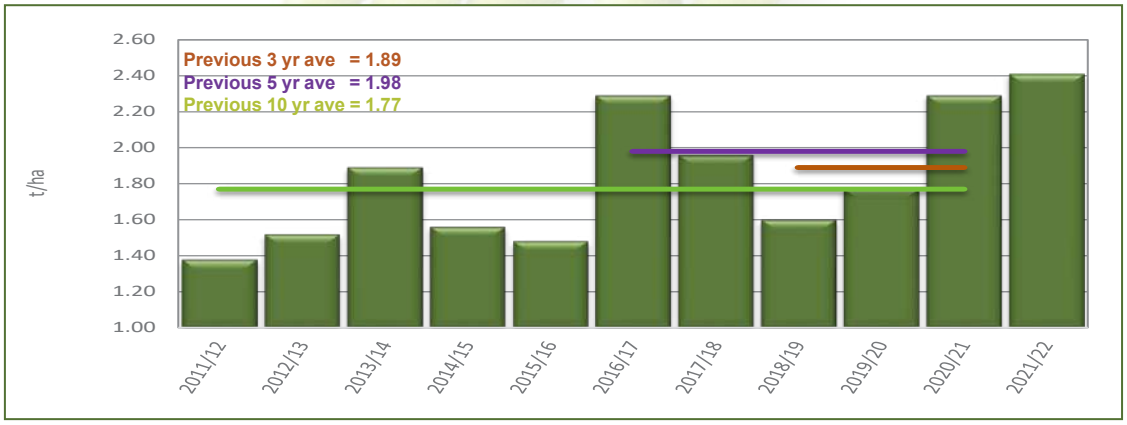
Graph 2: Total RSA area utilised for soybean production from 2011/21 to 2021/22



Graph 3: Soybean production in RSA from 2011/12 to 2021/22

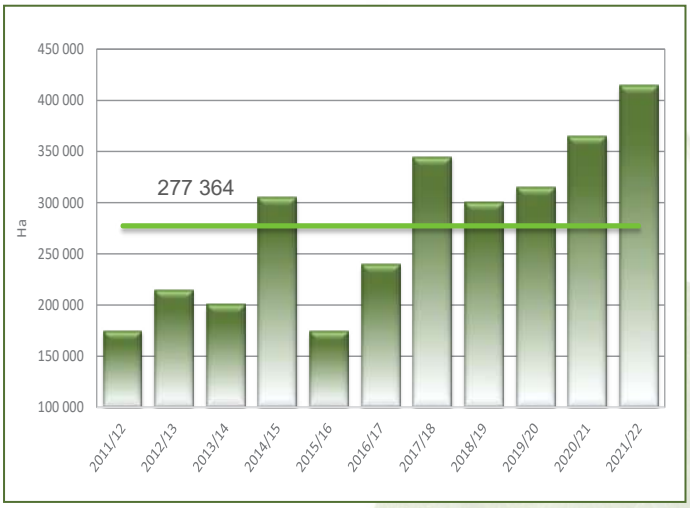


Graph 4: RSA soybean yield from 2011/12 to 2021/22

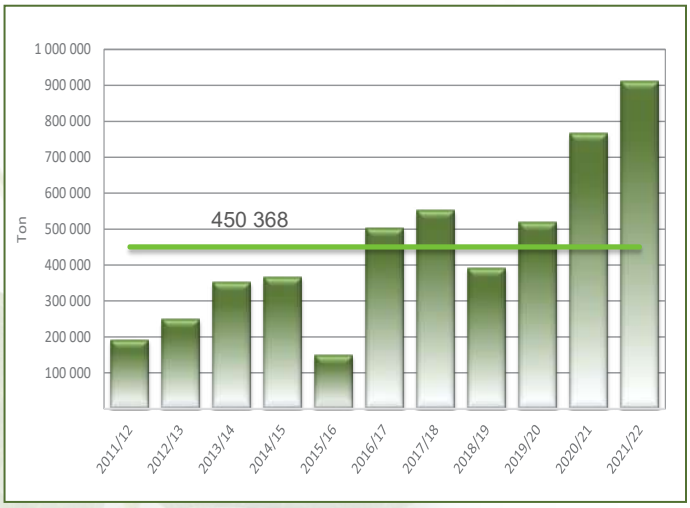


Figures provided by the CEC.

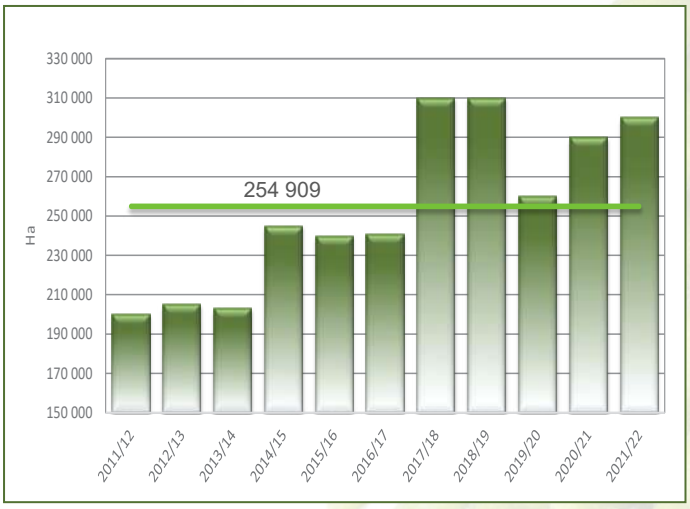
Graph 5: Area utilised for soybean production in the Free State since 2011/12



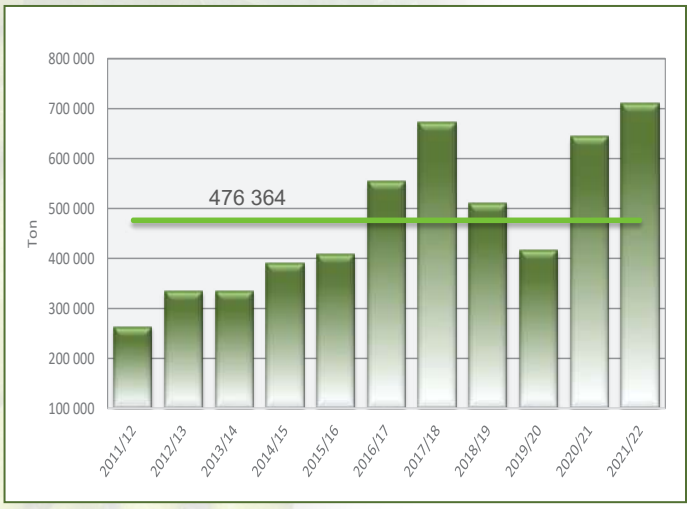
Graph 6: Soybean production in the Free State since 2011/12



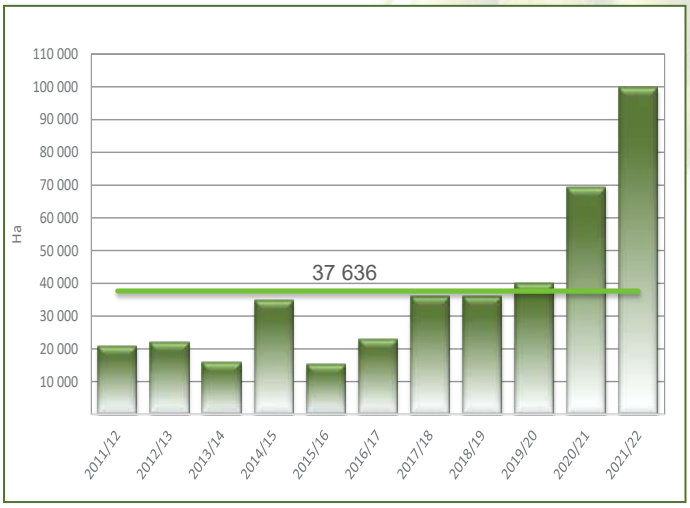
Graph 7: Area utilised for soybean production in Mpumalanga since 2011/12



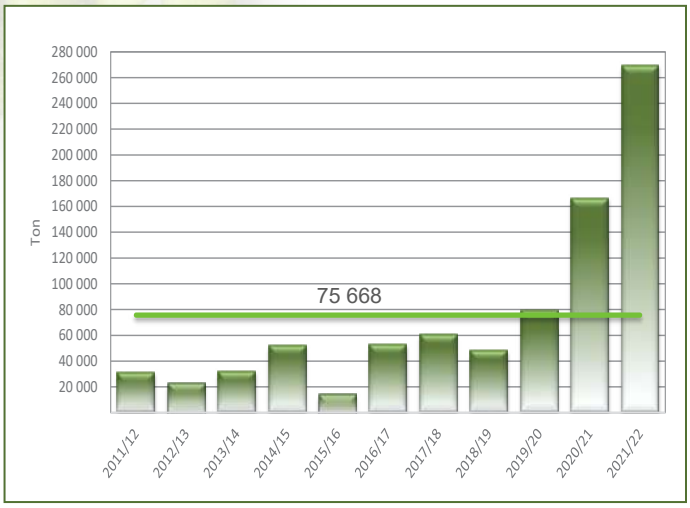
Graph 8: Soybean production in Mpumalanga since 2011/12



Graph 9: Area utilised for soybean production in North West since 2011/12



Graph 10: Soybean production in North West since 2011/12



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 2022 to January 2023), the amount of soybeans imported (4 018 tons) was less than the 13 448 tons imported during the previous season. The ten year import amount average is 67 571 tons. China remains the largest importer of soybeans worldwide, with 91.57 million metric tons during the 2021/22 season, followed by the European Union.

Of the 1.75 million tons of soybeans processed locally to date, 1.2% was used for human consumption, 10.1% 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 2% more than the total quantity crushed during the previous season and 60% more than the 10-year average. According to *BFAP Baseline*, soybean processing volumes are projected to increase by 40% over the next 10 years.

Soybean oilcake remains the main source of protein in most animal feed rations, due to its high protein content and favourable pricing relative to alternatives such as fishmeal. As livestock production continues to grow, the demand for soybean oilcake will also increase, with growth projected at an average of 2.6% per annum. Soybean oilcake production growth is expected to be 28% above 2021 levels by 2031.

Over the course of 2022 to 2031, soybean oilcake imports are set to remain below 300 000 tonnes, compared to 496 000 tons in 2021. Industry managed to replace 450 000 tons of imported oilcake over the past decade. Imports occur into the coastal regions, mostly in the off season. While some trade has started to occur to the coastal regions through the harvest season, the high cost of transportation continues to inhibit full import replacement. Investment into rail infrastructure to reduce transport cost, will benefit both the soybean processing as well as the livestock subsector.

By 2031, total vegetable oil consumption is expected to rise by 18% relative to average levels between 2019 and 2021. Over the same period, soybean oil consumption is expected to rise by 25%. From 2011 to 2021 soybean oil consumption rose by 28%.

251 876 tons of soybeans/products have been exported so far this season compared to the2 295 tons of the previous season and the 26 192 tons of the 10-year average. Exports to countries outside the African continent (Bangladesh, Malaysia, Thailand and Vietnam) have increased considerably. Globally, soybean exports during the 2021/22 season amounted to an estimated 153.98 million metric tons, with Brazil exporting 51% and the United States 38% of this figure. The projected world soybean exports for the 2022/23 season currently stands at 168.40 million metric tons. Argentina, followed by Brazil and the USA are the largest exporters of soybean meal and Argentina and Brazil the largest exporters of soybean oil *(WASDE - 634)*.

Graph 11: Soybean supply and demand overview for the current marketing season (Mar 2022 - Jan 2023)

Information provided by SAGIS.

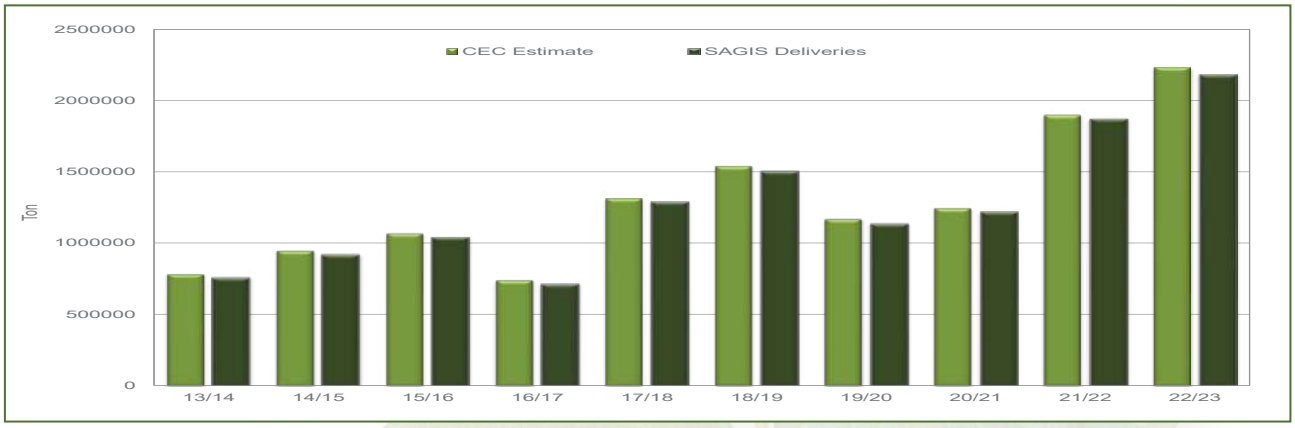
SAGIS South African Grain Information Service
Suid-Afrikaanse Graan Inligtingsdiens
Association incorporated under section 21 / Vereniging ingelyf kragtens artikel 21 (Reg No. 199/01919/08/08)

SOYBEANS: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO (TON) — Publication date: 2023/02/27

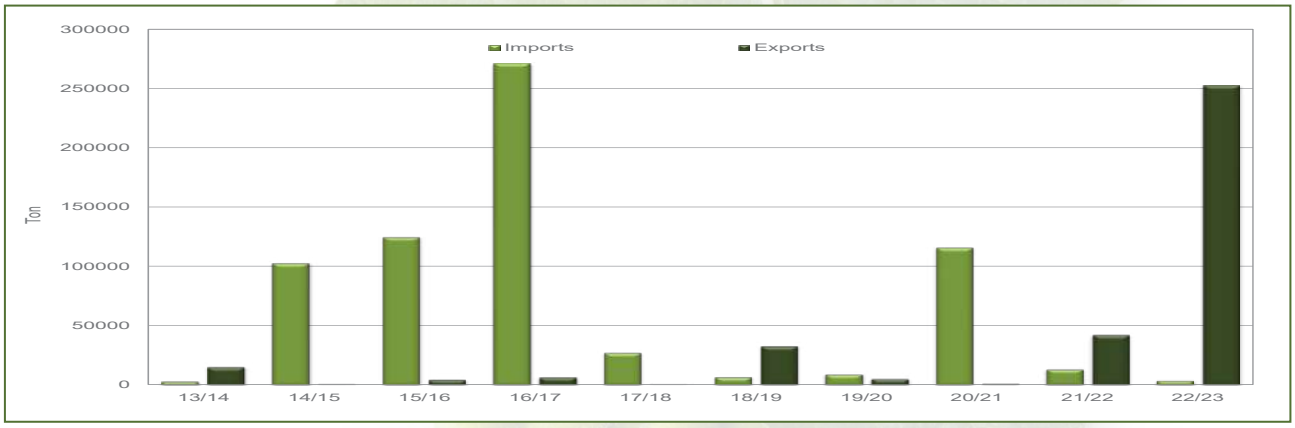
	Season (Mar - Feb)																Current Season Mar - Jan	10 Year average
	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	2012/13-2021/22
																	11	
CEC (Crop Estimate)	424 000	205 000	282 000	516 000	566 000	710 000	650 000	784 500	948 000	1 070 000	742 000	1 316 000	1 540 000	1 170 345	1 245 500	1 897 000	2 230 000	1 136 335
SUPPLY																		
Opening stock (1 Mar)	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	46 053	168 387	161 115
Prod deliveries	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	1 219 044	1 868 772	2 177 190	1 107 271
Imports	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	116 103	13 448	4 018	67 571
Surplus	3 900	3 300	900	700	1 500	1 800	1 698	2 572	0	10 526	1 122	2 519	4 497	0	1 968	4 289	5 023	2 919
Total Supply	477 500	407 400	326 900	560 700	589 600	738 600	849 690	833 613	1 084 506	1241 340	1 075 008	1 405 037	1 844 953	1 646 484	1 475 570	1 932 562	2 354 618	1 338 876
DEMAND																		
Processed	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	1 417 165	1 710 221	1 748 010	1 144 634
-human	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	23 234	22 279	20 359	24 362
-animal feed (full fat soya)	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	144 985	167 480	176 609	150 220
-crush (oil/oilcake)	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	1 248 946	1 520 462	1 551 042	970 051
Withdrawn by producers	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	496	196	0	1 634
Released to end-consumers	1 900	900	1 200	900	3 700	3 400	2 757	2 825	2 886	2 650	1 098	608	431	367	673	123	124	1 442
Seed for planting purposes	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	9 961	11 079	8 971	7 744
Net receipts(-)/disp(+)	300	1 600	1 300	3 200	1 900	1 600	0	2 316	1 924	805	1 427	- 429	- 239	1 107	162	261	126	733
Deficit	0	0	0	0	0	0	0	0	2 782	0	0	0	0	8 097	0	0	0	1 088
Exports	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	42 295	251 876	26 192
Total Demand	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	1 429 517	1 764 175	2 009 107	1 183 467
Ending Stock (28 Feb)	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	46 053	168 387	345 511	161 151
- processed p/month	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	118 097	142 518	158 910	81 137
- months' stock	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	0.4	1.2	2.2	2

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

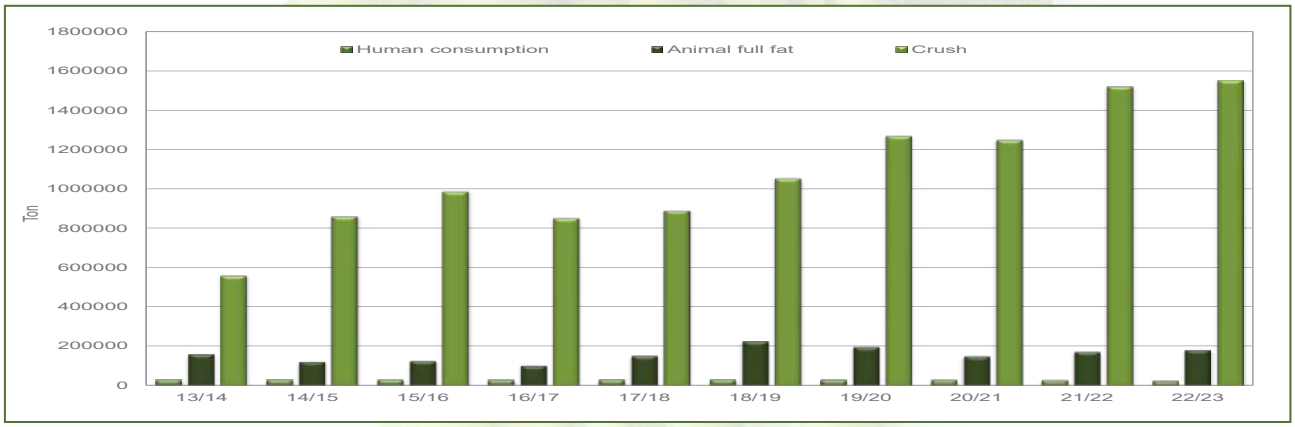
Graph 12: Soybeans: CEC Estimate vs SAGIS deliveries over 10 marketing seasons



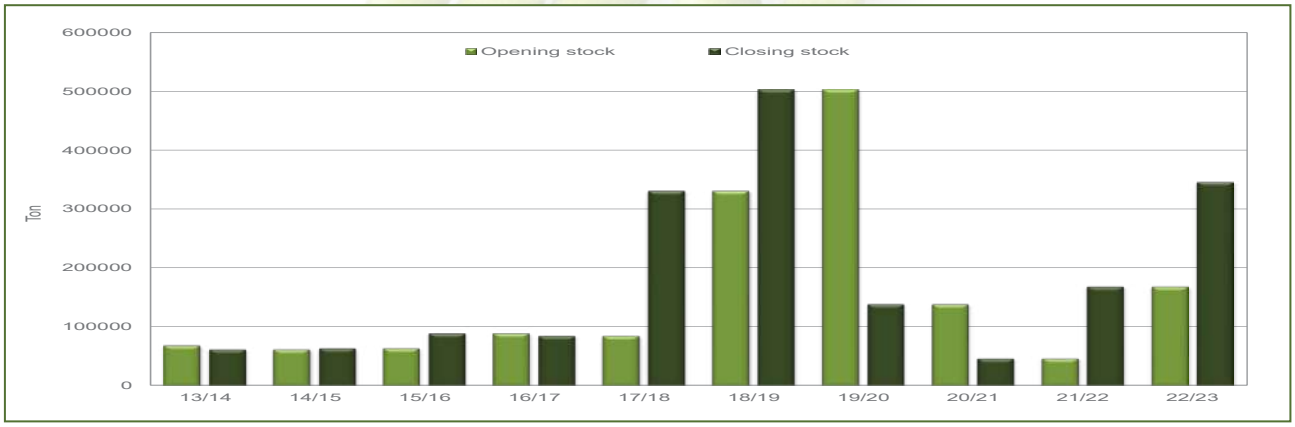
Graph 13: Soybeans: Imports and Exports over 10 marketing seasons



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
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	2 037	1 623	0	0	0	52 534	4 909	0	**116 103**
2021/22	0	0	0	3 197	30	0	0	0	0	8 374	1 847	**13 448**
2022/23	0	0	0	0	0	0	0	0	0	4 018	0	**4 018**

Season	SOYBEANS IMPORTS PER HARBOUR (Tons)				
	Harbours				
	East London	Durban	Cape Town	Port Elizabeth	Total
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**
2021/22	0	674	0	0	**674**
2022/23*	0	0	0	0	**0**

*Progressive March 2022 - January 2023
Note: Includes Imports for RSA and Other Countries

Season	SOYBEANS: RSA EXPORTS PER COUNTRY (Tons)												
	Bangladesh	Botswana	Lesotho	Namibia	Malawi	Malaysia	Mozambique	Thailand	Turkey	Eswatini	Vietnam	Zimbabwe	Total
2017/18	0	4	0	0	0	0	410	0	0	0	0	0	**414**
2018/19	0	17	0	0	0	0	160	0	27 660	0	0	4 973	**32 810**
2019/20	0	189	0	0	0	0	291	0	0	0	0	4 856	**5 336**
2020/21	0	744	9	0	0	0	298	0	0	7	0	2	**1 060**
2021/22	0	1 020	0	0	764	986	8 094	0	0	0	0	31 431	**42 295**
2022/23	28 978	0	0	71	0	119 967	4 531	52 393	0	0	27 531	18 405	**251 876**

Season	SOYBEANS EXPORTS PER HARBOUR (Tons)					
	Harbours					
	East London	Durban	Cape	Port Elizabeth	Richards Bay	Total
2008/09	0	0	0	0	0	**0**
2009/10	0	151 212	0	0	0	**151 212**
2010/11	0	121 243	0	0	0	**121 243**
2011/12	0	40 633	0	0	0	**40 633**
2012/13	0	152 318	0	0	0	**152 318**
2013/14	0	15 044	0	0	0	**15 044**
2014/15	0	0	0	0	0	**0**
2015/16	0	0	0	0	0	**0**
2016/17	0	0	0	0	0	**0**
2017/18	0	0	0	0	0	**0**
2018/19	0	27 660	0	0	0	**27 660**
2019/20	0	0	0	0	0	**0**
2020/21	0	0	0	0	0	**0**
2021/22	0	986	0	0	0	**986**
2022/23*	0	173 396	0	0	0	**173 396**

*Progressive March 2022 - January 2023

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

	OIL SEEDS PRODUCTS MANUFACTURED (per month)													
	Marketing year Mar 2020 - Feb 2021 Progressive: 12 Months	Marketing year Mar 2021 - Feb 2022 Progressive: 12 Months	Mar 2022 Tons	Apr 2022 Tons	May 2022 Tons	June 2022 Tons	July 2022 Tons	Aug 2022 Tons	Sep 2022 Tons	Oct 2022 Tons	Nov 2022 Tons	Dec 2022 Tons	Jan 2023 Tons	Marketing year Mar 2022 - Feb 2023 Progressive: 11 Months (Mar - Jan)
Palm Oil and Derivatives	**0**	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**
Soybean Oil	**214 912**	**261 757**	21 277	23 081	19 705	20 685	23 665	25 683	27 188	27 193	25 800	22 439	26 364	**238 873**
Sunflower Oil	**305 099**	**263 060**	12 244	22 325	32 035	28 305	28 886	33 028	29 279	26 893	29 327	17 626	19 226	**259 553**
Coconut Oil/ Groundnut Oil / Canola Oil / Corn (Maize) Oil / Blends or mixes of Oils which includes one of the above Oils / Biodiesel / Cottonseed Oil	**48 762**	**68 734**	6 023	5 462	5 703	5 892	5 450	3 264	3 745	5 790	7 187	5 172	6 836	**62 092**
Sunflower Oilcake	**351 190**	**300 155**	12 644	28 267	34 508	31 594	31 272	34 154	30 477	28 172	32 263	17 964	20 441	**295 026**
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	**1 005 161**	**1 237 766**	99 366	103 621	95 164	104 079	112 314	122 517	127 814	129 345	125 705	109 331	129 212	**1 126 899**
Soybean Flours and Meals / Textured Vegetable Protein	**38 724**	**41 078**	3 787	3 409	3 603	3 072	3 836	3 392	3 350	3 765	4 393	2 710	3 367	**38 128**
Soybean Fullfat	**148 918**	**169 604**	15 360	12 920	14 646	15 602	15 716	16 591	15 946	14 823	15 207	11 285	14 008	**154 665**
Peanut Butter and Paste	**37 131**	**33 700**	3 209	2 478	2 612	3 072	2 499	2 863	2 560	2 759	2 483	2 221	1 693	**30 876**
Total	**2 149 897**	**2 375 854**	**173 910**	**201 563**	**207 976**	**212 301**	**223 638**	**241 492**	**240 359**	**238 740**	**242 365**	**188 748**	**221 147**	**2 206 112**

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

	OIL SEEDS PRODUCTS IMPORTED (per month)													
	Marketing year Mar 2020 - Feb 2021 Progressive: 12 Months	Marketing year Mar 2021 - Feb 2022 Progressive: 12 Months	Mar 2022 Tons	Apr 2022 Tons	May 2022 Tons	June 2022 Tons	July 2022 Tons	Aug 2022 Tons	Sep 2022 Tons	Oct 2022 Tons	Nov 2022 Tons	Dec 2022 Tons	Jan 2023 Tons	Marketing year Mar 2022 - Feb 2023 Progressive: 11 Months (Mar - Jan)
Palm Oil and Derivatives	**528 067**	**524 513**	57 561	34 481	40 624	17 897	39 353	73 621	55 851	31 778	45 879	38 275	2 075	**437 395**
Soybean Oil	**119 019**	**68 481**	0	0	0	0	0	0	0	0	0	0	0	**0**
Sunflower Oil	**136 571**	**107 808**	0	0	0	0	0	0	0	0	0	0	0	**0**
Soybean Oil/Sunflower Oil	**0**	**0**	20 583	15 877	6 993	26 572	20 853	28 436	14 541	10 897	21 089	3 438	2 066	**171 345**
Coconut Oil/ Groundnut Oil / Canola Oil / Corn (Maize) Oil / Blends or mixes of Oils which includes one of the above Oils / Biodiesel / Cottonseed Oil	**12 702**	**10 035**	225	491	686	223	2 207	437	574	164	239	102	105	**5 453**
Sunflower Oilcake	**7 049**	**55 684**	0	0	0	0	0	0	0	0	0	0	0	**0**
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	**401 851**	**408 986**	685	27 348	7 707	33 343	3 730	1 148	35 917	29 705	7 826	293	33 799	**181 501**
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	**1 503**	**1 563**	124	157	109	78	65	210	213	62	276	272	174	**1 740**
Total	**1 206 762**	**1 177 070**	**79 178**	**78 354**	**56 119**	**78 113**	**66 208**	**103 852**	**107 096**	**72 606**	**75 309**	**42 380**	**38 219**	**797 434**

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

	OIL SEEDS PRODUCTS EXPORTED (per month)													
	Marketing year Mar 2020 - Feb 2021 Progressive: 12 Months	Marketing year Mar 2021 - Feb 2022 Progressive: 12 Months	Mar 2022 Tons	Apr 2022 Tons	May 2022 Tons	June 2022 Tons	July 2022 Tons	Aug 2022 Tons	Sep 2022 Tons	Oct 2022 Tons	Nov 2022 Tons	Dec 2022 Tons	Jan 2023 Tons	Marketing year Mar 2022 - Feb 2023 Progressive: 11 Months (Mar - Jan)
Palm Oil and Derivatives	**12 476**	**14 421**	595	389	497	1 163	1 294	1 423	836	972	1 117	810	982	**10 078**
Soybean Oil	**44 035**	**53 889**	0	0	0	0	0	0	0	0	0	0	0	**0**
Sunflower Oil	**3 200**	**2 971**	0	0	0	0	0	0	0	0	0	0	0	**0**
Soybean Oil/Sunflower Oil	**0**	**0**	5 335	5 639	4 495	3 335	2 235	4 788	4 309	5 008	6 279	4 084	4 255	**49 762**
Coconut Oil/ Groundnut Oil / Canola Oil / Corn (Maize) Oil / Blends or mixes of Oils which includes one of the above Oils / Biodiesel / Cottonseed Oil	**6 679**	**12 559**	920	780	2 035	2 289	1 477	927	509	828	452	1 556	1 129	**12 902**
Sunflower Oilcake	**1 510**	**1 755**	0	0	0	0	0	0	0	0	0	0	0	**0**
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	**11 547**	**18 052**	2 240	1 491	1 040	1 654	414	1 038	726	742	403	339	87	**10 174**
Soybean Flours and Meals / Textured Vegetable Protein	**5 267**	**21 019**	2 110	2 317	2 867	2 500	2 478	2 649	1 213	2 499	2 149	1 139	889	**22 810**
Soybean Fullfat	**2 742**	**3 450**	0	0	0	0	0	0	0	0	0	0	0	**0**
Peanut Butter and Paste	**228**	**240**	20	19	24	22	15	13	25	3	16	20	16	**193**
Total	**87 684**	**128 356**	**11 220**	**10 635**	**10 958**	**10 963**	**7 913**	**10 838**	**7 618**	**10 052**	**10 416**	**7 948**	**7 358**	**105 919**

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.

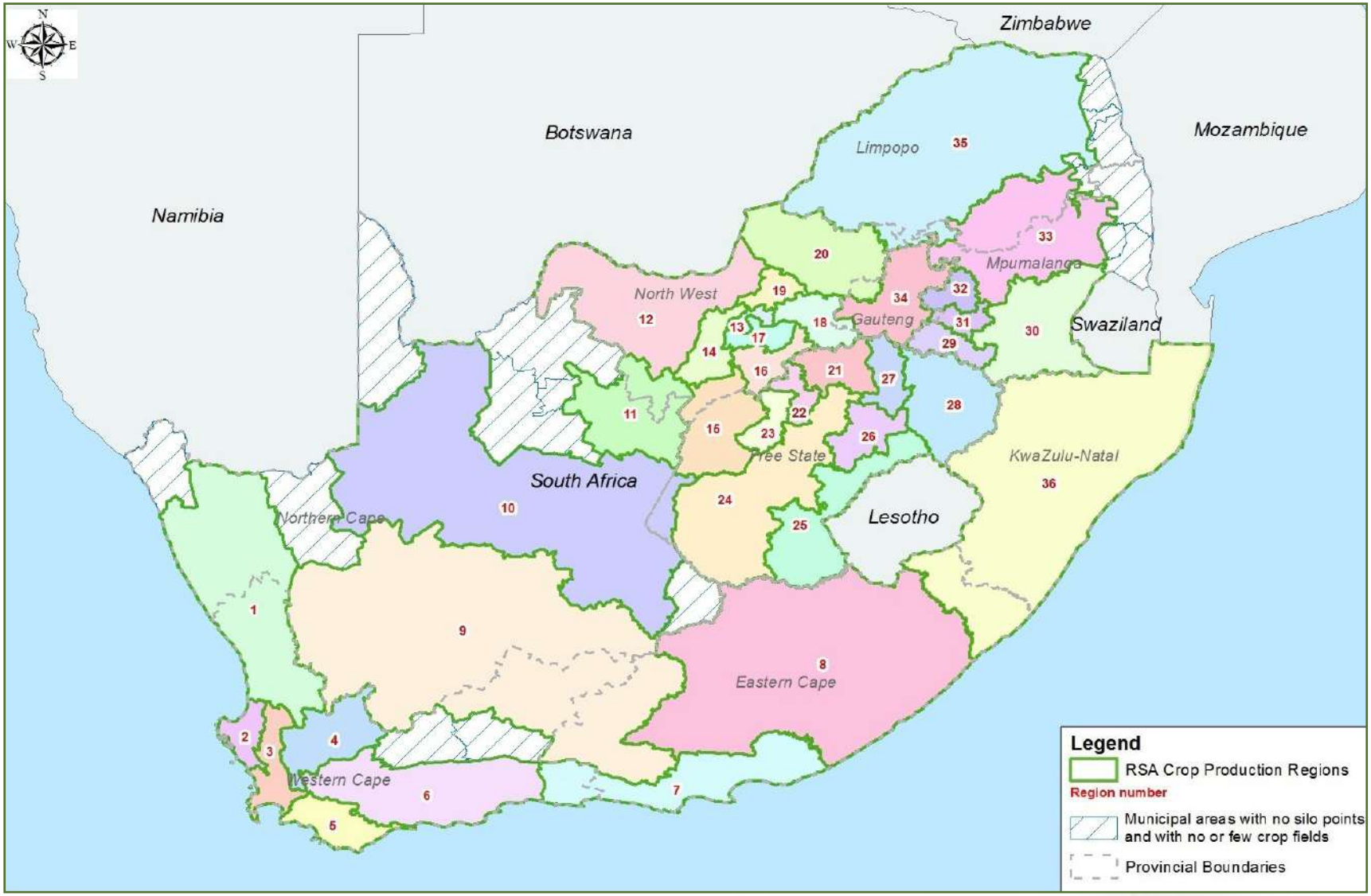
The 9 provinces are divided into 36 grain production regions.

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 2021/22 production season, are named and described on pages 21 to 23. 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.

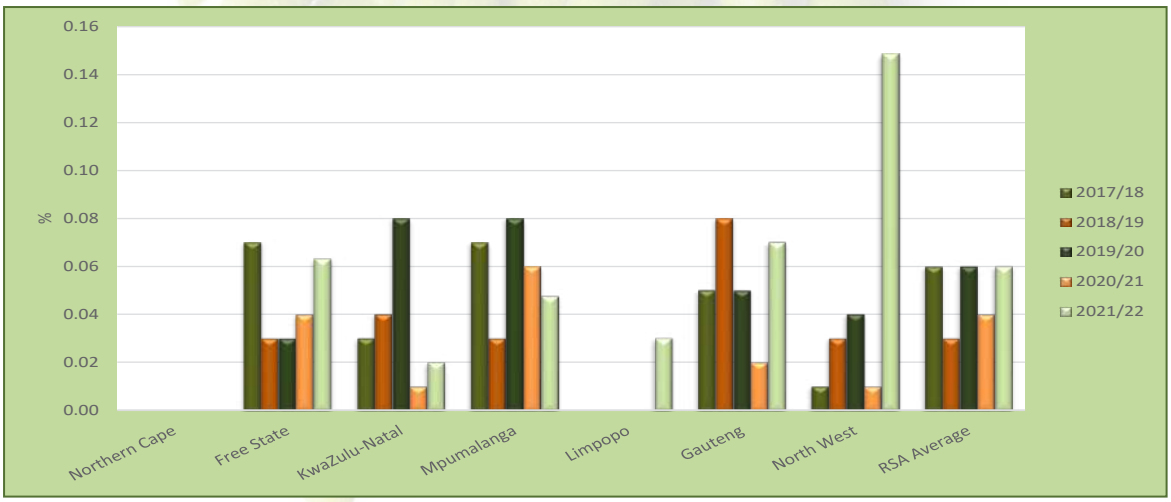
Soybean Crop Quality 2021/22 – Summary of results

Eighty-one percent (121) of the 150 samples analysed for the purpose of this survey were graded as Grade SB1, while 29 (19%) of the samples were downgraded to COSB (Class Other Soya Beans). During the previous two seasons, 20% (2020/21) and 27% (2019/20) of the samples were downgraded to COSB.

- One of the 29 samples were downgraded as a result of the percentage other grain exceeding the maximum permissible deviation of 0.5%.
- Three 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%.
- Five samples were downgraded as a result of the percentage soiled soybeans present in the samples exceeding the maximum permissible deviation of 10%.
- Five samples were downgraded as a result of the number of *Crotolaria sp.* and three samples as a result of *Datura sp.* poisonous seeds present exceeding the maximum permissible number of 1 per 1000 g.
- Two samples were downgraded as a result of the number of *Ipomoea purpurea Roth.* poisonous seeds present exceeding the maximum permissible number of 7 per 1000 g.
- The remaining ten samples were downgraded as a result of a combination of two or more of the following deviations exceeding the maximum permissible deviation: foreign matter, other grain, defective soybeans above the 4.75 mm sieve, soiled soybeans, collective deviations, the presence of poisonous seeds *(Datura sp. and Ipomoea purpurea Roth.)* as well as the presence of undesirable odours.

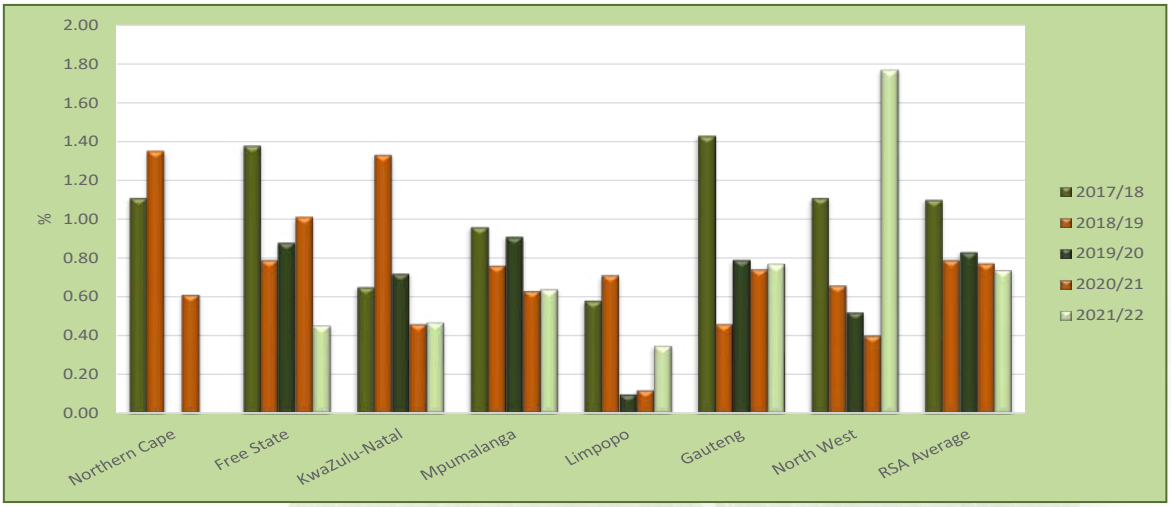
The percentage samples containing sclerotia from the fungus *Sclerotinia sclerotiorum*, was equal to that of the previous season, namely 43%. In the 2019/20 season, 41% of samples contained sclerotia. 42% of the samples that contained sclerotia this season originated in Mpumalanga, 25% North West and 18% in the Free State province. The remainder of the samples originated in Gauteng (8%), KwaZulu-Natal (6%) and Limpopo (1%). All these percentages sclerotia found to be present in the samples were however still well below the maximum permissible level of 4%. The national weighted average percentage this season was 0.06% compared to the 0.04% of the previous season. See Graph 16.

Graph 16: Average percentage sclerotia per province over five seasons



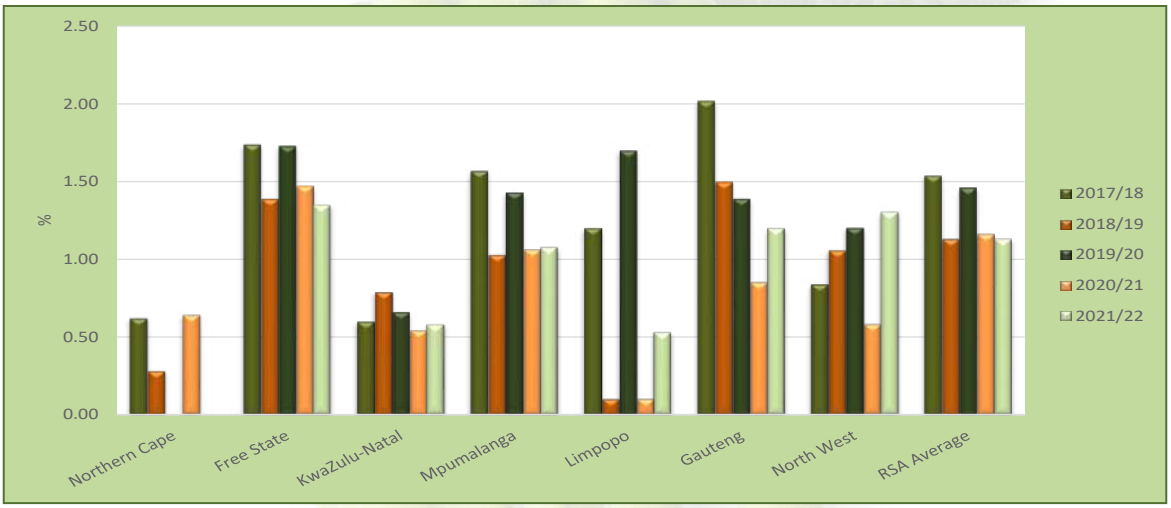
The samples received from North West province (21 samples) had the highest weighted average percentage foreign matter (1.77%), followed by Gauteng (9 samples) with 0.77% and Mpumalanga (65 samples) with 0.64%. The lowest percentage foreign matter was observed on the three samples from Limpopo, namely 0.35%. The national weighted average of 0.74% 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 1.35%, followed closely by the 1.30% and 1.20% from North West and Gauteng respectively. The lowest weighted average values reported were 0.53% on the samples from Limpopo and 0.58% on the samples from KwaZulu-Natal (N = 14). The national weighted average percentage decreased slightly from 1.16 % in the previous season to 1.13% this season. The 2019/20 season's average was 1.46%. Please see Graph 18.

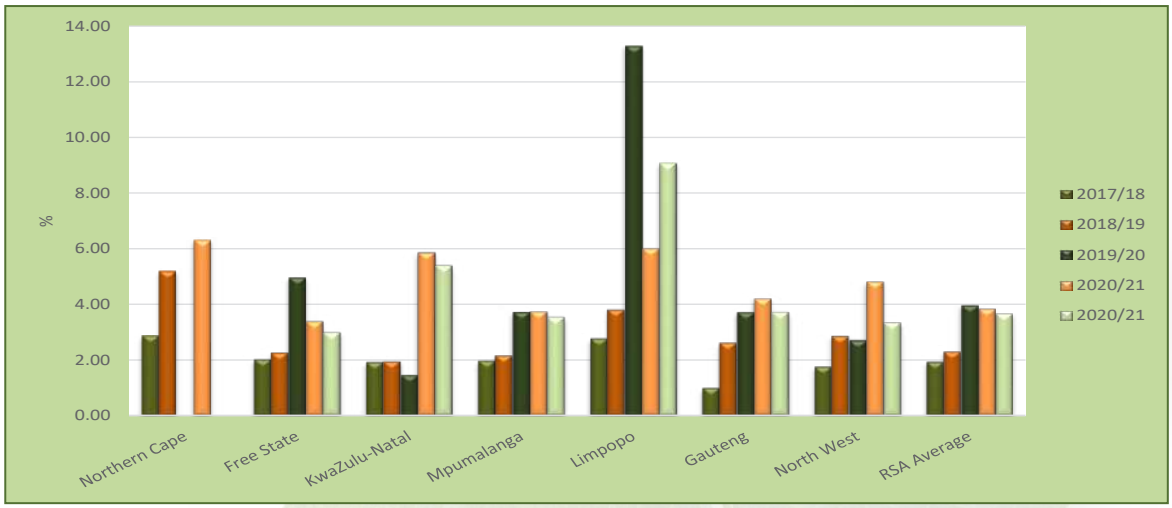
Graph 18: Average percentage soybeans and parts of soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve per province over five seasons



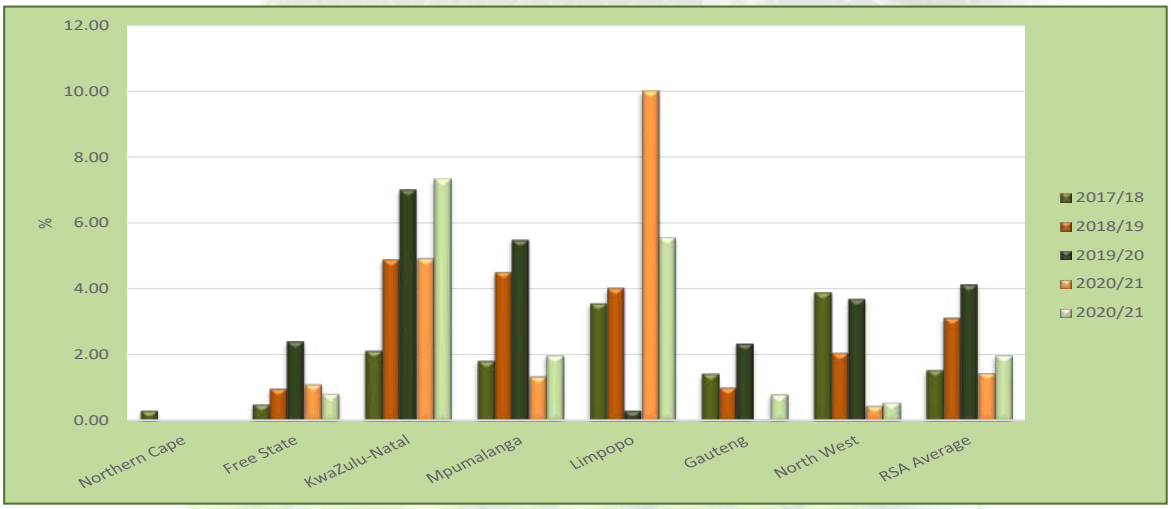
The lowest weighted average percentage defective soybeans on the 4.75 mm sieve, namely 2.99%, was observed on the 38 samples from the Free State. The highest percentage, namely 9.08% was observed on the Limpopo samples. The averages in the other provinces ranged from 3.35% in North West to 5.39% in KwaZulu-Natal. The national weighted average decreased from 3.82% last season to 3.67% this season. Please see Graph 19.

The national weighted average percentage soiled soybeans was 1.98%. The previous two seasons averaged 1.44% and 4.13% respectively. Weighted average percentages per province ranged from 0.55% in North West to 7.34% in KwaZulu-Natal. Please see Graph 20. Eight samples exceeded the maximum permissible deviation of 10% according to the grading regulations. The highest percentage reported was 22.22% on a sample from Mpumalanga. The rest of these samples originated in Mpumalanga, Limpopo and KwaZulu-Natal. Last season, six samples exceeded the grading limit.

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



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



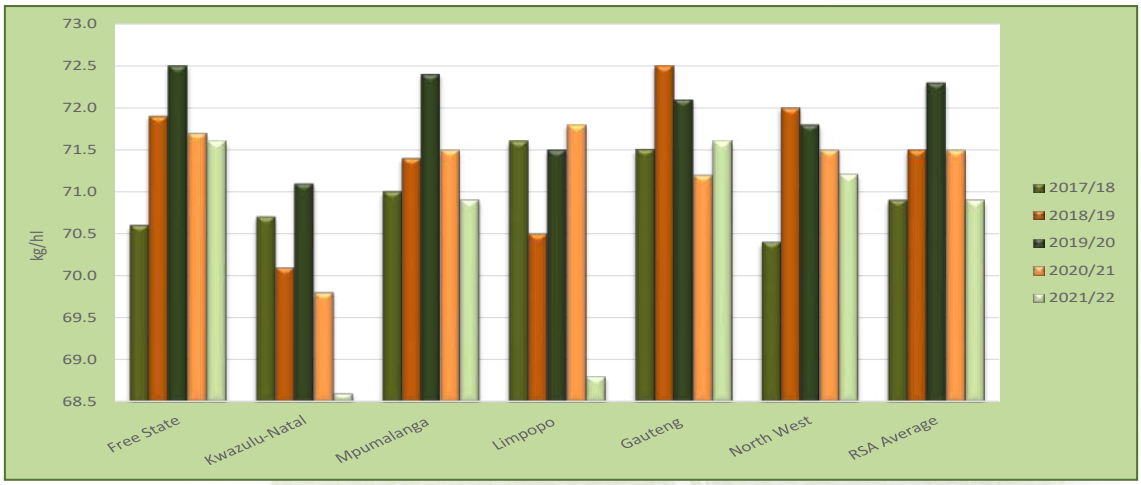
Test weight does not form part of the grading regulations for soybeans in South Africa. An approximation of the test weight of South African soybeans is provided in Table 2 for information purposes. The standard working procedure of the Kern 222 instrument, as described in ISO 7971-3:2019, was followed.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

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

Province	Test weight, kg/hl								
	2021/22 Season			2020/21 Season			2019/20 Season		
	Weighted average	Range	No. of samples	Weighted average	Range	No. of samples	Weighted average	Range	No. of samples
Northern Cape (Regions 10 - 11)	-	-	-	71.7	71.6 - 71.7	2	-	-	-
Free State (Regions 21 - 28)	71.6	69.8 - 73.3	**36	71.7	68.9 - 75.0	**59	72.5	70.3 - 74.4	51
KwaZulu-Natal (Region 36)	68.6	65.7 - 71.1	14	69.8	67.7 - 71.2	10	71.1	70.0 - 72.3	9
Mpumalanga (Regions 29 - 33)	70.9	67.4 - 73.1	65	71.5	66.5 - 73.2	*65	72.4	70.2 - 74.0	*64
Limpopo (Region 35)	68.8	63.7 - 72.7	3	71.8	-	1	71.5	-	1
Gauteng (Region 34)	71.6	70.7 - 72.3	9	71.2	70.3 - 71.8	5	72.1	71.0 - 73.2	8
North West (Region 12 - 20)	71.2	68.7 - 74.2	21	71.5	70.8 - 71.9	5	71.8	68.7 - 73.3	16
RSA	***70.9***	***63.7 - 74.2***	***148***	***71.5***	***66.5 - 75.0***	***147***	***72.3***	***68.7 - 74.4***	***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

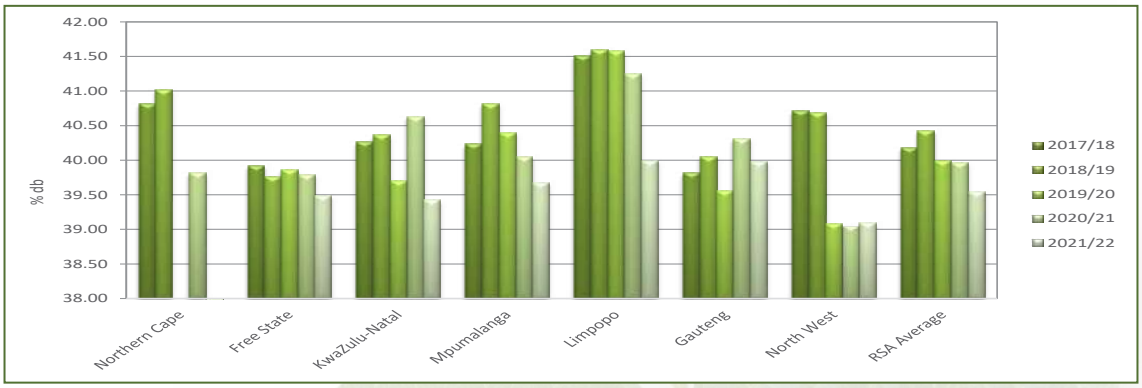
Season	2021/22		2020/21		2019/20		2018/19		2017/18	
Moisture, % (17hr, 103°C)	8.2		7.5		7.2		7.0		7.4	
Moisture basis	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**	**Dry basis**	**As is**
Crude protein, %	39.54	36.31	39.96	36.95	39.99	37.12	40.43	37.60	40.18	37.40
Crude fat, %	19.6	18.0	19.5	18.0	18.0	16.7	19.1	17.8	19.3	18.0
Crude fibre, %	7.2	6.6	6.8	6.3	7.0	6.5	6.8	6.3	5.9	5.5
Ash, %	4.63	4.25	4.55	4.21	4.63	4.19	4.67	4.34	4.59	4.27
No. of samples	***150***		***150***		***150***		***150***		***150***	

The weighted average crude protein content this season was 39.54% compared to the 39.96% of the previous season. This value is the second lowest since the 2011/2012 season (39.42%) when these annual surveys commenced. Limpopo reported the highest average (39.99%) and North West the lowest average (39.09%). The weighted average crude fat percentage of 19.6% was the highest since the 2016/17 season (19.8%). The samples from Limpopo had the highest weighted average crude fat content, namely 21.6%. The lowest fat average was observed in the Free State province with 19.2%.

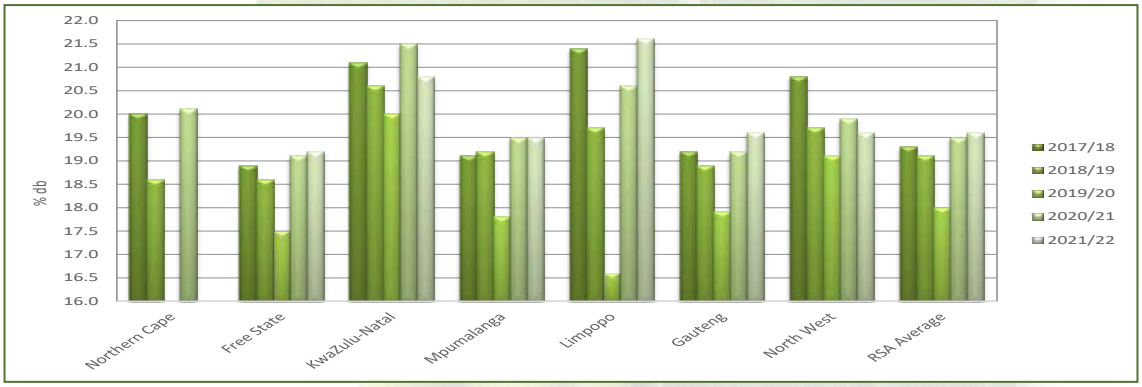
The weighted average percentage crude fibre varied from 5.8% in Limpopo to 7.7% in KwaZulu-Natal. The RSA weighted average was 7.2% compared to the 6.8% of the previous season. The national weighted average ash content ranged from 4.55% to 4.67% over the eleven seasons that this survey has been conducted. This season, the average ash content was 4.63%, compared to the 4.55% of the previous season (the lowest average value of the eleven seasons).

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

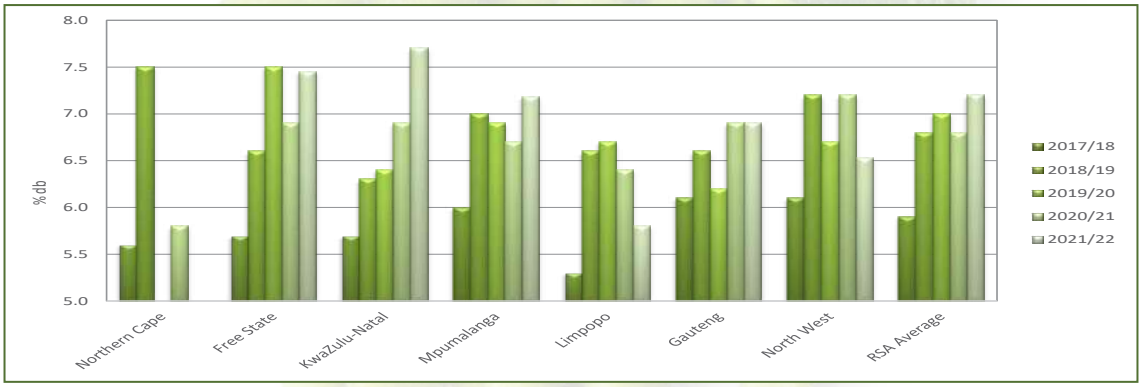
Graph 22: Average crude protein content per province over five seasons



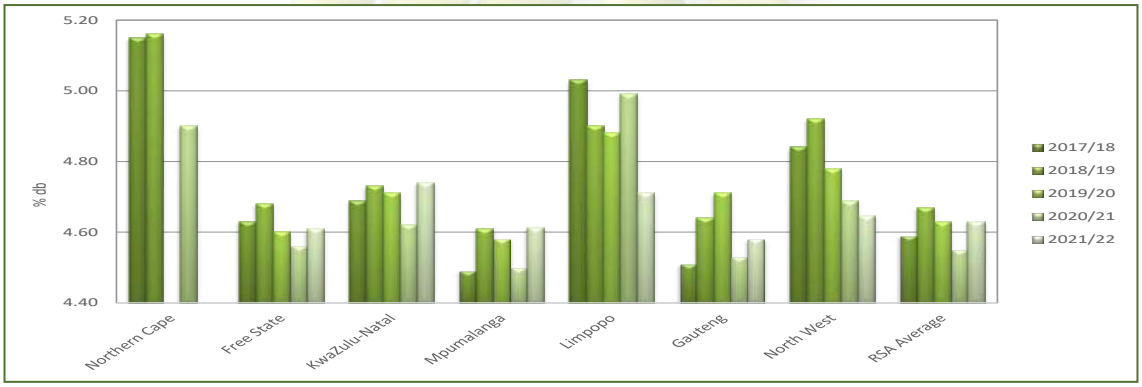
Graph 23: Average crude fat content per province over five seasons



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



Graph 25: Average ash content per province over five seasons



The 2021/22 season is the fourth 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 2021/22 season

Analysis	Moisture, % (17hr, 103°C)	Crude Protein, % (db)	Crude Protein, % (as is)	Crude Fat, % (db)	Crude Fat, % (as is)
Soybean Crop Quality Survey results					
Average	**8.2**	**39.54**	**36.31**	**19.6**	**18.0**
Minimum	6.5	34.50	31.77	16.9	15.4
Maximum	11.1	42.44	39.63	23.4	21.7
Standard Deviation	0.90	1.47	1.41	1.12	1.06
No. of samples	*150*	*150*	*150*	*150*	*150*
ARC Grain Crops Cultivar trial sample results					
Average	**8.0**	**40.81**	**37.55**	**19.6**	**18.0**
Minimum	7.5	36.25	33.53	15.9	14.7
Maximum	8.6	46.19	42.22	25.1	22.9
Standard Deviation	0.24	2.20	2.19	2.03	2.0
No. of samples	*90*	*90*	*90*	*90*	*90*
% Difference between crop and cultivar samples	***0.2***	***-1.3***	***-1.2***	***0.0***	***0.0***

A summary of the RSA Soybean Crop Quality averages of the 2021/22 season compared to those of the 2020/21 season, is provided in Table 5 on page 20.

Please see pages 24 to 30 for the average soybean quality per region.

Table 5: South African Soybean Crop Quality Averages 2021/22 vs 2020/21						
Class and Grade Soya	**2021/22**			**2020/21**		
	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), %	0.50	1.72	0.74	0.57	1.53	0.77
(C) Other grain, %	0.06	0.15	0.08	0.04	0.71	0.17
(D) Sunflower seed, %	0.00	0.01	0.00	0.00	0.05	0.01
(E) Stones, %	0.01	0.03	0.01	0.02	0.05	0.03
(F) Sclerotia, %	0.05	0.11	0.06	0.04	0.04	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, %	1.00	1.65	1.13	1.06	1.55	1.16
(H) Defective soybeans on the 4.75 mm round hole sieve, %	3.22	5.56	3.67	3.49	5.13	3.82
(I) Soiled soybeans, %	1.20	5.24	1.98	0.98	3.29	1.44
(J) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.56	1.83	0.80	0.62	1.58	0.81
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	7	1	0	2	0
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	5	1	0	3	1
Undesirable odour	No	No	No	No	No	No
Live insects	No	No	No	No	No	No
Number of samples	***121***	***29***	***150***	***120***	***30***	***150***
Nutritional analysis:						
Moisture, % (17 hr, 103 °C)	8.2	8.2	8.2	7.5	7.5	7.5
Crude Protein, % (db)	39.64	39.13	39.54	40.18	39.12	39.96
Crude Fat, % (db)	19.5	19.7	19.6	19.4	20.0	19.5
Crude Fibre, % (db)	7.1	7.2	7.2	6.9	6.7	6.8
Ash, % (db)	4.62	4.68	4.63	4.53	4.60	4.55
Number of samples	***121***	***29***	***150***	***120***	***30***	***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)	Senwes	Kameel (Bins)
NWK	Kameel (Bins)	Senwes	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)	Senwes	Amalia (Bins)
NWK	Excelsior (Bins)	Senwes	Hallatshope (Bins)
NWK	Geysdorp (Bins)	Senwes	Migdol (Bins)
NWK	Migdol (Bins)	Senwes	Schweizer-Reneke (Bins)
NWK	Nooitgedacht (Bins)		

Region 17: North-West Central Region (Ottosdal)

NWK	Boschpoort (Bags/Bins/Bulk)	NWK	Vermaas (Bins)
NWK	Kleinharts (Bins)	Senwes	Hartbeesfontein (Bins)
NWK	Ottosdal (Bins)	Senwes	Melliodora (Bins)
NWK	Rostrataville (Bins)	Senwes	Werda (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 (Bunkers)	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)

Region 21: Free State North-Western Region (Viljoenskroon)

Afgri	Kommandonek (Bunkers)	Senwes	Rooiwal (Bins)
Senwes	Attie (Bins)	Senwes	Vierfontein (Bins)
Senwes	Groenebloem (Bins)	Senwes	Viljoenskroon (Bins) G232
Senwes	Heuningspruit (Bins)	Senwes	Viljoenskroon (Bins) G266
Senwes	Koppies (Bins)	Senwes	Vredefort (Bins)
Senwes	Rooiwal (Bins)	Senwes	Weiveld (Bins)

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 22: Free State North-Western Region (Bothaville)

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

Region 23: Free State North-Western Region (Bultfontein)

Senwes	Bultfontein (Bins)	Senwes	Tierfontein (Bins)
Senwes	Kaalplaas (Bins)	Senwes	Wesselsbron (Bins/Bunkers)
Senwes	Losdoorns (Bins)	Senwes	Willemsrus (Bins)
Senwes	Protespan (Bins)		

Region 24: Free State Central Region

Senwes	Bainsvlei (Bins)	Senwes	Kroonstad (Bins)
Senwes	Bloemfontein (Bins)	Senwes	Pietersburg (Bins)
Senwes	Brandfort (Bins)	Senwes	Theunissen (Bins)
Senwes	De Burg (Bins)	Senwes	Van Tonder (Bins)
Senwes	Geneva (Bins)	Senwes	Welgeleë (Bins)
Senwes	Hennenman (Bins)	Senwes	Winburg (Bins)

Region 27: Free State Northern Region

Senwes	Gottenburg (Bins)	Senwes	Mooigeleë (Bins)
Senwes	Heilbron (Bins)	Senwes	Wolwehoek (Bins)
Senwes	Hoogte Grainlink (Bins)	VKB	Petrus Steyn (Bins)

Region 28: Free State Eastern Region

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

Region 29: Mpumalanga Southern Region

Afgri	Balfour (Bins)	Afgri	Leeuspruit (Bins)
Afgri	Greylingstad (Bins)	Afgri	Platrand (Bins)
Afgri	Grootvlei (Bins)	Afgri	Standerton (Bins)
Afgri	Harvard (Bins)	Afgri	Vaaldrift (Bunkers)
Afgri	Holmdene (Bins)	Afgri	Val (Bins)

Region 30: Mpumalanga Eastern Region

Afgri	Amersfoort (Bins)	Afgri	Maizefield (Bins)
Afgri	Carolina (Bins)	Afgri	Morgenzon (Bins)
Afgri	Davel (Bins)	Afgri	Overvaal (Bins)
Afgri	Eerstelingsfontein (Bunkers)	Afgri	Sandspruit (Bunkers)
Afgri	Ermelo (Bins)	BKB	Waterval (Bunkers)
Afgri	Estancia (Bins)	TWK	Mkondo (Bins)
Afgri	Hendriksvallei (Bunkers)	TWK	Panbult (Bins)
Afgri	Lothair (Bins)		

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 31: Mpumalanga Central Region

Afgri	Bakenlaagte (Bunkers)	Afgri	Kortlaagte (Bunkers)
Afgri	Bethal (Bins)	Afgri	Leslie (Bins)
Afgri	Brakfontein (Bunkers)	Afgri	Palmietfontein (Bunkers)
Afgri	Devon (Bins)	Afgri	Trichardt (Bins)
Afgri	Kinross (Bins/Bunkers)	Afgri	Vaalkrantz (Bunkers)

Region 32: Mpumalanga Western Region

Afgri	Argent (Bins/Bunkers)	Afgri	Hawerklip (Bins)
Afgri	Delmas (Bunkers)	Afgri	Kendal (Bins)
Afgri	Dryden (Bins)	Afgri	Ogies (Bins)
Afgri	Eloff (Bins)	Afgri	Vlakfontein (Bunkers)
Afgri	Endicott (Bins)		

Region 33: Mpumalanga Northern Region

Afgri	Arnot (Bins)	Afgri	Middelburg (Bins)
Afgri	Driefontein (Bins)	Afgri	Pan (Bins)
Afgri	Lydenburg (Bins)	Afgri	Stoffberg (Bins)
Afgri	Marble Hall (Bins)	BKB	Wonderfontein (Bins)

Region 34: Gauteng Region

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

Region 35: Limpopo Region

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

Region 36: KwaZulu-Natal Region

Afgri	Bergville (Bins/Bunkers)	Afgri	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	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), %	10.0	-	-	-	0.39	0.10	0.68	0.41	0.88	0.46	1.38	0.47
(c) Other grain, %	0.00	-	-	-	0.17	0.00	0.34	0.24	0.05	0.00	0.16	0.09
(d) Sunflower seed, %	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(e) Stones, %	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(f) Sclerotia, %	0.00	-	-	-	0.06	0.00	0.12	0.08	0.20	0.10	0.40	0.17
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	4.44	-	-	-	0.38	0.14	0.62	0.34	1.29	1.00	1.56	0.28
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	3.60	-	-	-	2.90	2.88	2.92	0.03	2.31	2.00	2.92	0.53
(i) Soiled Soybeans, %	1.00	-	-	-	0.00	0.00	0.00	0.00	0.29	0.00	0.48	0.26
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	10.00	-	-	-	0.45	0.10	0.80	0.49	1.08	0.56	1.78	0.63
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	-	-	-	10	0	20	14.14	13	0	20	11.55
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	-	-	-	0	0	0	0.00	0	0	0	0.00
Number of samples	***1***				***2***				***3***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	6.5	-	-	-	8.5	8.0	9.0	0.71	9.4	8.8	10.0	0.60
Crude protein, % (db)	42.38	-	-	-	37.28	34.61	39.94	3.77	39.07	38.47	40.20	0.98
Crude fat, % (db)	18.2	-	-	-	20.2	19.2	21.1	1.34	19.9	19.6	20.1	0.29
Crude Fibre, % (db)	5.4	-	-	-	5.8	5.2	6.3	0.78	6.8	6.1	7.4	0.67
Ash, % (db)	4.62	-	-	-	4.55	4.42	4.68	0.18	4.71	4.48	4.88	0.21
Number of samples	***1***				***2***				***3***			

South African
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(17) North-West Central Northern Region (Ottosdal)				(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	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), %	2.73	0.20	7.50	4.13	1.61	0.54	3.00	1.21	2.35	0.44	5.82	3.01
(c) Other grain, %	0.04	0.00	0.12	0.07	0.47	0.00	1.35	0.61	0.03	0.00	0.10	0.06
(d) Sunflower seed, %	0.01	0.00	0.04	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.04	0.02
(e) Stones, %	0.00	0.00	0.00	0.00	0.06	0.00	0.25	0.13	0.00	0.00	0.00	0.00
(f) Sclerotia, %	0.17	0.08	0.32	0.13	0.17	0.00	0.58	0.28	0.27	0.00	0.56	0.28
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	1.49	0.50	3.34	1.60	1.58	1.22	2.08	0.40	1.71	0.30	3.10	1.40
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	2.55	2.42	2.76	0.18	4.12	2.50	6.22	1.69	4.15	2.72	5.20	1.28
(i) Soiled Soybeans, %	0.00	0.00	0.00	0.00	0.85	0.00	2.24	0.97	0.80	0.00	2.40	1.39
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	2.90	0.28	7.82	4.26	1.78	0.54	3.58	1.46	2.63	0.44	6.08	3.03
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	10	0	30	17.32	0	0	0	0.00	13	0	20	11.55
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	0	0	0	0.00	0	0	0	0.00	7	0	20	11.55
Number of samples	***3***				***4***				***3***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	8.1	7.3	9.5	1.24	8.8	7.7	10.3	1.28	9.5	7.9	11.1	1.60
Crude protein, % (db)	38.99	38.80	39.30	0.27	40.10	39.20	41.02	0.80	38.04	37.85	38.38	0.30
Crude fat, % (db)	19.3	18.8	19.6	0.42	19.2	18.5	19.8	0.53	19.5	19.1	19.9	0.40
Crude Fibre, % (db)	6.6	6.2	7.1	0.45	6.8	6.2	7.8	0.71	6.7	5.8	7.6	0.90
Ash, % (db)	4.64	4.56	4.75	0.10	4.55	4.17	5.01	0.35	4.80	4.64	5.10	0.26
Number of samples	***3***				***4***				***3***			

South African
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(20) North-Western 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), %	0.42	0.18	0.64	0.23	0.25	0.14	0.36	0.16	0.62	0.30	1.10	0.43
(c) Other grain, %	0.08	0.00	0.14	0.07	0.04	0.00	0.08	0.06	0.12	0.00	0.35	0.20
(d) Sunflower seed, %	0.01	0.00	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(e) Stones, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(f) Sclerotia, %	0.08	0.06	0.10	0.02	0.00	0.00	0.00	0.00	0.03	0.00	0.10	0.06
(g) Soybeans and parts of Soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, %	0.48	0.26	0.84	0.22	1.65	0.50	2.80	1.63	1.04	0.20	1.50	0.73
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	3.49	2.64	5.00	0.96	2.77	2.44	3.10	0.47	2.66	1.60	3.84	1.12
(i) Soiled Soybeans, %	0.78	0.00	3.40	1.47	0.11	0.00	0.22	0.16	0.47	0.00	1.40	0.81
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.50	0.26	0.70	0.22	0.25	0.14	0.36	0.16	0.65	0.40	1.10	0.39
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***				***2***				***3***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	9.5	7.5	11.0	1.78	8.9	8.6	9.2	0.42	7.8	6.8	9.5	1.50
Crude protein, % (db)	39.04	35.70	40.45	1.94	36.77	36.59	36.94	0.25	40.71	40.22	41.56	0.74
Crude fat, % (db)	19.9	19.1	20.4	0.60	18.5	18.3	18.7	0.28	19.1	18.6	19.8	0.64
Crude Fibre, % (db)	6.5	6.0	6.9	0.38	7.6	7.5	7.6	0.07	6.7	6.2	7.0	0.42
Ash, % (db)	4.64	4.41	4.90	0.20	4.60	4.52	4.67	0.11	4.32	4.19	4.41	0.12
Number of samples	***5***				***2***				***3***			

South African
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(23) Free State North-Western Region (Bultfontein				(24) Free State Central Region				(27) Free State Northern Region			
Grading:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
(a) Wet pods, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-
(b) Foreign matter, including stones, other grains and sunflower seeds: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.28	0.10	0.45	0.25	0.78	0.10	1.88	0.69	0.14	-	-	-
(c) Other grain, %	0.18	0.00	0.36	0.25	0.02	0.00	0.10	0.04	0.00	-	-	-
(d) Sunflower seed, %	0.00	0.00	0.00	0.00	0.01	0.00	0.06	0.03	0.00	-	-	-
(e) Stones, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-
(f) Sclerotia, %	0.00	0.00	0.00	0.00	0.00	0.00	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, %	0.36	0.12	0.60	0.34	0.64	0.00	1.22	0.49	1.23	-	-	-
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	1.66	0.98	2.34	0.96	2.87	1.26	5.40	1.65	2.34	-	-	-
(i) Soiled Soybeans, %	0.00	0.00	0.00	0.00	0.86	0.00	2.60	1.07	1.10	-	-	-
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.28	0.10	0.45	0.25	0.78	0.10	1.88	0.69	0.20	-	-	-
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	0	0	0.00	8	0	20	10.95	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***				***5***				***1***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	8.2	7.9	8.4	0.35	7.6	7.0	9.5	1.09	7.2	-	-	-
Crude protein, % (db)	39.97	39.59	40.34	0.53	36.58	35.85	38.53	1.13	34.50	-	-	-
Crude fat, % (db)	19.1	18.9	19.2	0.21	18.8	18.3	19.6	0.50	18.6	-	-	-
Crude Fibre, % (db)	7.3	6.8	7.8	0.71	7.7	7.1	8.6	0.58	7.3	-	-	-
Ash, % (db)	4.43	4.34	4.51	0.12	4.87	4.53	5.11	0.31	4.74	-	-	-
Number of samples	***2***				***5***				***1***			

South African
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(28) Free State Eastern Region				(29) Mpumalanga Southern Region				(30) Mpumalanga Eastern Region			
Grading:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
(a) Wet pods, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(b) Foreign matter, including stones, other grains and sunflower seeds: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.41	0.06	1.54	0.38	0.60	0.04	2.60	0.59	0.72	0.10	3.38	0.86
(c) Other grain, %	0.07	0.00	0.34	0.09	0.09	0.00	0.46	0.12	0.02	0.00	0.20	0.05
(d) Sunflower seed, %	0.00	0.00	0.10	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(e) Stones, %	0.02	0.00	0.26	0.06	0.01	0.00	0.16	0.04	0.01	0.00	0.20	0.05
(f) Sclerotia, %	0.09	0.00	0.62	0.18	0.04	0.00	0.20	0.06	0.04	0.00	0.30	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, %	1.59	0.06	7.45	2.15	0.95	0.12	2.53	0.63	1.30	0.24	3.30	0.87
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	3.20	1.10	7.86	1.68	2.96	1.76	4.80	0.87	3.77	0.38	16.10	3.47
(i) Soiled Soybeans, %	0.94	0.00	5.00	1.59	0.94	0.00	5.42	1.51	1.59	0.00	12.98	3.07
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.49	0.06	2.16	0.54	0.64	0.04	2.66	0.59	0.77	0.10	3.58	0.92
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	1	0	20	4.85	3	0	50	11.47
Number of samples	***25***				***17***				***19***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	8.2	7.0	10.1	0.82	8.0	7.4	9.1	0.50	8.3	7.3	10.0	0.87
Crude protein, % (db)	40.29	38.99	42.44	0.87	39.12	37.39	42.34	1.33	40.15	38.50	41.64	0.84
Crude fat, % (db)	19.3	16.9	22.1	1.23	20.1	18.0	22.2	1.17	18.8	17.4	20.8	0.95
Crude Fibre, % (db)	7.5	6.3	8.9	0.71	7.2	5.9	9.4	0.83	7.4	6.8	8.0	0.42
Ash, % (db)	4.60	4.32	4.96	0.12	4.65	4.31	4.88	0.15	4.58	4.33	4.86	0.14
Number of samples	***25***				***17***				***19***			

South African
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(31) Mpumalanga Central Region				(32) Mpumalanga Western Region				(33) Mpumalanga Northern Region			
Grading:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
(a) Wet pods, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(b) Foreign matter, including stones, other grains and sunflower seeds: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.72	0.08	2.18	0.71	0.42	0.12	1.02	0.28	0.70	0.10	2.90	1.02
(c) Other grain, %	0.09	0.00	0.40	0.17	0.03	0.00	0.16	0.06	0.14	0.00	0.80	0.27
(d) Sunflower seed, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(e) Stones, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.20	0.07
(f) Sclerotia, %	0.03	0.00	0.10	0.04	0.10	0.00	0.26	0.09	0.04	0.000	0.16	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, %	1.20	0.12	3.16	1.04	0.85	0.24	1.68	0.48	0.95	0.22	2.60	0.95
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	5.08	1.00	14.00	3.99	3.23	0.42	8.12	2.06	2.85	1.00	5.00	1.41
(i) Soiled Soybeans, %	1.43	0.00	5.32	1.55	1.96	0.24	5.76	1.68	5.35	0.80	22.22	6.51
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.75	0.08	2.18	0.70	0.52	0.20	1.28	0.34	0.74	0.10	3.06	1.08
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	0	0	0	0.00	0	0	0	0.00	2	0	20	6.67
Poisonous seeds *(Argemone mexicana L., Convolvulus sp., Ipomoea purpurea Roth., Lolium temulentum, Xanthium sp.)*	2	0	22	6.96	2	0	20	6.32	2	0	20	6.67
Number of samples	***10***				***10***				***9***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	7.6	7.2	8.2	0.33	7.8	7.3	8.6	0.40	8.2	7.2	10.0	0.89
Crude protein, % (db)	39.86	38.10	41.71	1.05	39.93	38.85	41.27	0.87	39.21	36.26	41.14	1.55
Crude fat, % (db)	19.8	18.2	21.1	0.84	19.5	18.2	20.5	0.89	19.5	19.1	20.5	0.47
Crude Fibre, % (db)	7.2	6.4	7.9	0.46	6.9	5.5	8.2	0.84	7.0	4.3	8.1	1.10
Ash, % (db)	4.64	4.30	4.83	0.16	4.59	4.31	4.80	0.15	4.60	4.35	4.94	0.21
Number of samples	***10***				***10***				***9***			

South African
REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(34) Gauteng Region				(35) Limpopo Region				(36) KwaZulu-Natal 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), %	0.77	0.10	1.50	0.49	0.35	0.12	0.66	0.28	0.47	0.08	1.50	0.46
(c) Other grain, %	0.04	0.00	0.26	0.09	0.00	0.00	0.00	0.00	0.08	0.00	0.77	0.21
(d) Sunflower seed, %	0.00	0.00	0.00	0.00	0.05	0.00	0.10	0.05	0.00	0.00	0.00	0.00
(e) Stones, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.26	0.09
(f) Sclerotia, %	0.07	0.00	0.32	0.10	0.03	0.00	0.10	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, %	1.20	0.12	2.20	0.63	0.53	0.40	0.68	0.14	0.58	0.00	1.30	0.38
(h) Defective Soybeans on the 4.75 mm round hole sieve, %	3.73	3.14	5.06	0.61	9.08	0.90	21.44	10.89	5.39	0.90	10.26	2.77
(i) Soiled Soybeans, %	0.79	0.00	2.40	1.03	5.57	0.00	15.68	8.77	7.34	0.68	18.66	5.40
(j) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.84	0.10	1.56	0.51	0.38	0.12	0.66	0.27	0.49	0.08	1.50	0.46
Poisonous seeds *(Crotalaria sp., Datura sp., Ricinis communis)*	2	0	20	6.67	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	***9***				***3***				***14***			
Nutritional analysis:	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Moisture, % (17 hr, 103 °C)	8.3	7.6	9.2	0.53	7.5	6.9	7.8	0.49	8.0	7.1	9.0	0.54
Crude protein, % (db)	39.98	37.56	41.13	1.06	39.99	39.32	40.53	0.62	39.42	36.08	41.06	1.50
Crude fat, % (db)	19.6	18.9	20.3	0.45	21.6	20.8	22.2	0.72	20.8	18.9	23.4	1.30
Crude Fibre, % (db)	6.9	5.7	7.8	0.64	5.8	5.2	6.9	0.93	7.7	6.2	9.4	0.84
Ash, % (db)	4.58	4.45	4.81	0.13	4.71	4.39	4.88	0.28	4.74	4.54	5.04	0.15
Number of samples	***9***				***3***				***14***			

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 third consecutive season to perform fatty acid profile analyses on 22 composite crop samples representing different production regions as well as 18 cultivar samples from different localities. Please refer to Tables 6, 7 and 8 on pages 32 to 35 for the results.

The following fatty acid were included in the profile analysis:

C14:0	Myristic acid	C18:3n5	Eleostearic acid
C16:0	Palmitic acid	C18:3n3	n3 Linolenic acid
C16:1	Palmitoleic acid	C20:0	Arachidic acid
C17:0	Margaric acid	C20:1	Eicosenoic acid
C17:1	Glinkgolic acid	C20:2	Eicosadienoic acid
C18:0	Stearic acid	C20:5	Eicosapentanoic acid
C18:1 t	trans Oleic acid	C21:0	Heneicosanoic acid
C18:1 c	cis Oleic acid	C22:0	Behenic acid
C18:1n7	Vaccenic acid	C22:1	Erucic acid
C18:2 t	trans Linoleic acid	C24:0	Lignoceric acid
C18:2 c	cis Linoleic acid	C24:1	Nervonic acid
C18:3n6	n6 Linolenic acid		

Vaccenic acid (C18:1n7) is an isomer of C18:1 which can now be distinguished with new technology and was previously included in the total amount for oleic acid.

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

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

Table 6: Fatty acid profile results of a selection of crop quality samples from the 2021/22 season

Province	Region	g Fatty acids/100 g Fatty Acids																						
		C14:0	C16:0	C16:1	C17:0	C17:1	C18:0	C18:1 t	C18:1 c	C18:1 n7	C18:2 t	C18:2 c	C18:3n6	C18:3n5	C18:3n3	C20:0	C20:1	C20.2	C20.5	C21:0	C22:0	C22:1	C24:0	C24:1
North West	13	ND	9.7	ND	LOQ	ND	4.42	ND	17.78	1.3	ND	55.8	ND	ND	9.41	0.468	LOQ	ND	ND	ND	0.48	ND	LOQ	ND
	14	ND	9.5	LOQ	LOQ	ND	4.36	ND	19.15	1.3	ND	54.7	ND	ND	9.32	0.48	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
	17	ND	9.4	ND	LOQ	ND	4.46	ND	18.90	1.3	ND	54.4	ND	ND	9.96	0.429	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
	18	ND	9.6	ND	LOQ	ND	5.08	ND	19.49	1.3	ND	53.9	ND	ND	8.89	0.52	LOQ	ND	ND	ND	0.58	ND	LOQ	ND
	19	ND	9.5	LOQ	LOQ	ND	4.46	ND	17.24	1.2	ND	55.5	ND	ND	10.54	0.451	LOQ	ND	ND	ND	0.51	ND	LOQ	ND
	20	ND	9.2	ND	LOQ	ND	5.02	ND	18.78	1.2	ND	54.6	ND	ND	9.53	0.50	LOQ	ND	ND	ND	0.56	ND	LOQ	ND
	Min	-	*9.2*	-	-	-	*4.36*	-	*17.24*	*1.2*	-	*53.9*	-	-	*8.89*	*0.429*	-	-	-	-	*0.48*	-	-	-
	Max	-	*9.7*	-	-	-	*5.08*	-	*19.49*	*1.3*	-	*55.8*	-	-	*10.54*	*0.52*	-	-	-	-	*0.58*	-	-	-
	N	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*
Free State	21	ND	9.1	ND	LOQ	ND	4.47	ND	18.41	1.3	ND	54.2	ND	ND	10.93	0.443	LOQ	ND	ND	ND	0.55	ND	LOQ	ND
	22	ND	9.6	ND	LOQ	ND	4.92	ND	19.36	1.3	ND	53.8	ND	ND	9.20	0.50	LOQ	ND	ND	ND	0.58	ND	LOQ	ND
	23	ND	9.7	ND	LOQ	ND	4.80	ND	19.21	1.3	ND	54.1	ND	ND	9.20	0.50	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
	24	ND	8.8	ND	LOQ	ND	3.71	ND	16.46	1.4	ND	57.7	ND	ND	10.43	0.403	LOQ	ND	ND	ND	0.50	ND	LOQ	ND
	28	ND	9.4	ND	LOQ	ND	5.82	ND	17.92	1.2	ND	54.3	ND	ND	9.63	0.53	LOQ	ND	ND	ND	0.54	ND	LOQ	ND
	28	ND	9.3	ND	LOQ	ND	4.80	ND	18.82	1.4	ND	55.2	ND	ND	8.81	0.50	LOQ	ND	ND	ND	0.57	ND	LOQ	ND
	Min	-	*8.8*	-	-	-	*3.71*	-	*16.46*	*1.2*	-	*53.8*	-	-	*8.81*	*0.403*	-	-	-	-	*0.50*	-	-	-
	Max	-	*9.7*	-	-	-	*5.82*	-	*19.36*	*1.4*	-	*57.7*	-	-	*10.93*	*0.53*	-	-	-	-	*0.58*	-	-	-
	N	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*
Mpumalanga	29	ND	8.9	ND	LOQ	ND	5.45	ND	18.94	1.2	ND	54.3	ND	ND	9.63	0.52	LOQ	ND	ND	ND	0.52	ND	LOQ	ND
	30	ND	8.7	ND	LOQ	ND	4.78	ND	17.40	1.1	ND	55.6	ND	ND	10.90	0.469	LOQ	ND	ND	ND	0.52	ND	LOQ	ND
	30	ND	9.3	ND	LOQ	ND	4.62	ND	16.83	1.2	ND	55.4	ND	ND	11.04	0.530	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
	31	ND	8.7	0.32	ND	ND	5.95	ND	21.51	1.5	ND	52.0	ND	ND	7.99	0.575	LOQ	ND	ND	ND	0.72	ND	LOQ	ND
	32	ND	8.9	ND	LOQ	ND	5.41	ND	19.43	1.3	ND	54.2	ND	ND	9.14	0.51	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
	33	ND	8.8	ND	LOQ	ND	4.69	ND	18.49	1.3	ND	54.4	ND	ND	10.70	0.472	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
	Min	-	*8.7*	-	-	-	*4.62*	-	*16.83*	*1.1*	-	*52.0*	-	-	*7.99*	*0.469*	-	-	-	-	*0.52*	-	-	-
	Max	-	*9.3*	-	-	-	*5.95*	-	*21.51*	*1.5*	-	*55.6*	-	-	*11.04*	*0.58*	-	-	-	-	*0.72*	-	-	-
	N	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*
Gauteng	34	ND	9.2	ND	LOQ	ND	5.33	ND	19.14	1.3	ND	54.3	ND	ND	9.08	0.53	LOQ	ND	ND	ND	0.54	ND	LOQ	ND
Limpopo	35	ND	9.4	ND	LOQ	ND	5.32	ND	26.05	1.5	ND	49.7	ND	ND	5.98	0.54	LOQ	ND	ND	ND	0.57	ND	LOQ	ND
KwaZulu-Natal	36	ND	9.9	ND	LOQ	ND	4.50	ND	17.49	1.2	ND	55.3	ND	ND	10.17	0.430	LOQ	ND	ND	ND	0.474	ND	LOQ	ND
		ND	10.1	ND	LOQ	ND	4.83	ND	22.14	1.4	ND	52.2	ND	ND	7.74	0.465	LOQ	ND	ND	ND	0.49	ND	LOQ	ND
	Min	-	*9.9*	-	-	-	*4.50*	-	*17.49*	*1.2*	-	*52.2*	-	-	*7.74*	*0.430*	-	-	-	-	*0.474*	-	-	-
	Max	-	*10.1*	-	-	-	*4.83*	-	*22.14*	*1.4*	-	*55.3*	-	-	*10.17*	*0.465*	-	-	-	-	*0.49*	-	-	-
	N	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
RSA	*Min*	-	*8.7*	-	-	-	*3.71*	-	*16.46*	*1.1*	-	*49.7*	-	-	*5.98*	*0.403*	-	-	-	-	*0.474*	-	-	-
	Max	-	*10.1*	-	-	-	*5.95*	-	*26.05*	*1.5*	-	*57.7*	-	-	*11.04*	*0.58*	-	-	-	-	*0.72*	-	-	-
	N	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*

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 7: Fatty acid profile results of a selection of cultivar samples per region from the 2021/22 season

Province	Locality	Region	Cultivar	g Fatty acids/100 g Fatty Acids																						
				C14:0	C16:0	C16:1	C17:0	C17:1	C18:0	C18:1 t	C18:1 c	C18:1 n7	C18:2 t	C18:2 c	C18:3n6	C18:3n5	C18:3n3	C20:0	C20:1	C20.2	C20.5	C21:0	C22:0	C22:1	C24:0	C24:1
Free State	Bethlehem	25	DM 5953 RSF	ND	10.2	LOQ	LOQ	ND	5.38	ND	18.61	1.3	ND	53.9	ND	ND	9.07	0.46	LOQ	ND	ND	ND	0.44	ND	LOQ	ND
			SSS 5052 (tuc)	ND	9.3	LOQ	LOQ	ND	4.85	ND	18.64	1.3	ND	54.6	ND	ND	9.71	0.49	LOQ	ND	ND	ND	0.51	ND	LOQ	ND
			PAN 1521 R	ND	9.6	ND	LOQ	ND	5.39	ND	18.55	1.3	ND	53.8	ND	ND	9.91	0.50	LOQ	ND	ND	ND	0.49	ND	LOQ	ND
			RA 660 R	ND	8.7	LOQ	LOQ	ND	5.09	ND	17.57	1.2	ND	55.7	ND	ND	10.28	0.48	LOQ	ND	ND	ND	0.50	ND	LOQ	ND
			NS 6448 R	ND	9.2	ND	LOQ	ND	5.41	ND	18.21	1.2	ND	54.7	ND	ND	9.81	0.50	LOQ	ND	ND	ND	0.48	ND	LOQ	ND
			Y657	ND	9.9	ND	LOQ	ND	5.74	ND	17.31	1.2	ND	53.7	ND	ND	10.45	0.57	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
			Min	-	*8.7*	-	-	-	*4.85*	-	*17.31*	*1.2*	-	*53.7*	-	-	*9.07*	*0.46*	-	-	-	-	*0.44*	-	-	-
			Max	-	*10.2*	-	-	-	*5.74*	-	*18.64*	*1.3*	-	*55.7*	-	-	*10.45*	*0.57*	-	-	-	-	*0.53*	-	-	-
			N	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*
Limpopo	Groblersdal	35	DM 5953 RSF	ND	10.4	LOQ	ND	ND	6.26	ND	29.03	1.5	ND	44.8	ND	ND	6.07	0.61	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
			SSS 5052 (tuc)	ND	10.3	LOQ	ND	ND	5.12	ND	23.40	1.6	ND	51.1	ND	ND	6.65	0.60	LOQ	ND	ND	ND	0.58	ND	LOQ	ND
			PAN 1521 R	ND	10.1	LOQ	LOQ	ND	5.26	ND	22.95	1.5	ND	54.4	ND	ND	6.80	0.63	LOQ	ND	ND	ND	0.58	ND	LOQ	ND
			RA 660 R	LOQ	9.6	LOQ	LOQ	ND	5.32	ND	23.95	1.5	ND	51.2	ND	ND	6.62	0.56	LOQ	ND	ND	ND	0.61	ND	LOQ	ND
			NS 6448 R	LOQ	10.5	LOQ	LOQ	ND	5.11	ND	20.46	1.3	ND	53.6	ND	ND	7.17	0.55	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
			Y657	ND	10.7	LOQ	LOQ	ND	5.64	ND	22.58	1.5	ND	50.8	ND	ND	6.88	0.63	LOQ	ND	ND	ND	0.67	ND	LOQ	ND
			Min	-	*9.6*	-	-	-	*5.11*	-	*20.46*	*1.3*	-	*44.8*	-	-	*6.07*	*0.55*	-	-	-	-	*0.53*	-	-	-
			Max	-	*10.7*	-	-	-	*6.26*	-	*29.03*	*1.6*	-	*54.4*	-	-	*7.17*	*0.63*	-	-	-	-	*0.67*	-	-	-
			N	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*
KwaZulu-Natal	Greytown	36	DM 5953 RSF	LOQ	11.5	LOQ	LOQ	ND	4.44	ND	20.98	1.4	ND	51.8	ND	ND	8.49	0.42	LOQ	ND	ND	ND	0.39	ND	LOQ	ND
			SSS 5052 (tuc)	ND	10.8	LOQ	LOQ	ND	3.85	ND	17.81	1.4	ND	54.4	ND	ND	10.20	0.43	LOQ	ND	ND	ND	0.48	ND	LOQ	ND
			PAN 1521 R	ND	10.9	LOQ	LOQ	ND	4.39	ND	17.59	1.3	ND	54.4	ND	ND	9.72	0.50	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
			RA 660 R	ND	10.0	ND	LOQ	ND	4.32	ND	16.76	1.2	ND	55.9	ND	ND	10.03	0.49	LOQ	ND	ND	ND	0.63	ND	LOQ	ND
			NS 6448 R	ND	10.5	ND	LOQ	ND	4.26	ND	16.38	1.2	ND	55.9	ND	ND	10.09	0.48	LOQ	ND	ND	ND	0.56	ND	LOQ	ND
			Y657	LOQ	10.8	LOQ	LOQ	LOQ	4.36	LOQ	16.81	1.3	LOQ	54.6	LOQ	LOQ	10.35	0.49	LOQ	LOQ	LOQ	LOQ	0.58	LOQ	LOQ	LOQ
			Min	-	*10.0*	-	-	-	*3.85*	-	*16.38*	*1.2*	-	*51.8*	-	-	*8.49*	*0.42*	-	-	-	-	*0.39*	-	-	-
			Max	-	*11.5*	-	-	-	*4.44*	-	*20.98*	*1.4*	-	*55.9*	-	-	*10.35*	*0.50*	-	-	-	-	*0.63*	-	-	-
			N	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*
RSA			*Min*	-	*8.7*	-	-	-	*3.85*	-	*16.38*	*1.2*	-	*44.8*	-	-	*6.07*	*0.42*	-	-	-	-	*0.39*	-	-	-
			Max	-	*11.5*	-	-	-	*6.26*	-	*29.03*	*1.6*	-	*55.9*	-	-	*10.45*	*0.63*	-	-	-	-	*0.67*	-	-	-
			N	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*

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

Table 8: Fatty acid profile results per cultivar from the 2021/22 season

Cultivar	Locality	Region	g Fatty acids/100 g Fatty Acids																						
			C14:0	C16:0	C16:1	C17:0	C17:1	C18:0	C18:1 t	C18:1 c	C18:1 n7	C18:2 t	C18:2 c	C18:3n6	C18:3n5	C18:3n3	C20:0	C20:1	C20.2	C20.5	C21:0	C22:0	C22:1	C24:0	C24:1
DM 5953 RSF	Bethlehem	25	ND	10.2	LOQ	LOQ	ND	5.38	ND	18.61	1.3	ND	53.9	ND	ND	9.07	0.46	LOQ	ND	ND	ND	0.44	ND	LOQ	ND
	Groblersdal	35	ND	10.4	LOQ	ND	ND	6.26	ND	29.03	1.5	ND	44.8	ND	ND	6.07	0.61	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
	Greytown	36	LOQ	11.5	LOQ	LOQ	ND	4.44	ND	20.98	1.4	ND	51.8	ND	ND	8.49	0.42	LOQ	ND	ND	ND	0.39	ND	LOQ	ND
	Min		-	*10.2*	-	-	-	*4.44*	-	*18.61*	*1.3*	-	*44.8*	-	-	*6.07*	*0.42*	-	-	-	-	*0.39*	-	-	-
	Max		-	*11.5*	-	-	-	*6.26*	-	*29.03*	*1.5*	-	*53.9*	-	-	*9.07*	*0.61*	-	-	-	-	*0.53*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*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	5.41	ND	18.21	1.2	ND	54.7	ND	ND	9.81	0.50	LOQ	ND	ND	ND	0.48	ND	LOQ	ND
	Groblersdal	35	LOQ	10.5	LOQ	LOQ	ND	5.11	ND	20.46	1.3	ND	53.6	ND	ND	7.17	0.55	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
	Greytown	36	ND	10.5	ND	LOQ	ND	4.26	ND	16.38	1.2	ND	55.9	ND	ND	10.09	0.48	LOQ	ND	ND	ND	0.56	ND	LOQ	ND
	Min		-	*9.2*	-	-	-	*4.26*	-	*16.38*	*1.2*	-	*53.6*	-	-	*7.17*	*0.48*	-	-	-	-	*0.48*	-	-	-
	Max		-	*10.5*	-	-	-	*5.41*	-	*20.46*	*1.3*	-	*55.9*	-	-	*10.09*	*0.55*	-	-	-	-	*0.56*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
PAN 1521 R	Bethlehem	25	ND	9.6	ND	LOQ	ND	5.39	ND	18.55	1.3	ND	53.8	ND	ND	9.91	0.50	LOQ	ND	ND	ND	0.49	ND	LOQ	ND
	Groblersdal	35	ND	10.1	LOQ	LOQ	ND	5.26	ND	22.95	1.5	ND	54.4	ND	ND	6.80	0.63	LOQ	ND	ND	ND	0.58	ND	LOQ	ND
	Greytown	36	ND	10.9	LOQ	LOQ	ND	4.39	ND	17.59	1.3	ND	54.4	ND	ND	9.72	0.50	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
	Min		-	*9.6*	-	-	-	*4.39*	-	*17.59*	*1.3*	-	*53.8*	-	-	*6.80*	*0.50*	-	-	-	-	*0.49*	-	-	-
	Max		-	*10.9*	-	-	-	*5.39*	-	*22.95*	*1.5*	-	*54.4*	-	-	*9.91*	*0.63*	-	-	-	-	*0.58*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
RA 660 R	Bethlehem	25	ND	8.7	LOQ	LOQ	ND	5.09	ND	17.57	1.2	ND	55.7	ND	ND	10.28	0.48	LOQ	ND	ND	ND	0.50	ND	LOQ	ND
	Groblersdal	35	LOQ	9.6	LOQ	LOQ	ND	5.32	ND	23.95	1.5	ND	51.2	ND	ND	6.62	0.56	LOQ	ND	ND	ND	0.61	ND	LOQ	ND
	Greytown	36	ND	10.0	ND	LOQ	ND	4.32	ND	16.76	1.2	ND	55.9	ND	ND	10.03	0.49	LOQ	ND	ND	ND	0.63	ND	LOQ	ND
	Min		-	*8.7*	-	-	-	*4.32*	-	*16.76*	*1.2*	-	*51.2*	-	-	*6.62*	*0.48*	-	-	-	-	*0.50*	-	-	-
	Max		-	*10.0*	-	-	-	*5.32*	-	*23.95*	*1.5*	-	*55.9*	-	-	*10.28*	*0.56*	-	-	-	-	*0.63*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
SSS 5052 (tuc)	Bethlehem	25	ND	9.3	LOQ	LOQ	ND	4.85	ND	18.64	1.3	ND	54.6	ND	ND	9.71	0.49	LOQ	ND	ND	ND	0.51	ND	LOQ	ND
	Groblersdal	35	ND	10.3	LOQ	ND	ND	5.12	ND	23.40	1.6	ND	51.1	ND	ND	6.65	0.60	LOQ	ND	ND	ND	0.58	ND	LOQ	ND
	Greytown	36	ND	10.8	LOQ	LOQ	ND	3.85	ND	17.81	1.4	ND	54.4	ND	ND	10.20	0.43	LOQ	ND	ND	ND	0.48	ND	LOQ	ND
	Min		-	*9.3*	-	-	-	*3.85*	-	*17.81*	*1.3*	-	*51.1*	-	-	*6.65*	*0.43*	-	-	-	-	*0.48*	-	-	-
	Max		-	*10.8*	-	-	-	*5.12*	-	*23.40*	*1.6*	-	*54.6*	-	-	*10.20*	*0.60*	-	-	-	-	*0.58*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*

Table 8: Fatty acid profile results per cultivar from the 2021/22 season

Cultivar	Locality	Region	g Fatty acids/100 g Fatty Acids (continue)																						
			C14:0	C16:0	C16:1	C17:0	C17:1	C18:0	C18:1 t	C18:1 c	C18:1 n7	C18:2 t	C18:2 c	C18:3n6	C18:3n5	C18:3n3	C20:0	C20:1	C20.2	C20.5	C21:0	C22:0	C22:1	C24:0	C24:1
Y657	Bethlehem	25	ND	9.9	ND	LOQ	ND	5.74	ND	17.31	1.2	ND	53.7	ND	ND	10.45	0.57	LOQ	ND	ND	ND	0.53	ND	LOQ	ND
	Groblersdal	35	ND	10.7	LOQ	LOQ	ND	5.64	ND	22.58	1.5	ND	50.8	ND	ND	6.88	0.63	LOQ	ND	ND	ND	0.67	ND	LOQ	ND
	Greytown	36	LOQ	10.8	LOQ	LOQ	LOQ	4.36	LOQ	16.81	1.3	LOQ	54.6	LOQ	LOQ	10.35	0.49	LOQ	LOQ	LOQ	LOQ	0.58	LOQ	LOQ	LOQ
	Min		-	*9.9*	-	-	-	*4.36*	-	*16.81*	*1.2*	-	*50.8*	-	-	*6.88*	*0.49*	-	-	-	-	*0.53*	-	-	-
	Max		-	*10.8*	-	-	-	*5.74*	-	*22.58*	*1.5*	-	*54.6*	-	-	*10.45*	*0.63*	-	-	-	-	*0.67*	-	-	-
	N		*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*	*3*
RSA	*Min*		-	*8.7*	-	-	-	*3.85*	-	*16.38*	*1.2*	-	*44.8*	-	-	*6.07*	*0.42*	-	-	-	-	*0.39*	-	-	-
	Max		-	*11.5*	-	-	-	*6.26*	-	*29.03*	*1.6*	-	*55.9*	-	-	*10.45*	*0.63*	-	-	-	-	*0.67*	-	-	-
	N		*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*	*18*

Note:
Limit of detection (LOD) = 0.09 g Fatty acid/100 g Fatty acids.
Limit of quantitation (LOQ) = 0.28 g Fatty acid/100 g Fatty acids.
Values below the limit of detection are reported as ND (not detected).
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

Crude fibre is the loss on ignition of the dried residue remaining after digestion of a sample with 1.25% Sulphuric acid (H_2SO_4) and 1.25% Sodium hydroxide (NaOH) solutions under specific conditions.

In-House method 031 was used for the determination of the crude fibre in the samples. This method is based on AACCI method 32-10.01 using the Velp FIWE Advance fibre AutoExtractor.

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.

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 Laboratories NPC
Agri-Hub Office Park - Grain Building
477 Witherite Road
The Willows
Pretoria
0040

Technical Signatories:

Ms J Nortje (All Methods excl. In-house method 029)
Ms M Bothma (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)
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)
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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)

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

Facility Number: T0116

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

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Accreditation Manager

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Grain Crops

Potchefstroom

Republiek van Suid Afrika

Republic of South Africa

VERSLAG VAN DIE NASIONALE SOJABOON KULTIVARPROEWE 2021/22

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

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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 conducted.**
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INHOUD/INDEX

TABEL TABLE		BLADSY PAGE

1 INTRODUCTION

The National Soybean Cultivar Trials (project M101/62 (P05000002) were planted for the 44th successive year this past growing season. A total of 27 trials (of the planned 29 trials) were planted at 24 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 in a randomized Latinized row/column design using three replications and 32 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, 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 (UPL inoculant) 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 lodgings, will not hamper mechanical harvesting
3 = Few lodgings, lodging less than what will hamper mechanical harvesting
4 = Few lodgings, 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 = Many 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.

Six (6) of the 27 trials planted could not be included (22.2%) in the report compared to the one (1) out of 24 trials (4.2%) in the 2020/21 season.

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

1. Bapsfontein PD 1 – bird damage
2. Brits – flooding
3. Groblersdal (Agricol) – flooding
4. Mthatha – high CV%
5. Viljoenskroon – trial layout
6. Villiers - flooding

As in the previous seasons the evaluation of the trials was based on several parameters. No recommendation 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 (50 days Groblersdal ARC) and the longest in the cooler areas (93 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 (169 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 LS 6860 R (MG 6.2) had a mean plant height of 137 cm (highest) in the warm area compared to 35 cm (lowest) of the indeterminate cultivar PAN 1479 R (MG 4.7) in the warm region.

The average plant height between localities varied from a mean of 66 cm at Standerton to 110 cm at Hoopstad.

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 P71T74 R (MG 7.1; indeterminate), had a mean pod height of 24 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 NS 5909 R (MG 5.9; indeterminate), LS 6860 R (MG 6.2; indeterminate), PAN 1521 R (MG 5.7; indeterminate), PAN 1555 R (MG 5.7, indeterminate), P57T19 R (MG 5.7; indeterminate), DM59R03 (MG 6.0; indeterminate, P62T16 R (MG 6.2; indeterminate), P64T39 R (MG 6.4; indeterminate) and RA6520 RS (MG 6.5; indeterminate).

PAN 1479 R (MG 4.7) (indeterminate) and NS 5258 R (MG 4.9) (indeterminate) had the lowest reading of 5 cm in the cool area. 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 Belfast. The highest lodging figures was reported for DM59R03, LS 6164 R, RA6520 RS and DM 6.8i RR at Belfast in the cool area.

3.2.5 Green stem (Table 10)

A high percentage of green stem was recorded at Groblersdal (ARC) while the cultivars DM 5351RSF, PAN 1479 R, P57T19R, P62T16R, RA6520 RS, DM68R09, DM 6.8i RR and P71T74 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 Standerton in the cool 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 Bapsfontein PD2 due to bird damage.

3.2.8 Percentage undesirable seed (Table 13)

The lowest mean of 0.85% undesirable seeds was recorded for the cool region. The range varied from 3.75% at Pyramid to 0.26% at Standerton.

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

The variation in seed mass among localities ranged between 12.78 g 100^{-1} seeds at Clarens to 20.08 g 100^{-1} seeds at Standerton. The highest seed mass was recorded for LS 6164 R in the cool region, while PAN 1588 R, had the smallest seed in the moderate area.

1.2.10 Oil percentage (Table 15)

The cultivar RA5921 R had, the highest average oil percentage for the moderate and warm regions (22.83% moderate, 23.92% warm), while DM 5351RSF (21.88%) the highest for the cool area. The average oil percentage are 21.86% for the warm, 21.19% for the moderate and 20.65% for the cool area.

1.2.11 Crude Protein percentage (Table 16)

The cultivar DM 5302RSF, had an above 40% average for all climate regions. The overall averages are 39.24% for the warm, 38.36% for the moderate and 39.39% 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 P57T19 R, 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 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 5953RSF 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 NS 6448 R, PAN 1644 R, P64T39 R and DM 6.8i RR showed above average figures over the whole production potential range (Table 21). PAN 1521 R, NS 5909 R, NS 6448 R, P71T74 R, P64T39 R, PAN 1644 R and DM 6.8i RR performed above average for the warm dryland area (Table 23).

Lokaliteite, medewerkers en proeflokaliteit van kultivarproewe soos beplan vir, 2021/22
Localities, co-operators and trial locality of the cultivar trials for 2021/22

Nr No	Lokaliteit Locality	Proeflokaliteit Trial locality	Verantwoordelike beampte Responsible officer
1	Barberspan	J Basson	G de Beer & L Bronkhorst
2-3	Bapsfontein	Corteva Agriscience Research Centre	A Mathebula
4	Belfast	G Roos	L Bronkhorst
5	Bergville	J Jackson	R Wessels
6-7	Bethlehem	Kleingraan Instituut ARC	L Bronkhorst
8	Brits	K2 Navorsingstasie	F Middleton
9	Cedara	Departmaent of Agriculture	J Arathoon
10	Clarens	D Terblanche	R Wessels
11	Delmas (Agri Seed)	-	D van Staden
12	Greytown	Pannar Proefplaas	A Jarvie
13	Groblersdal (Agricol)	R Louw	R van Niekerk & C Schoeman
14	Groblersdal (Agri Seed)	-	D van Staden
15	Groblersdal (ARC)	-	L Bronkhorst
16	Hoopstad	R Taljaard	G de Beer & L Bronkhorst
17	Kinross	Vosstoffel Boerdery	L Bronkhorst
18	Kroonstad	Hoërskool Kroonstad	L Bronkhorst
19	Leeudoringstad	D Bergh	G de Beer & L Bronkhorst
20	Mathatha	Dimanda High School	M Mtyobile
21	Potchefstroom	Limagrain Research Station	F Middleton
22	Pyramid	-	D Scheepers
23-24	Schweizer Reneke	J du Plessis	G de Beer & L Bronkhorst
25	Standerton	T Schoonraad	C Schoeman
26	Stoffberg	P Prinsloo	R van Niekerk & C Schoeman
27	Viljhoenskroon	-	G van Rensburg
28	Villiers	-	D van Staden
29	Winterton	Terry Muirhead	F Middleton

Tabel 1 Sojaboonsaad eienskappe en inligting oor verskaffers, 2021/22
Table 1 Soybean seed characteristics and information about agents, 2021/22

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
PAN 1479	4.7	I	BL	P	T	JA/YES	Pannar	JA/YES
DM 5953RSF	4.8	I	IB	P	T	JA/YES	GDM Seeds SA	JA/YES
NS 5258 R	4.9	I	BL	W	B	JA/YES	Limagrain (K2)	NEE/NO
RA4918 R	4.9	I	BL	P	T	JA/YES	Agri-Seed & Technology	JA/YES
DM 5351RSF	5.1	I	IB	W	T	JA/YES	GDM Seeds SA	JA/YES
SSS 5449 (tuc)	5.2	I	B	P	G	JA/YES	Syngenta (Sensako)	JA/YES
Y540	5.4	I	B	W	-	JA/YES	Southern Hemisphere Seeds	NEE/NO
RA565 R	5.5	I	B	P	G	JA/YES	Agri-Seed & Technology	JA/YES
LS 6851 R	5.5	D	B	P	W	JA/YES	Limagrain	JA/YES
SSS 5052 (tuc)	5.5	I	B	W	G	JA/YES	Sensako	JA/YES
P57T19 R	5.7	I	DB	P	B	JA/YES	Corteva Agriscience RSA	JA/YES
PAN 1555 R	5.7	I	B	P	T	JA/YES	Pannar	JA/YES
PAN 1521 R	5.7	I	IB	P	G	JA/YES	Pannar	JA/YES
DM 5302RSF	5.7	I	LB	P	G	JA/YES	GDM Seeds SA	JA/YES
RA5921 R	5.9	I	LB	W	G	JA/YES	Agri-Seed & Technology	JA/YES
PAN 1588 R	5.9	I	IB	P	T	JA/YES	Pannar	JA/YES
NS 5909 R	5.9	I	IB	P	G	JA/YES	Limagrain (K2)	NEE/NO
RA660 R	6.0	I	B	P	G	JA/YES	Agri-Seed & Technology	JA/YES
DM59R03	6.0	I	LB	W	G	JA/YES	GDM Seeds SA	JA/YES
LS 6164 R	6.1	I	LB	W	G	JA/YES	Limagrain	JA/YES
LS 6860 R	6.2	I	B	P	W	JA/YES	Limagrain	JA/YES
P62T16 R	6.2	I	B	W	W	JA/YES	Corteva Agriscience RSA	JA/YES
Y627	6.2	I	B	W	-	JA/YES	Southern Hemisphere Seeds	NEE/NO
PAN 1692 R	6.3	I	BL	P	T	JA/YES	Pannar	JA/YES
P64T39 R	6.4	I	KL	W	G	JA/YES	Pioneer	JA/YES
NS 6448 R	6.4	SD	LB	P	G	JA/YES	Limagrain (K2)	NEE/NO
RA650 RS	6.5	I	B	W	G	NEE/NO	Agri-Seed & Technology	NEE/NO
Y657	6.5	I	B	P	-	JA/YES	Southern Hemisphere Seeds	NEE/NO
DM68R09	6.6	I	B	W	G	JA/YES	GDM Seeds SA	JA/YES
PAN 1644 R	6.7	I	IB	P	G	JA/YES	Pannar	NEE/NO
DM 6.8i RR	6.8	I	B	P	G	JA/YES	GDM Seeds SA	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, 2021/22
Table 2: General information in connection with soil and cultivation practices at the different trial localities, 2021/22

Lokaliteit Locality	Plantdatum Date of planting	Spasiëring Spacing (cm)	Onkruid beheer Weed control
Barberspan/D	01/12/2021	75	Strongarm, Alachlor, Round-up
Bapsfontein PD1/B/I	24/11/2021	90	Metagan Gold, Karate, Touchdown, Functional
Bapsfontein PD2/B/I	21/12/2021	90	Metagan Gold, Karate, Touchdown, Functional
Belfast/D	05/11/2021	75	Strongarm, Alachlor
Bergville/B/I	10/12/2021	38	-
Bethlehem PD1/D	02/11/2021	75	Strongarm, Alachlor
Bethlehem PD2/D	10/12/2021	75	Strongarm, Alachlor
Brits Limagrain/B/I	24/11/2021	45	-
Cedara/D	29/11/2021	45	Metalachlor 915 S, Equate, Round-up Power Max
Clarens/D	16/11/2021	75	Strongarm, Alachlor
Delmas Agri Seed/D	18/11/2021	76	-
Greytown/D	11/12/2021	75	Glyphosate
Groblersdal Agricol/B/I	13/12/2021	90	Round-up Power max
Groblersdal Agri Seed/B/I	10/11/2021	90	-
Groblersdal ARC	04/12/2021	75	Farmer spray
Hoopstad/D	29/11/2021	75	Round-up
Kinross/D	Nie geplant/Not planted	75	-
Kroonstad/D	09/12/2021	75	Strongarm, Alanex
Leeudoringstad/D	30/11/2021	75	Strongarm, Alanex
Mathatha/D	03/12/2021	75	-
Potchefstroom Limagrain/D	08/12/2021	75	-
Pyramid	21/12/2021	45	-
Schweizer Reneke/ PD1/D	05/11/2021	110	Round-up
Schweizer Reneke/ PD2/D	30/11/2021	110	Round-up
Standerton/D	04/11/2021	90	Round-up Power max
Stoffberg/D	Nie geplant,Not planted	90	-
Thaba Nchu	Nie geplant,Not planted		
Viljoenskroon Agricol/D	17/11/2021	75	-
Villiers/D	11/11/2021	76	-
Winterton/D	06/12/2021	76	Round-up

Tabel 3: Reënval en besproeiing vir die verskillende lokaliteite (mm), 2021/22
Table 3: Rainfall and irrigation at the different localities (mm), 2021/22

Lokaliteit	Maandelikse reënval (mm)/							Totaal	Besproeiing	Totaal
Locality	Monthly rainfall (mm)							Total	Irrigation	Total
	Okt	Nov	Des	Jan	Feb	Mrt	Apr	*		**
Barberspan	-	30	170	205	73	77	124	679	0	679
Cedara	55.12	75.95	209.8	241.55	79.51	107.19	189.48	958.6	0	958.6
Greytown	-	-	171	184	27.3	98.2	114.3	594.8	0	594.8
Hoopstad	98	4	176	67	41	41	112	539	0	539
Leeudoringstad	75	40	216	170	75	155	133	864	0	864
Schweizer Reneke PD1	76	14	227	110	97.3	144.3	127.5	796.1	0	796.1
Schweizer Reneke PD2	76	14	227	110	97.3	144.3	127.5	796.1	0	796.1
Standerton	-	90	151	118	89	96	79	623	0	623

* 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, 2021/22
Table 4: The number of days from planting to 50% flowering stage of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool								Matig/Moderate							Warm				
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Standerton	Winterton	Gem/Mean	Barberspan	Bergville	Cedara	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal ARC	Hoopstad	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	48	59	64	57	78	65	47	60	41	45	47	47	42	49	45	40	39	37	48	40
DM 5953RSF	48	59	64	54	78	67	44	59	41	45	47	47	43	51	46	40	39	38	49	39
NS 5258 R	48	51	64	57	78	69	44	59	43	45	47	55	46	51	48	40	41	40	49	40
RA4918 R	48	59	64	61	78	70	47	61	43	45	50	55	43	53	48	40	39	72	51	40
DM 5351RSF	48	46	64	54	78	73	44	58	42	45	47	55	43	48	47	40	41	41	49	41
SSS 5449 (tuc)	61	71	79	67	86	72	56	70	57	50	63	58	64	58	58	42	58	63	57	50
Y540	62	71	69	67	91	76	54	70	59	53	61	63	64	59	60	40	57	59	58	49
RA565 R	63	81	84	61	96	77	57	74	62	50	64	63	64	62	61	43	63	63	64	53
LS 6851 R	63	71	69	64	91	76	55	70	57	51	63	63	65	60	60	40	56	61	64	48
SSS 5052 (tuc)	63	86	84	73	96	76	56	76	64	51	65	63	65	59	61	66	63	65	64	64
P57T19 R	62	67	79	67	91	79	58	72	65	53	65	68	66	62	63	57	63	67	66	60
PAN 1555 R	63	81	84	73	93	79	58	76	59	53	69	63	65	62	62	54	64	68	64	59
PAN 1521 R	66	86	84	73	98	79	59	78	66	51	67	68	68	62	64	54	64	68	64	59
DM 5302RSF	62	76	84	67	102	79	53	75	59	50	61	68	64	59	60	42	55	59	60	49
RA5921 R	63	86	84	71	91	80	56	76	59	54	65	63	68	61	62	47	64	67	65	56
PAN 1588 R	68	81	84	71	91	80	64	77	62	55	70	63	68	63	64	57	64	73	65	61
NS 5909 R	61	86	74	75	93	80	61	76	62	55	67	65	67	63	63	57	65	73	67	61
RA660 R	64	81	84	73	91	81	58	76	62	53	67	63	67	62	63	47	65	68	67	56
DM59R03	63	86	92	73	98	81	58	79	60	51	65	68	65	62	62	47	63	64	65	55
LS 6164 R	63	86	84	73	96	82	58	78	65	55	67	68	66	56	63	47	65	67	65	56
LS 6860 R	66	86	69	73	96	83	62	76	65	57	70	68	67	64	65	66	66	73	66	66
P62T16 R	66	86	92	73	100	83	59	80	64	55	67	71	65	61	64	47	66	73	68	57
Y627	66	86	92	67	96	83	61	79	66	56	66	68	68	60	64	57	65	69	65	61
PAN 1692 R	64	95	111	82	103	85	63	86	67	54	70	73	70	68	67	57	69	73	72	63
P64T39 R	59	95	92	77	101	86	64	82	82	55	68	74	68	62	68	52	65	72	70	58
NS 6448 R	64	86	84	77	98	86	61	79	66	56	68	68	67	62	65	47	65	73	70	56
RA6520 RS	60	96	111	73	98	88	63	84	65	56	71	68	69	62	65	57	65	82	70	61
Y657	59	86	92	73	96	88	60	79	66	56	68	71	68	62	65	62	65	73	70	63
DM68R09	64	86	92	73	98	89	63	81	67	57	68	68	69	64	66	62	65	73	70	64
PAN 1644 R	63	86	74	73	101	89	56	77	66	55	68	68	69	62	65	42	66	73	70	54
DM 6,8i RR	48	86	84	73	101	91	60	78	65	56	68	74	68	58	65	54	64	104	68	59
P71T74 R	64	90	92	73	101	93	61	82	66	57	69	74	68	60	66	62	67	74	68	64
Gem/Mean	60	79	82	69	93	80	57	74	60	53	64	65	63	60	61	50	60	66	63	55

Tabel 5: Die aantal dae vanaf plant tot fisiologiesrypstadium van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2021/22
Table 5: The number of days from planting to physiological maturity of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool							Matig/Moderate							Warm			
	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Standerton	Winterton	Gem/Mean	Barberspan	Bergville	Cedara	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Hoopstad	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	64	134	126	150	126	109	118	120	107	123	96	118	118	114	119	128	128	125
DM 5953RSF	71	134	115	150	126	111	118	117	112	128	96	118	116	114	118	128	128	125
NS 5258 R	130	134	115	155	128	110	129	120	107	125	96	118	115	114	118	130	128	125
RA4918 R	130	134	115	170	130	111	132	123	107	128	96	119	117	115	115	130	129	125
DM 5351RSF	139	134	115	150	127	116	130	120	112	127	96	122	118	116	119	128	129	125
SSS 5449 (tuc)	159	134	121	162	132	109	136	128	112	127	96	120	116	116	121	136	129	129
Y540	159	134	121	150	134	114	135	128	115	103	96	130	119	115	130	136	135	134
RA565 R	159	134	131	170	135	118	141	128	115	134	131	128	117	125	130	142	137	136
LS 6851 R	166	134	131	162	135	121	141	138	120	139	131	133	118	130	130	153	145	143
SSS 5052 (tuc)	159	134	131	170	135	125	142	128	120	139	129	134	118	128	132	142	139	138
P57T19 R	143	134	131	162	140	122	139	138	120	139	131	128	116	129	132	142	141	138
PAN 1555 R	139	141	138	162	139	118	139	138	120	138	137	135	122	132	132	148	141	140
PAN 1521 R	159	141	126	170	139	119	142	138	120	135	125	135	118	129	131	141	141	137
DM 5302RSF	159	141	121	162	136	112	139	130	120	129	96	129	118	120	124	136	135	132
RA5921 R	159	134	138	170	143	122	144	138	124	140	131	135	116	131	134	145	141	140
PAN 1588 R	159	141	138	175	144	122	147	143	124	141	131	135	120	132	134	148	136	139
NS 5909 R	139	141	126	170	144	123	141	134	124	140	131	135	124	131	132	148	136	139
RA660 R	166	134	131	170	147	122	145	128	100	139	131	137	116	125	132	144	136	137
DM59R03	159	141	131	183	146	121	147	137	120	138	131	135	119	130	132	153	138	141
LS 6164 R	159	141	138	170	147	129	147	138	124	142	137	137	125	134	135	155	138	143
LS 6860 R	173	141	138	183	149	122	151	137	128	141	137	133	125	133	136	163	139	146
P62T16 R	173	134	157	193	151	126	156	140	128	143	137	145	125	136	134	164	142	147
Y627	159	141	131	170	150	124	146	143	128	139	137	141	127	136	135	154	139	143
PAN 1692 R	173	141	157	175	153	123	154	142	126	141	137	135	120	133	131	154	139	141
P64T39 R	159	141	157	183	156	128	154	140	124	143	137	141	123	135	138	154	141	144
NS 6448 R	159	141	138	175	155	127	149	120	128	142	137	141	122	132	132	156	139	142
RA6520 RS	173	148	157	186	157	130	159	139	128	144	131	141	126	135	136	164	142	147
Y657	159	141	131	175	156	124	148	138	128	141	137	139	116	133	133	159	139	144
DM68R09	159	134	138	180	158	129	150	143	128	142	137	137	126	136	136	158	139	144
PAN 1644 R	173	141	138	162	159	124	150	138	124	140	137	143	120	133	136	166	139	147
DM 6,8i RR	173	139	138	165	159	126	150	139	125	141	137	143	125	135	136	166	140	147
P71T74 R	166	148	157	183	161	126	157	144	128	143	137	145	129	138	138	166	142	149
Gem/Mean	152	138	134	169	144	121	143	134	120	136	124	133	120	128	130	148	137	138

Tabel 6: Die aantal dae vanaf plant tot oesstadium van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2021/22
Table 6: The number of days from planting to maturity of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool								Matig/Moderate						Warm					
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Standerton	Winterton	Gem/Mean	Barberspan	Cedara	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal ARC	Hoopstad	Pyramid	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	139	159	169	145	183	161	119	154	140	144	131	133	147	139	128	134	151	146	141	140
DM 5953RSF	129	159	169	131	170	161	122	149	140	144	131	133	147	139	128	134	150	146	141	140
NS 5258 R	129	159	169	135	170	161	119	149	140	144	131	161	147	145	128	134	155	146	141	141
RA4918 R	129	159	169	145	170	161	119	150	140	144	131	133	147	139	128	134	158	146	155	144
DM 5351RSF	129	159	169	145	170	161	128	152	140	144	131	133	147	139	133	134	151	146	155	144
SSS 5449 (tuc)	145	173	169	145	183	161	119	156	140	144	131	133	147	139	128	134	153	146	155	143
Y540	142	173	169	135	183	161	119	155	140	144	136	149	147	143	128	148	151	146	155	146
RA565 R	142	173	169	149	188	161	128	159	140	144	145	149	147	145	128	148	153	166	155	150
LS 6851 R	146	186	169	158	183	161	128	162	153	148	149	149	147	149	128	148	148	166	155	149
SSS 5052 (tuc)	150	182	149	158	197	161	131	161	140	161	145	149	147	148	128	148	153	166	155	150
P57T19 R	149	182	169	158	188	169	128	163	153	161	145	149	147	151	133	148	148	166	155	150
PAN 1555 R	142	173	169	158	183	169	128	160	153	156	149	149	147	151	128	148	149	166	155	149
PAN 1521 R	142	177	169	163	188	161	128	161	153	144	145	149	147	148	128	148	155	166	155	150
DM 5302RSF	129	173	169	149	183	169	119	156	140	144	145	133	147	142	128	134	148	146	155	142
RA5921 R	150	186	174	167	197	169	128	167	153	156	154	149	147	152	128	148	153	166	155	150
PAN 1588 R	149	177	174	158	199	169	128	165	153	156	149	149	147	151	128	162	148	166	155	152
NS 5909 R	157	186	169	163	197	169	128	167	153	161	125	149	147	147	128	148	155	166	155	150
RA660 R	143	173	169	158	192	169	133	163	140	156	145	149	147	147	128	148	154	166	155	150
DM59R03	150	186	174	163	204	169	128	168	153	161	154	149	147	153	142	148	151	166	155	152
LS 6164 R	160	186	174	172	204	169	136	171	153	161	158	148	147	153	142	162	155	166	155	156
LS 6860 R	160	186	183	172	217	169	131	174	153	156	154	149	147	152	128	148	153	180	155	153
P62T16 R	160	186	183	172	210	169	136	174	153	170	158	161	147	158	128	148	155	180	155	153
Y627	150	186	174	167	197	169	131	168	153	156	154	161	147	154	137	148	153	180	155	155
PAN 1692 R	143	186	174	167	194	183	128	168	153	156	158	149	147	153	128	148	158	166	155	151
P64T39 R	160	186	178	172	210	183	136	175	153	161	158	161	147	156	133	162	155	180	155	157
NS 6448 R	158	186	183	172	197	183	136	174	153	156	158	149	147	153	128	148	153	180	155	153
RA6520 RS	157	186	174	193	217	183	136	178	153	170	158	161	147	158	142	162	151	180	155	158
Y657	150	186	149	163	192	183	128	164	153	156	145	149	147	150	128	148	148	180	155	152
DM68R09	159	186	174	167	217	183	136	175	153	170	158	149	147	155	142	162	158	180	155	159
PAN 1644 R	143	186	174	172	188	183	133	168	153	156	149	161	147	153	128	148	155	180	155	153
DM 6,8i RR	159	186	183	172	197	183	136	174	153	161	158	161	147	156	142	162	151	180	155	158
P71T74 R	160	186	183	172	217	183	136	177	153	170	158	161	147	158	142	162	155	180	155	159
Gem/Mean	147	179	172	160	193	170	129	164	149	155	147	149	147	149	131	148	153	166	154	150

Tabel 7: Die planthoogte van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2021/22

Table 7: The plant height of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool							Matig/Moderate							Warm				
	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Standerton	Winterton	Gem/Mean	Barberspan	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal ARC	Hoopstad	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	62	67	47	44	54	83	59	47	80	78	58	55	57	63	65	81	81	35	66
DM 5953RSF	58	78	62	48	49	72	61	70	79	83	53	62	66	69	87	93	78	45	76
NS 5258 R	62	67	35	40	42	83	55	63	89	75	58	58	65	68	80	92	78	48	75
RA4918 R	57	65	53	50	53	75	59	49	86	74	58	60	69	66	83	85	95	38	75
DM 5351RSF	70	73	48	48	56	93	65	64	89	95	67	60	75	75	88	88	88	50	79
SSS 5449 (tuc)	83	73	62	60	82	83	74	60	90	82	70	70	76	75	83	117	103	50	89
Y540	80	70	48	63	51	82	66	58	81	80	72	50	67	68	80	95	102	65	86
RA565 R	80	78	63	77	65	98	77	64	90	81	73	80	73	77	82	106	93	65	87
LS 6851 R	75	78	62	67	60	75	69	59	79	68	72	70	63	68	82	98	55	50	71
SSS 5052 (tuc)	88	82	65	78	67	98	80	84	101	83	75	63	82	81	90	110	106	65	93
P57T19 R	98	88	90	78	58	98	85	70	100	85	77	75	85	82	88	122	107	70	97
PAN 1555 R	88	82	67	58	76	102	79	72	107	90	83	84	84	87	93	132	118	70	103
PAN 1521 R	97	90	88	82	69	100	88	77	97	83	70	75	81	80	92	105	103	75	94
DM 5302RSF	83	80	57	77	64	72	72	58	82	73	63	73	71	70	83	92	97	55	82
RA5921 R	77	75	63	67	51	80	69	58	84	76	60	75	70	70	72	96	97	80	86
PAN 1588 R	90	87	68	82	83	105	86	67	99	85	83	83	83	83	95	118	97	90	100
NS 5909 R	93	77	67	65	74	95	78	80	99	77	73	90	74	82	95	114	85	90	96
RA660 R	85	80	62	72	57	85	73	64	91	83	63	72	66	73	75	99	92	90	89
DM59R03	97	88	98	87	68	98	89	80	106	96	85	92	80	90	90	117	107	105	105
LS 6164 R	102	100	80	78	72	108	90	87	101	95	70	80	87	87	112	132	93	100	109
LS 6860 R	102	95	87	73	73	108	90	77	105	88	80	75	89	86	98	137	103	105	111
P62T16 R	93	90	73	65	78	105	84	80	107	85	77	90	77	86	85	111	108	95	100
Y627	93	75	70	70	60	105	79	70	97	87	75	75	76	80	98	113	112	85	102
PAN 1692 R	98	82	72	85	78	98	86	65	95	77	78	70	78	77	88	100	85	90	91
P64T39 R	105	97	95	77	84	100	93	81	101	97	85	95	77	89	90	125	103	102	105
NS 6448 R	82	80	63	50	63	98	73	60	89	73	72	80	80	76	87	100	68	80	84
RA6520 RS	92	102	93	86	62	92	88	60	112	89	80	70	84	83	93	115	98	105	103
Y657	102	88	65	88	82	105	88	78	104	89	80	90	74	86	97	123	118	105	111
DM68R09	88	87	65	65	64	92	77	58	100	85	72	95	75	81	92	117	97	100	101
PAN 1644 R	87	85	62	72	71	100	79	63	100	85	80	93	85	84	95	122	109	105	108
DM 6,8i RR	100	95	85	60	71	108	87	70	122	101	90	117	88	98	110	130	112	110	115
P71T74 R	110	93	90	87	82	108	95	83	119	97	80	90	90	93	108	129	120	105	116
Gem/Mean	87	83	69	69	66	94	78	68	96	84	73	77	76	79	89	110	97	79	94

Tabel 8: Die peulhoogte van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2021/22
Table 8: The pod height of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool							Matig/Moderate							Warm				
	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Standerton	Winterton	Gem/Mean	Barberspan	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal ARC	Hoopstad	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	4	5	5	3	3	9	5	5	16	13	5	5	6	8	9	8	11	3	8
DM 5953RSF	6	8	8	5	3	11	7	9	16	14	6	6	9	10	15	10	9	5	10
NS 5258 R	7	7	4	5	2	6	5	7	17	11	7	5	6	9	10	12	8	5	9
RA4918 R	7	8	6	6	4	9	7	5	18	13	7	6	14	10	14	10	19	3	12
DM 5351RSF	8	9	6	7	3	11	7	10	17	16	6	7	11	11	14	11	11	5	10
SSS 5449 (tuc)	10	7	5	8	15	14	10	7	23	17	9	6	7	12	13	14	20	5	13
Y540	10	11	5	6	6	15	9	8	19	16	8	7	8	11	12	19	14	10	14
RA565 R	10	10	9	10	8	18	11	10	23	18	11	9	10	13	12	15	19	6	13
LS 6851 R	8	10	7	9	5	15	9	11	23	16	8	12	8	13	9	13	6	3	8
SSS 5052 (tuc)	11	12	8	9	7	19	11	15	25	15	9	6	11	14	15	24	13	10	16
P57T19 R	13	17	15	11	9	21	14	12	27	19	12	12	13	16	16	21	20	12	17
PAN 1555 R	13	15	10	8	13	25	14	11	30	17	12	13	12	16	17	30	25	12	21
PAN 1521 R	14	15	10	11	9	17	13	11	23	18	8	15	13	15	12	22	22	12	17
DM 5302RSF	12	11	7	10	5	14	10	10	18	16	8	11	9	12	11	13	17	3	11
RA5921 R	9	10	9	9	4	18	10	9	21	14	6	6	6	10	11	18	16	12	14
PAN 1588 R	13	13	9	11	16	17	13	13	24	16	11	11	7	14	12	22	16	15	16
NS 5909 R	13	14	10	9	12	21	13	14	28	19	11	16	11	16	17	21	12	18	17
RA660 R	13	12	8	10	5	19	11	9	25	20	8	12	8	14	10	19	16	18	16
DM59R03	14	13	13	11	13	17	14	18	26	19	9	11	9	15	17	23	15	20	19
LS 6164 R	14	17	9	11	12	19	14	9	24	21	8	9	9	14	19	30	15	20	21
LS 6860 R	13	14	12	9	11	23	14	14	26	22	9	13	12	16	14	28	19	18	20
P62T16 R	14	15	9	10	12	16	13	15	25	20	9	14	8	15	12	22	15	18	17
Y627	14	9	7	9	5	20	11	14	25	14	7	7	9	13	17	24	23	12	19
PAN 1692 R	16	14	9	12	12	19	14	11	25	16	10	11	10	14	15	19	14	15	16
P64T39 R	14	14	13	9	14	17	14	10	25	21	10	14	7	15	18	23	19	18	19
NS 6448 R	9	13	7	6	10	17	10	10	25	19	7	11	15	14	13	18	9	12	13
RA6520 RS	13	18	15	12	11	23	15	6	30	22	11	11	12	15	16	22	16	20	19
Y657	11	11	9	12	16	18	13	10	27	17	9	14	10	15	13	30	25	25	23
DM68R09	11	12	6	8	12	17	11	8	26	16	10	17	7	14	18	20	16	20	18
PAN 1644 R	12	13	7	9	7	18	11	11	24	19	11	14	14	15	13	29	19	20	21
DM 6,8i RR	12	14	8	8	4	20	11	13	26	23	10	23	10	18	15	25	20	25	21
P71T74 R	16	15	11	10	12	21	14	14	26	21	10	14	14	16	18	28	25	25	24
Gem/Mean	11	12	9	9	9	17	11	11	24	18	9	11	10	14	14	20	16	13	16

Tabel 9: Omvalwaarnemings (1-5) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2021/22
Table 9: Lodging dat (1-5) of the different soybean cultivars at the different trial localities, 20211/22

Kultivar Cultivar	Koel/Cool									Matig/Moderate								Warm				
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Delmas	Standerton	Winterton	Gem/Mean	Barberspan	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal ARC	Hoopstad	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 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	1.00	1.33	1.00	1.00	1.00	1.08
DM 5953RSF	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	1.00	2.67	1.00	1.00	1.00	1.42
NS 5258 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	1.00	2.33	1.00	1.00	1.00	1.33
RA4918 R	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.33	1.17	1.00	1.00	1.00	2.33	1.00	1.00	1.00	1.19	2.67	1.00	1.00	1.00	1.42
DM 5351RSF	1.33	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.17	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.33	1.00	1.00	1.00	1.33
SSS 5449 (tuc)	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.00	1.00	1.00	1.08
Y540	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	1.00	2.33	1.00	1.00	1.00	1.33
RA565 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	1.00	1.67	1.00	1.00	1.00	1.17
LS 6851 R	1.33	1.00	1.00	1.00	2.33	5.00	1.00	1.33	1.75	1.00	1.00	1.00	2.67	1.00	1.00	1.00	1.24	1.00	1.00	1.00	1.00	1.00
SSS 5052 (tuc)	1.33	1.00	1.00	1.00	1.00	2.00	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	1.00	1.00	1.00
P57T19 R	2.33	4.67	1.00	1.00	2.67	4.00	1.00	2.67	2.42	1.00	1.00	1.00	2.33	1.00	1.00	1.00	1.19	2.33	1.00	1.00	1.00	1.33
PAN 1555 R	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.00	1.33	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00
PAN 1521 R	2.00	3.00	1.00	1.00	3.33	3.00	1.00	1.67	2.00	1.00	1.00	1.00	2.67	1.00	1.00	1.00	1.24	1.00	1.00	1.00	1.00	1.00
DM 5302RSF	1.33	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.17	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.33	1.00	1.00	1.00	1.33
RA5921 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	1.00	1.00	1.00	1.00	1.00	1.00
PAN 1588 R	1.33	2.00	1.00	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	1.00	1.00	1.00
NS 5909 R	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.08	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.17
RA660 R	1.00	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.00	1.33	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00
DM59R03	2.33	5.00	1.00	1.00	1.00	1.00	1.00	1.67	1.75	1.00	1.00	1.00	2.67	1.00	1.00	1.00	1.24	2.33	1.00	1.00	1.00	1.33
LS 6164 R	2.00	5.00	1.00	1.00	2.00	5.00	1.00	1.33	2.29	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.14	2.33	1.00	1.00	1.00	1.33
LS 6860 R	2.67	4.00	1.00	1.00	1.00	2.00	2.00	1.67	1.92	1.00	1.00	1.00	1.33	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00
P62T16 R	1.67	2.00	1.00	1.00	1.33	2.00	1.00	1.00	1.38	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.17
Y627	1.67	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.33	1.00	1.00	1.00	1.33
PAN 1692 R	1.33	2.00	1.00	1.00	1.33	2.00	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	1.00	1.00	1.00
P64T39 R	2.00	4.67	1.00	1.00	1.00	3.00	1.00	2.33	2.00	1.00	1.00	1.00	1.33	1.00	1.00	1.00	1.05	2.33	1.00	1.00	1.00	1.33
NS 6448 R	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.13	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
RA6520 RS	2.67	5.00	1.00	1.00	2.67	4.00	1.00	2.33	2.46	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.14	3.67	1.00	1.00	1.00	1.67
Y657	1.67	1.33	1.00	1.00	1.00	1.00	1.00	2.00	1.25	1.00	1.00	1.00	1.33	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00
DM68R09	2.00	3.33	1.00	1.00	2.33	1.00	1.00	2.67	1.79	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.14	4.67	1.00	1.00	1.00	1.92
PAN 1644 R	1.00	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.04	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	2.00	5.00	1.00	1.00	1.00	5.00	1.00	2.00	2.25	1.00	1.00	1.00	3.00	1.00	1.00	1.00	1.29	2.00	1.00	1.00	1.00	1.25
P71T74 R	2.33	4.33	1.00	1.00	1.00	2.00	1.00	1.33	1.75	1.00	1.00	1.00	1.33	1.00	1.00	1.00	1.05	3.00	1.00	1.00	1.00	1.50
Gem/Mean	1.56	2.21	1.00	1.00	1.31	1.94	1.03	1.39	1.43	1.00	1.00	1.00	1.46	1.00	1.00	1.00	1.07	1.85	1.00	1.00	1.00	1.21

Tabel 10: Groenstam (1-5) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2021/22
Table 10: Greenstem (1-5) of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool								Matig/Moderate								Warm				
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Standerton	Winterton	Gem/Mean	Barberspan	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal ARC	Hoopstad	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	1.00	5.00	1.33	1.00	1.00	1.00	1.00	1.62	1.00	1.00	1.33	1.00	2.00	4.00	1.00	1.62	4.33	2.00	1.67	1.00	2.25
DM 5953RSF	1.00	2.33	1.00	1.00	1.00	1.00	1.00	1.19	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.10	3.00	1.00	1.00	1.00	1.50
NS 5258 R	1.00	1.33	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.33	1.00	1.00	1.05	2.00	1.00	1.00	1.00	1.25
RA4918 R	1.00	1.33	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.33	2.00	1.00	1.19	1.67	1.00	1.00	1.00	1.17
DM 5351RSF	1.00	5.00	2.33	1.00	1.00	1.00	1.00	1.76	1.00	1.00	2.33	1.00	2.00	2.00	1.00	1.48	4.67	1.00	3.00	5.00	3.42
SSS 5449 (tuc)	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.14	1.00	1.00	1.00	1.00	2.33	2.00	1.00	1.33	2.00	1.00	2.00	2.00	1.75
Y540	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	2.00	1.00	1.24	1.33	1.00	2.33	1.00	1.42
RA565 R	1.00	1.33	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.10	2.67	1.00	1.00	1.00	1.42
LS 6851 R	1.00	1.00	1.00	1.00	1.33	1.00	1.00	1.05	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.29	1.33	1.00	3.67	4.00	2.50
SSS 5052 (tuc)	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.33	1.00	1.00	1.05	3.67	1.00	4.00	1.00	2.42
P57T19 R	1.00	3.00	1.33	1.00	1.33	1.00	1.33	1.43	1.00	1.00	2.67	1.00	2.00	1.00	1.00	1.38	4.00	1.67	1.67	2.00	2.33
PAN 1555 R	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.00	1.00	3.00	2.00	1.00	1.43	3.67	2.00	1.00	1.00	1.92
PAN 1521 R	1.00	1.33	1.00	1.00	1.33	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.33	1.00	1.00	1.05	1.67	1.00	1.00	1.00	1.17
DM 5302RSF	1.00	1.00	1.00	1.33	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.00	2.00	1.00	1.42
RA5921 R	1.00	1.00	1.00	1.33	1.33	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.14	1.00	1.00	3.00	1.00	1.50
PAN 1588 R	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00	1.33	1.00	1.33	1.00	1.00	1.10	2.67	1.00	1.00	1.00	1.42
NS 5909 R	1.00	2.33	1.00	1.00	1.33	1.00	1.00	1.24	1.00	1.00	2.00	1.00	1.33	2.00	1.00	1.33	2.67	1.00	2.67	1.00	1.83
RA660 R	1.00	2.33	1.33	1.00	1.00	1.00	1.00	1.24	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.10	2.00	1.00	2.00	1.00	1.50
DM59R03	1.67	2.00	1.00	1.00	1.00	1.00	1.00	1.24	1.00	1.00	1.33	1.00	1.33	3.00	1.00	1.38	4.33	1.00	3.00	2.00	2.58
LS 6164 R	2.00	2.00	1.33	1.00	1.00	1.00	1.00	1.33	1.00	1.00	1.00	1.00	1.67	2.00	1.00	1.24	4.00	1.00	3.00	2.00	2.50
LS 6860 R	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.29	1.00	1.00	1.00	1.00	2.67	2.00	1.00	1.38	1.33	2.00	1.00	2.00	1.58
P62T16 R	2.00	2.00	1.00	1.00	1.33	1.00	1.00	1.33	1.00	1.00	1.33	1.00	4.00	1.33	1.00	1.52	2.00	2.00	2.33	3.00	2.33
Y627	1.67	1.33	1.33	1.00	1.00	1.00	1.00	1.19	1.00	1.00	1.33	1.00	2.00	2.00	1.00	1.33	3.67	1.00	1.00	1.00	1.67
PAN 1692 R	1.00	1.33	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.14	2.33	1.00	1.00	1.00	1.33
P64T39 R	2.00	3.33	1.00	1.00	1.33	1.00	1.00	1.52	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.14	4.33	1.00	2.00	2.00	2.33
NS 6448 R	1.67	1.00	1.00	1.00	1.67	1.00	1.00	1.19	1.00	1.00	1.00	1.00	1.00	3.00	1.00	1.29	1.00	1.67	1.00	1.00	1.17
RA6520 RS	2.67	4.67	1.67	1.00	1.00	1.00	1.00	1.86	1.00	1.00	2.33	1.33	3.33	2.00	1.00	1.71	4.00	1.00	3.00	3.00	2.75
Y657	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.10	1.00	1.00	1.67	1.00	1.17
DM68R09	1.67	2.67	1.67	1.67	1.00	1.00	1.33	1.57	1.00	1.00	1.67	1.00	1.67	2.00	1.00	1.33	4.33	1.00	1.00	2.00	2.08
PAN 1644 R	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.67	1.00	1.00	1.24	2.67	2.00	1.00	2.00	1.92
DM 6,8i RR	2.00	2.67	1.00	1.00	1.00	1.00	1.00	1.38	1.00	1.00	2.00	1.00	1.67	3.00	1.00	1.52	4.33	1.00	2.00	3.00	2.58
P71T74 R	2.33	2.33	1.00	1.00	1.00	1.00	1.00	1.38	1.00	1.00	2.33	1.00	3.67	3.00	1.00	1.86	3.33	1.00	2.00	3.00	2.33
Gem/Mean	1.35	2.02	1.14	1.04	1.13	1.00	1.02	1.24	1.00	1.00	1.34	1.01	1.82	1.82	1.00	1.29	2.77	1.20	1.88	1.72	1.89

Tabel 11: Oopspring (1-5) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2021/22
Table 11: Shattering (1-5) of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool								Matig/Moderate					Warm				
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Standerton	Winterton	Gem/Mean	Barberspan	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal ARC	Hoopstad	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DM 5953RSF	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NS 5258 R	1.67	1.00	1.00	1.00	1.00	2.00	1.00	1.24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RA4918 R	1.67	1.00	1.00	1.00	1.00	2.00	1.00	1.24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DM 5351RSF	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SSS 5449 (tuc)	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Y540	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	1.00	1.00
RA565 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	1.00	1.00
LS 6851 R	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SSS 5052 (tuc)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P57T19 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	1.00	1.00
PAN 1555 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	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DM 5302RSF	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	1.00	1.00
RA5921 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	1.00	1.00
PAN 1588 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	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	1.00	1.00
RA660 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	1.00	1.00
DM59R03	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	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	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P62T16 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	1.00	1.00
Y627	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	1.00	1.00
PAN 1692 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	1.00	1.00
P64T39 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	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RA6520 RS	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	1.00	1.00
Y657	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	1.00	1.00
DM68R09	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	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	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	1.00	1.00
P71T74 R	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Gem/Mean	1.07	1.00	1.00	1.00	1.00	1.16	1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Tabel 12: Die planttelling geoes (x 1000) van die verskillende sojaboonkultivars by die verskillende proeflokaliteite, 2021/22
Table 12: The number of plant harvested (x 1000) of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool								Matig/Moderate					Warm					
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Standerton	Winterton	Gem/Mean	Barberspan	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal ARC	Hoopstad	Pyramid	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	96	250	126	224	137	327	240	200	217	148	373	95	208	173	273	364	180	147	228
DM 5953RSF	107	311	303	322	297	326	250	274	331	197	310	190	257	296	347	396	170	162	274
NS 5258 R	120	308	261	297	286	320	238	261	353	217	347	150	267	291	407	363	232	178	294
RA4918 R	118	266	232	287	261	319	254	248	291	222	430	168	278	292	390	384	199	237	300
DM 5351RSF	113	321	292	296	264	327	238	264	398	228	323	161	278	301	400	464	235	239	328
SSS 5449 (tuc)	132	298	223	301	278	321	270	260	241	238	397	194	267	287	333	441	230	325	323
Y540	144	302	227	263	265	318	246	252	254	214	387	155	252	264	337	323	206	250	276
RA565 R	138	299	249	268	281	316	252	257	281	196	360	149	246	288	410	427	231	213	314
LS 6851 R	150	307	242	308	293	316	240	265	391	215	383	184	293	309	457	424	248	305	348
SSS 5052 (tuc)	163	283	240	309	291	317	277	269	383	232	403	160	294	284	427	366	239	281	319
P57T19 R	161	319	282	267	322	319	255	275	322	209	453	196	295	313	400	462	243	213	326
PAN 1555 R	148	266	242	297	241	320	247	251	336	229	463	177	301	308	180	486	178	232	277
PAN 1521 R	153	284	233	236	256	317	243	246	214	198	347	139	224	249	367	326	195	224	272
DM 5302RSF	126	297	275	296	306	327	239	266	378	202	440	174	298	284	457	436	217	221	323
RA5921 R	157	284	237	263	256	325	226	250	269	152	367	129	229	254	420	399	189	237	300
PAN 1588 R	159	298	251	266	277	321	247	260	221	173	323	174	223	279	330	361	238	204	283
NS 5909 R	175	301	253	280	271	324	255	266	372	208	290	147	254	276	333	452	239	239	308
RA660 R	150	290	238	323	274	310	215	257	319	214	400	203	284	304	410	413	250	303	336
DM59R03	121	294	251	308	294	324	275	267	315	173	477	152	279	292	403	401	237	147	296
LS 6164 R	168	272	254	273	289	326	230	259	357	207	400	157	280	294	343	403	236	184	292
LS 6860 R	162	276	205	268	264	323	235	248	222	205	247	152	207	297	333	390	246	167	286
P62T16 R	128	288	216	278	228	325	226	241	296	189	370	134	247	278	310	346	190	149	255
Y627	138	280	206	289	235	312	215	239	368	184	390	169	278	282	437	421	205	217	312
PAN 1692 R	169	276	236	276	268	318	228	253	300	163	383	171	254	232	270	273	227	178	236
P64T39 R	147	284	292	283	282	320	254	266	386	188	407	133	278	303	340	412	232	248	307
NS 6448 R	141	282	249	240	173	328	241	236	383	172	493	163	303	241	413	385	194	300	307
RA6520 RS	170	313	262	292	282	325	266	273	317	212	397	153	269	274	520	360	222	235	322
Y657	139	281	261	271	298	330	252	262	311	233	377	142	266	298	427	440	230	193	317
DM68R09	136	313	241	309	303	315	243	266	377	232	410	153	293	291	330	338	231	252	288
PAN 1644 R	145	260	243	252	303	318	248	253	338	213	420	147	280	294	433	356	189	235	301
DM 6,8i RR	157	287	227	314	260	318	235	257	328	181	393	178	270	296	427	458	189	270	328
P71T74 R	127	292	274	302	312	323	236	266	378	213	280	152	256	271	393	415	237	276	319
Gem/Mean	142	290	244	283	270	321	244	256	320	202	383	159	266	281	377	396	218	227	300

Tabel 13: Persentasie ongewenste sade van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2021/22
Table 13: Percentage undesirable seed of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool									Matig/Moderate								Warm						
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Delmas	Standerton	Winterton	Gem/Mean	Barberspan	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal (Agri-Seeds)	Groblersdal ARC	Hoopstad	Pyramid	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	0.00	1.00	0.94	0.36	1.27	5.95	0.60	0.73	1.36	1.29	2.48	0.83	0.50	0.30	0.73	0.07	0.89	1.16	5.90	0.00	3.36	1.57	2.37	2.39
DM 5953RSF	0.19	0.44	0.22	1.98	0.77	1.26	0.97	1.17	0.88	0.80	2.31	0.51	0.58	2.18	0.54	0.41	1.05	4.04	8.32	0.21	3.96	1.43	1.29	3.21
NS 5258 R	0.92	0.93	0.55	0.86	0.38	0.54	0.76	1.03	0.75	0.81	2.23	1.01	0.41	0.65	0.25	0.15	0.79	4.52	7.23	0.22	2.63	1.30	1.79	2.95
RA4918 R	0.43	0.64	0.27	0.10	0.44	0.07	0.65	0.62	0.40	2.79	1.68	1.34	1.27	0.62	0.81	0.14	1.24	3.39	0.78	0.69	5.44	0.51	0.55	1.89
DM 5351RSF	0.13	0.00	1.21	0.15	0.48	0.87	0.71	1.06	0.58	1.55	2.24	0.45	0.26	1.92	0.49	0.00	0.99	1.81	7.60	0.00	3.46	1.01	0.34	2.37
SSS 5449 (tuc)	1.13	0.27	0.50	0.47	0.66	3.46	0.12	0.39	0.88	0.86	0.47	0.42	0.69	0.42	0.86	0.00	0.53	0.86	1.68	0.16	1.35	1.96	0.20	1.04
Y540	1.77	0.30	0.53	0.43	0.90	3.75	0.19	0.90	1.10	5.36	1.37	0.21	1.51	0.70	0.37	0.17	1.38	1.26	2.32	0.00	2.89	1.11	0.75	1.39
RA565 R	0.34	0.00	0.00	0.70	0.36	0.58	0.00	0.85	0.35	8.62	0.95	1.50	1.86	0.07	0.12	0.68	1.97	1.98	0.70	0.34	2.63	7.77	1.00	2.40
LS 6851 R	0.79	0.00	0.46	1.12	0.94	1.40	0.00	0.78	0.69	0.29	0.79	0.67	2.35	2.53	0.27	0.70	1.09	0.95	1.27	0.44	6.70	5.39	0.28	2.51
SSS 5052 (tuc)	1.00	0.76	0.00	0.64	1.56	1.38	0.29	1.26	0.86	1.33	0.87	0.24	1.97	0.66	0.71	1.00	0.97	4.13	1.93	0.10	4.99	1.05	0.68	2.15
P57T19 R	0.62	0.41	0.34	0.58	0.33	1.73	0.21	0.93	0.64	0.10	0.64	1.14	1.67	0.40	0.18	0.68	0.69	1.66	7.14	0.23	4.80	0.24	0.43	2.42
PAN 1555 R	0.32	1.17	0.50	0.05	0.57	1.82	0.00	0.14	0.57	0.23	0.52	0.42	1.54	0.65	0.43	0.72	0.64	1.81	4.61	0.12	0.68	1.06	0.23	1.42
PAN 1521 R	0.10	0.61	0.45	0.15	1.99	0.92	0.48	0.78	0.69	0.00	0.32	0.37	1.62	1.19	1.07	1.24	0.83	1.28	0.71	0.16	5.22	0.53	0.10	1.33
DM 5302RSF	0.13	0.56	0.35	0.39	0.68	0.79	0.00	0.33	0.40	4.65	1.17	0.80	0.57	0.44	0.37	0.52	1.22	1.07	4.66	0.56	1.08	0.65	7.26	2.55
RA5921 R	0.76	0.44	0.75	0.48	1.42	1.17	0.00	0.57	0.70	0.90	0.33	0.38	2.81	0.29	0.08	0.71	0.79	0.77	1.83	0.07	2.88	0.12	0.21	0.98
PAN 1588 R	0.78	1.19	0.00	0.35	0.87	2.51	0.00	1.58	0.91	0.15	0.36	0.00	0.72	0.52	0.60	0.33	0.38	0.53	0.49	0.15	3.81	0.87	0.35	1.03
NS 5909 R	0.48	0.46	0.00	0.77	0.42	2.50	0.00	0.17	0.60	1.02	0.46	0.08	1.94	0.84	0.00	1.15	0.78	2.28	0.00	0.21	6.60	1.83	0.29	1.87
RA660 R	0.34	0.27	0.06	0.16	0.73	0.85	0.00	1.49	0.49	6.17	0.43	0.17	1.81	0.61	0.14	1.12	1.49	1.02	0.78	0.10	1.00	0.14	0.46	0.58
DM59R03	0.25	0.66	0.22	0.42	0.61	1.99	1.71	1.06	0.87	1.23	1.31	0.48	1.07	0.36	0.36	0.87	0.81	2.09	0.90	0.31	2.94	1.07	0.00	1.22
LS 6164 R	0.50	0.36	0.62	0.30	3.30	1.05	0.47	1.99	1.07	0.37	0.65	0.28	10.09	0.26	1.03	1.11	1.97	2.43	2.06	0.25	2.80	1.20	0.00	1.46
LS 6860 R	0.99	1.16	1.19	0.39	2.00	0.90	0.44	0.39	0.93	1.19	0.93	0.00	6.45	0.59	2.71	0.90	1.82	1.64	0.38	1.65	1.99	3.28	0.00	1.49
P62T16 R	3.09	0.59	0.53	0.41	2.97	1.69	0.00	0.58	1.23	0.68	1.39	0.42	2.18	0.96	0.78	2.01	1.20	3.25	0.90	0.12	5.49	0.56	1.24	1.93
Y627	0.58	0.27	0.39	0.43	1.14	0.34	0.00	1.01	0.52	0.21	0.66	0.85	1.93	0.49	0.06	0.71	0.70	3.15	0.63	0.36	4.31	1.36	0.26	1.68
PAN 1692 R	0.87	2.00	0.11	0.32	0.64	0.66	0.00	1.08	0.71	0.54	0.97	0.00	1.56	0.32	0.89	0.61	0.70	7.67	2.27	0.00	4.64	4.38	1.03	3.33
P64T39 R	0.83	1.99	0.41	0.58	3.32	1.39	0.00	1.03	1.19	0.80	0.26	0.20	1.31	0.13	0.15	1.34	0.60	2.52	0.79	0.12	6.17	1.28	0.60	1.91
NS 6448 R	1.26	0.98	0.37	0.31	1.59	3.39	0.00	1.39	1.16	0.27	0.78	0.00	4.02	0.12	0.17	0.67	0.86	0.88	1.40	0.45	3.27	0.69	0.49	1.20
RA6520 RS	4.49	1.22	0.50	1.22	11.06	0.38	0.17	0.28	2.42	2.43	0.54	0.26	3.81	0.14	0.49	0.78	1.21	1.80	1.61	0.17	7.11	1.19	0.10	2.00
Y657	1.01	0.42	0.41	0.89	1.43	3.54	0.00	1.03	1.09	0.68	0.43	0.47	1.42	0.65	0.09	0.39	0.59	1.87	1.33	0.41	1.89	1.75	0.29	1.26
DM68R09	0.00	0.36	0.26	0.36	1.79	1.50	0.00	0.87	0.64	0.97	2.04	0.64	2.85	0.92	0.34	1.26	1.29	4.63	2.13	0.00	2.88	0.20	1.31	1.86
PAN 1644 R	0.49	0.44	0.25	0.51	1.23	1.17	0.34	1.28	0.71	2.09	0.32	0.06	1.04	0.85	0.14	0.87	0.77	1.55	0.43	0.55	4.66	0.30	1.08	1.43
DM 6,8i RR	0.30	0.54	0.34	0.38	0.79	1.05	0.00	1.06	0.56	1.96	1.11	0.17	7.42	1.30	0.42	0.66	1.86	3.42	5.23	0.15	5.02	0.76	0.34	2.49
P71T74 R	1.62	1.41	0.49	0.41	3.88	0.61	-	0.91	1.33	0.75	1.09	1.88	2.55	0.47	0.38	0.78	1.13	2.11	2.46	0.36	3.31	0.64	1.39	1.71
Gem/Mean	0.83	0.68	0.41	0.52	1.58	1.60	0.26	0.90	0.85	1.60	1.00	0.51	2.24	0.70	0.50	0.71	1.04	2.30	2.51	0.27	3.75	1.48	0.83	1.86

Tabel 14: Massa van 100 sade (g) van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2021/22
Table 14: Mass 100 seeds (g) of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool									Matig/Moderate								Warm						
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Delmas	Standerton	Winterton	Gem/Mean	Barberspan	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal (Agri-Seeds)	Groblersdal ARC	Hoopstad	Pyramid	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	16.61	18.92	18.24	15.51	15.22	17.23	18.72	18.99	17.43	16.60	18.54	17.98	15.31	16.55	16.40	18.85	17.18	19.80	18.96	17.13	15.98	18.10	19.47	18.24
DM 5953RSF	15.26	18.77	17.62	17.18	15.63	16.34	19.51	17.37	17.21	17.53	18.01	16.56	13.39	14.43	15.73	15.95	15.94	16.78	16.43	17.27	14.22	17.57	19.20	16.91
NS 5258 R	14.43	17.78	16.14	13.05	14.26	14.32	18.43	16.80	15.65	16.93	16.25	16.50	13.48	14.08	14.13	14.57	15.13	17.26	15.06	16.00	14.67	18.37	19.00	16.73
RA4918 R	15.40	17.59	17.19	13.72	14.01	13.94	18.10	17.88	15.98	12.13	17.25	17.20	14.08	13.74	15.07	15.86	15.05	18.34	16.34	16.13	16.17	17.63	18.07	17.11
DM 5351RSF	16.30	18.46	16.54	14.52	14.49	14.39	18.87	19.10	16.58	16.60	18.65	19.15	14.14	15.51	15.67	15.93	16.52	21.01	17.48	17.00	14.80	19.10	18.53	17.99
SSS 5449 (tuc)	13.52	15.38	14.66	11.55	11.12	12.30	19.61	14.00	14.02	15.53	14.71	15.25	12.88	13.12	14.93	15.08	14.50	16.63	14.09	16.33	14.10	16.53	15.47	15.53
Y540	13.61	15.75	16.44	12.03	11.88	12.98	19.10	15.20	14.62	15.93	15.49	15.72	11.51	12.72	15.27	15.40	14.58	17.63	15.42	17.07	15.90	16.60	17.20	16.64
RA565 R	14.40	17.28	17.18	12.88	13.01	15.48	19.98	17.11	15.91	15.67	16.88	17.78	13.78	14.66	16.27	16.34	15.91	19.47	17.89	18.80	17.34	17.80	19.53	18.47
LS 6851 R	12.93	16.12	13.75	12.76	11.54	12.43	18.01	14.33	13.98	16.40	14.14	15.07	11.01	13.34	17.00	17.18	14.88	17.79	13.97	15.33	16.30	16.17	17.80	16.23
SSS 5052 (tuc)	13.50	15.01	14.88	12.03	11.96	13.69	16.68	15.71	14.18	15.93	15.56	16.17	12.00	13.86	15.13	15.25	14.84	17.91	16.32	15.87	17.97	16.27	16.07	16.73
P57T19 R	16.44	18.14	19.30	16.40	14.96	14.40	21.19	20.04	17.61	17.40	17.07	21.07	15.22	15.61	14.67	17.40	16.92	18.34	16.31	17.20	19.44	18.50	17.57	17.89
PAN 1555 R	15.33	17.66	18.11	14.93	12.15	15.75	20.17	18.73	16.60	19.20	18.04	19.45	14.47	16.75	18.47	17.35	17.67	18.41	17.05	17.73	19.50	20.03	19.07	18.63
PAN 1521 R	14.98	17.20	17.10	13.68	13.93	14.29	19.36	18.13	16.08	17.27	16.46	18.50	13.48	15.84	17.20	17.68	16.63	19.41	17.54	15.80	16.60	19.20	18.60	17.86
DM 5302RSF	14.84	17.25	18.06	14.16	13.84	15.25	20.35	16.46	16.28	18.87	16.23	17.40	13.21	15.35	14.27	16.47	15.97	20.80	16.76	15.27	17.25	19.37	16.80	17.71
RA5921 R	14.41	15.86	15.01	12.68	13.36	12.30	19.53	16.92	15.01	17.47	14.97	15.69	11.66	14.98	13.60	15.18	14.79	19.30	14.66	17.20	17.66	16.40	17.33	17.09
PAN 1588 R	13.23	14.90	14.90	12.09	11.61	13.38	16.79	17.36	14.28	11.20	14.01	16.29	11.71	14.28	15.00	15.21	13.96	19.39	16.32	17.53	19.04	16.73	15.67	17.45
NS 5909 R	14.84	17.10	16.17	13.23	12.11	14.64	18.88	17.62	15.57	11.47	15.63	18.08	12.01	14.39	13.60	16.89	14.58	17.67	15.90	18.07	17.52	17.47	17.07	17.28
RA660 R	13.76	15.40	16.19	13.89	12.10	14.54	18.06	16.71	15.08	15.07	14.77	17.34	11.86	14.87	13.93	16.26	14.87	18.29	16.21	16.40	17.27	19.13	16.73	17.34
DM59R03	15.61	17.20	18.73	15.20	14.06	16.01	19.01	19.23	16.88	12.33	17.77	19.77	14.23	16.65	16.40	17.01	16.31	19.89	18.02	15.80	19.74	17.60	16.00	17.84
LS 6164 R	14.06	14.79	14.28	12.28	11.09	12.69	61.63	17.62	19.81	15.67	14.58	16.62	14.82	14.83	18.47	16.42	15.91	17.94	16.57	18.00	17.11	17.73	18.33	17.62
LS 6860 R	15.48	16.72	15.83	14.32	13.84	16.06	19.29	19.41	16.37	13.67	16.51	19.03	15.07	16.70	19.13	18.11	16.89	27.13	18.23	17.07	20.95	18.73	16.87	19.83
P62T16 R	14.83	16.26	14.66	13.63	11.73	14.68	17.54	18.78	15.26	15.07	15.70	19.33	12.33	16.40	19.00	17.48	16.47	19.85	17.20	16.60	19.35	16.57	16.87	17.74
Y627	15.23	16.77	15.23	12.49	12.81	14.99	17.38	18.02	15.37	16.67	14.90	16.70	13.02	14.37	17.27	15.29	15.46	18.14	15.31	18.00	17.96	17.47	15.20	17.01
PAN 1692 R	16.33	18.19	17.22	14.66	14.38	16.28	20.75	20.45	17.28	20.20	17.39	21.72	14.99	17.44	16.20	19.21	18.16	19.96	18.67	17.13	22.96	18.73	15.27	18.79
P64T39 R	14.81	13.94	15.07	12.85	11.45	13.84	16.98	18.11	14.63	17.07	15.43	17.40	12.63	15.44	14.47	16.29	15.53	18.26	15.91	16.87	19.41	15.83	15.93	17.04
NS 6448 R	13.96	15.21	15.68	12.78	10.65	13.69	18.36	18.05	14.80	17.67	13.56	17.28	13.46	15.68	18.40	15.61	15.95	18.88	16.00	18.00	20.16	19.13	15.13	17.88
RA6520 RS	12.85	14.32	15.71	12.79	10.72	13.99	17.99	18.69	14.63	13.27	15.51	18.70	15.82	15.11	17.00	16.89	16.04	18.25	18.01	19.13	20.33	19.27	16.60	18.60
Y657	13.75	15.37	14.56	12.47	12.36	13.80	16.75	16.18	14.41	16.00	14.55	15.58	11.13	13.76	15.53	13.79	14.33	16.42	15.46	16.80	18.49	16.87	14.87	16.48
DM68R09	-	16.77	15.97	13.52	12.68	15.07	18.07	17.36	15.64	16.80	15.09	18.70	12.66	15.17	13.27	16.34	15.43	16.73	16.86	17.27	18.67	19.60	15.33	17.41
PAN 1644 R	14.73	15.56	15.60	12.78	12.11	14.62	18.17	17.35	15.11	14.00	15.36	17.75	13.80	14.52	13.33	15.09	14.84	17.18	16.41	18.00	19.77	18.70	17.87	17.99
DM 6,8i RR	15.37	15.79	16.42	14.17	12.00	16.50	19.16	18.76	16.02	14.13	15.66	19.94	14.10	16.24	16.33	17.46	16.27	19.69	17.67	19.73	20.32	19.13	16.13	18.78
P71T74 R	14.90	15.82	15.29	13.81	11.90	14.53	-	17.86	14.87	18.07	14.83	19.05	13.10	15.96	15.27	16.31	16.08	18.60	17.08	18.20	20.28	17.80	17.60	18.26
Gem/Mean	14.70	16.48	16.18	13.56	12.78	14.51	20.08	17.64	15.72	15.87	15.92	17.77	13.32	15.07	15.83	16.38	15.74	18.79	16.57	17.15	18.04	17.94	17.10	17.60

Tabel 15: Oliepersentasie op vogvrye basis van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2021/22
Table 15: Oil percentage on moisture free basis of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool									Matig/Moderate								Warm						
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Delmas	Standerton	Winterton	Gem/Mean	Barberspan	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal (Agri-Seeds)	Groblersdal ARC	Hoopstad	Pyramid	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	19.70	20.32	22.08	20.11	20.45	20.08	22.82	21.68	20.91	21.33	21.89	21.34	19.40	21.67	20.77	20.88	21.04	22.14	22.16	21.41	21.96	21.54	20.67	21.65
DM 5953RSF	20.47	21.47	22.86	21.24	21.04	20.78	23.65	23.31	21.85	21.60	23.14	22.29	20.13	21.87	22.42	21.94	21.91	22.87	21.92	23.10	24.27	22.96	21.72	22.81
NS 5258 R	20.01	20.95	22.77	20.72	20.06	20.23	23.25	22.79	21.35	21.31	22.40	21.52	20.08	22.03	22.87	21.09	21.61	21.96	21.95	22.41	23.90	23.12	20.84	22.36
RA4918 R	20.66	20.34	22.82	21.60	20.69	21.03	23.74	22.68	21.70	22.62	22.59	22.27	19.80	21.69	21.74	21.50	21.74	22.15	22.47	22.37	22.78	22.75	21.85	22.40
DM 5351RSF	20.86	20.63	23.53	21.45	20.79	20.89	23.56	23.36	21.88	22.07	22.49	22.25	21.38	21.18	23.20	21.41	22.00	22.60	22.69	22.43	23.93	23.36	21.50	22.75
SSS 5449 (tuc)	19.58	20.29	21.85	20.46	18.98	19.83	22.14	22.72	20.73	21.45	23.44	22.48	19.81	21.64	22.18	21.30	21.76	23.60	23.56	22.10	23.57	22.41	21.26	22.75
Y540	20.25	20.79	21.94	20.46	20.00	20.23	22.55	22.49	21.09	21.58	23.38	22.84	19.67	21.61	22.24	21.74	21.87	23.52	23.59	22.34	23.42	22.71	21.82	22.90
RA565 R	20.25	20.32	21.51	20.17	19.80	20.95	22.30	22.62	20.99	18.12	22.94	21.88	19.90	21.39	21.29	20.93	20.92	23.45	22.82	22.03	22.16	21.86	21.38	22.28
LS 6851 R	19.91	20.71	21.70	20.50	18.96	20.78	22.56	22.60	20.97	21.83	23.64	21.99	21.29	21.61	22.29	21.15	21.97	23.41	23.27	22.44	23.03	22.91	21.26	22.72
SSS 5052 (tuc)	19.16	19.51	21.32	20.34	18.81	20.54	21.78	22.57	20.50	20.82	22.43	21.47	18.66	21.65	21.44	20.50	21.00	22.34	21.83	22.49	20.26	22.40	21.07	21.73
P57T19 R	19.19	20.04	21.03	19.50	19.24	20.75	22.46	24.07	20.79	22.12	23.41	22.36	20.60	20.87	22.20	21.17	21.82	23.21	22.03	22.01	21.32	22.66	20.81	22.01
PAN 1555 R	19.26	19.59	21.20	20.31	20.25	20.11	22.09	23.35	20.77	21.27	22.17	21.67	19.13	20.58	20.72	20.93	20.92	21.57	22.03	21.05	21.74	21.97	21.04	21.57
PAN 1521 R	19.34	19.69	21.08	19.43	18.48	20.15	22.18	23.40	20.47	21.24	22.43	21.77	19.68	20.54	21.58	19.71	20.99	22.38	22.24	21.43	21.14	21.61	20.63	21.57
DM 5302RSF	18.68	19.25	20.87	19.43	19.34	18.23	21.24	22.19	19.90	20.83	22.06	20.83	18.88	19.95	20.30	20.06	20.42	21.49	21.68	20.79	22.31	21.60	18.58	21.08
RA5921 R	20.19	21.66	22.50	20.87	19.45	21.48	21.97	24.70	21.60	22.65	24.22	23.09	21.30	23.05	22.90	22.63	22.83	25.13	25.24	23.36	22.94	23.92	22.95	23.92
PAN 1588 R	19.24	19.49	20.99	19.65	18.72	20.39	21.87	21.69	20.26	21.44	22.27	21.07	19.48	20.50	20.55	20.50	20.83	22.45	22.08	21.55	20.18	21.36	21.11	21.46
NS 5909 R	19.76	20.54	21.65	20.93	19.66	20.50	22.32	22.99	21.04	22.05	23.34	22.49	20.59	21.38	21.72	20.96	21.79	22.92	22.52	22.92	21.23	22.96	22.41	22.49
RA660 R	19.93	20.30	21.40	21.16	20.53	21.01	22.47	23.41	21.28	22.16	23.16	22.39	19.77	21.28	21.94	21.02	21.67	22.43	22.56	22.69	23.15	22.11	22.31	22.54
DM59R03	19.27	19.49	20.60	19.75	18.19	20.06	19.94	22.70	20.00	21.17	22.21	21.69	19.04	20.26	20.30	20.75	20.77	22.31	22.04	21.05	21.54	20.99	20.97	21.48
LS 6164 R	18.89	20.04	20.92	19.84	18.13	19.99	21.58	23.40	20.35	21.48	22.59	22.07	20.36	20.81	21.16	20.58	21.29	22.34	22.78	21.15	20.80	22.09	21.10	21.71
LS 6860 R	18.71	19.83	20.59	18.79	18.53	20.00	21.73	24.05	20.28	20.31	22.89	21.76	20.04	20.92	21.63	20.62	21.17	22.18	22.32	21.45	20.15	21.79	21.07	21.49
P62T16 R	19.22	21.40	21.84	19.82	20.29	21.59	22.53	25.05	21.47	21.96	24.39	23.67	20.17	22.10	21.67	21.77	22.25	24.24	23.64	22.58	21.51	22.87	22.30	22.86
Y627	18.56	19.76	20.19	19.12	17.93	19.79	21.25	22.92	19.94	20.40	22.77	21.49	18.87	20.59	20.67	19.59	20.63	21.48	21.87	21.31	19.69	20.56	21.18	21.02
PAN 1692 R	19.71	19.16	20.86	19.82	19.20	19.85	21.36	20.89	20.11	20.84	21.80	21.06	20.12	20.79	20.75	20.14	20.79	21.53	21.74	21.18	19.56	21.10	20.88	21.00
P64T39 R	18.72	18.33	19.85	19.70	19.78	20.00	20.87	21.70	19.87	20.85	21.89	19.47	18.38	20.38	21.00	19.73	20.24	22.43	21.88	21.15	19.15	21.24	20.36	21.04
NS 6448 R	19.30	19.99	21.51	20.66	20.32	20.75	21.96	23.49	21.00	21.96	22.94	20.65	20.52	21.70	21.90	20.35	21.43	22.61	22.56	22.41	20.26	22.56	21.68	22.01
RA6520 RS	18.08	18.72	20.97	18.79	18.04	20.72	21.82	22.99	20.02	21.69	23.37	20.93	20.21	20.82	22.50	20.82	21.48	22.11	22.27	21.82	18.23	21.84	21.07	21.22
Y657	18.73	20.34	20.54	20.07	18.95	19.55	21.80	21.26	20.16	20.78	21.84	19.51	18.21	20.73	20.72	20.14	20.28	22.63	21.69	20.75	20.69	20.83	20.54	21.19
DM68R09	-	20.05	20.49	18.95	17.56	19.27	21.46	22.63	20.06	21.23	22.22	20.38	18.99	20.57	20.93	19.72	20.58	22.67	22.60	21.51	20.33	21.26	20.93	21.55
PAN 1644 R	19.49	20.27	20.21	19.45	18.21	19.78	21.37	21.90	20.09	21.57	22.64	20.04	18.65	20.98	20.99	20.18	20.72	22.64	21.62	21.36	19.86	21.11	20.81	21.23
DM 6,8i RR	20.37	19.52	20.16	18.98	22.23	19.78	20.91	22.39	20.54	19.22	21.48	20.22	19.67	19.67	19.72	19.52	19.93	22.23	21.90	20.44	19.12	20.43	20.44	20.76
P71T74 R	17.80	18.11	19.26	18.60	17.92	18.71	-	20.84	18.75	19.53	20.89	19.26	18.19	18.87	20.25	19.18	19.45	20.48	20.71	19.95	18.72	19.99	19.36	19.87
Gem/Mean	19.46	20.03	21.28	20.02	19.39	20.24	22.05	22.78	20.65	21.23	22.67	21.51	19.72	21.05	21.45	20.70	21.19	22.55	22.38	21.78	21.34	21.96	21.12	21.86

Tabel 16: Ru-proteïenpersentasie op vogvrye basis van die verskillende sojaboonkultivars by die verskillende proef lokaliteite, 2021/22
Table 16: Percentage crude protein on moisture free basis of the different soybean cultivars at the different trial localities, 2021/22

Kultivar Cultivar	Koel/Cool									Matig/Moderate								Warm						
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Delmas	Standerton	Winterton	Gem/Mean	Barberspan	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal (Agri-Seeds)	Groblersdal ARC	Hoopstad	Pyramid	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	40.89	42.49	39.69	40.41	38.64	41.14	40.54	39.21	40.38	36.36	43.00	39.32	42.47	36.47	38.77	39.89	39.47	41.27	40.94	37.46	40.87	37.47	40.46	39.75
DM 5953RSF	39.40	39.98	37.39	39.76	39.51	42.16	39.11	38.83	39.52	37.50	42.33	38.23	41.87	37.92	34.06	39.09	38.71	40.25	41.52	37.12	37.10	36.85	39.91	38.79
NS 5258 R	40.84	40.47	38.96	40.09	40.40	42.22	40.63	39.37	40.37	37.70	41.80	39.71	42.30	37.10	33.76	40.11	38.93	42.17	42.89	36.73	36.94	37.08	40.07	39.31
RA4918 R	40.21	40.21	38.32	38.73	38.77	41.33	39.48	38.82	39.48	26.31	41.56	38.80	42.43	37.26	36.27	39.22	37.41	40.38	40.39	36.02	41.36	36.88	40.08	39.19
DM 5351RSF	37.87	39.36	36.82	38.47	37.25	40.01	38.51	38.72	38.38	35.53	40.48	37.62	38.98	36.15	29.83	38.00	36.66	39.39	39.75	34.16	33.96	36.53	39.14	37.16
SSS 5449 (tuc)	40.61	40.19	38.23	39.42	42.45	41.78	38.94	38.51	40.02	37.61	40.25	38.87	42.28	38.18	33.05	40.18	38.63	40.49	39.43	38.29	34.86	37.16	40.35	38.43
Y540	38.52	38.40	36.98	38.05	35.87	41.08	39.15	37.99	38.26	36.65	40.53	36.29	41.86	35.76	36.87	39.13	38.16	39.30	39.35	37.29	39.15	36.78	38.81	38.45
RA565 R	39.33	39.96	38.02	38.42	38.80	40.15	38.90	39.23	39.10	30.92	40.62	39.74	41.72	37.56	39.06	39.09	38.39	39.42	38.46	38.85	40.78	38.67	39.03	39.20
LS 6851 R	40.78	40.96	38.21	37.40	40.92	41.09	38.76	40.90	39.88	36.87	41.07	41.77	41.97	37.17	32.00	40.21	38.72	39.88	38.85	39.78	39.88	40.31	41.32	40.00
SSS 5052 (tuc)	40.98	39.70	37.92	38.19	41.44	40.39	38.85	38.91	39.55	37.47	39.76	38.47	43.00	36.02	34.27	39.61	38.37	39.47	40.13	35.29	41.63	36.16	39.59	38.71
P57T19 R	40.08	40.89	39.32	40.44	40.08	41.71	40.44	41.07	40.50	36.70	41.13	42.16	43.05	38.26	33.78	39.94	39.29	42.10	42.14	39.73	42.53	38.06	40.51	40.85
PAN 1555 R	39.50	38.72	38.56	37.69	31.51	40.82	39.01	38.17	38.00	35.76	41.33	39.38	43.18	37.15	39.37	39.37	39.36	40.83	40.67	40.38	38.60	39.04	39.58	39.85
PAN 1521 R	39.13	39.89	37.79	39.02	41.08	41.57	38.80	39.62	39.61	35.36	40.60	38.86	42.42	37.32	29.82	40.32	37.81	41.03	39.71	38.07	37.17	38.45	38.29	38.79
DM 5302RSF	41.38	41.42	39.75	41.16	39.06	43.65	41.68	40.58	41.09	40.15	41.36	40.92	42.19	39.64	40.79	41.39	40.92	42.63	41.65	41.07	37.76	39.17	40.40	40.45
RA5921 R	38.14	36.90	35.14	35.80	38.16	39.09	39.31	37.13	37.46	28.21	37.87	36.15	40.75	32.14	34.97	35.84	35.13	37.61	36.33	34.68	36.01	34.14	31.98	35.13
PAN 1588 R	41.20	40.58	39.78	38.62	41.44	41.12	39.72	41.74	40.53	33.74	41.25	40.75	42.91	37.58	37.85	39.61	39.10	41.42	40.13	37.79	42.51	39.74	40.51	40.35
NS 5909 R	40.13	40.21	38.35	37.73	36.20	40.87	39.11	39.46	39.01	36.82	39.96	38.02	41.05	35.93	36.42	39.23	38.20	40.16	39.16	37.83	38.51	37.02	37.09	38.30
RA660 R	40.75	40.96	39.24	37.92	35.38	41.31	39.76	39.46	39.35	29.58	39.94	39.98	42.55	38.48	37.04	40.84	38.34	42.19	40.53	38.33	35.52	40.22	38.88	39.28
DM59R03	39.82	40.36	38.91	39.14	40.18	40.95	40.19	40.80	40.04	36.57	41.30	41.15	42.97	37.40	37.75	38.91	39.44	40.75	40.20	40.19	37.60	40.53	36.83	39.35
LS 6164 R	39.65	39.60	37.73	38.33	40.52	39.71	39.47	39.65	39.33	34.57	39.78	39.70	42.42	36.77	34.66	39.37	38.18	40.81	40.06	38.05	38.09	39.08	36.59	38.78
LS 6860 R	40.41	39.77	38.22	37.27	37.34	38.85	38.33	38.32	38.56	26.42	40.42	38.39	42.23	37.02	30.73	39.30	36.36	40.10	39.04	38.13	39.93	38.69	36.20	38.68
P62T16 R	39.32	38.00	36.49	36.08	31.48	38.49	37.76	37.67	36.91	36.02	39.11	38.54	41.73	34.51	34.49	38.34	37.53	38.28	37.59	36.96	41.39	38.27	36.42	38.15
Y627	39.87	39.12	38.70	37.51	39.95	40.14	38.65	39.61	39.19	35.92	38.49	39.04	41.65	35.35	33.39	39.21	37.58	39.84	38.25	36.90	40.89	38.09	36.62	38.43
PAN 1692 R	41.39	42.44	38.99	38.51	41.88	42.29	40.66	42.89	41.13	34.88	42.20	41.28	41.42	36.32	38.94	40.51	39.36	42.72	40.64	40.56	43.70	40.40	37.41	40.91
P64T39 R	40.53	41.17	38.95	37.78	33.95	40.61	38.91	40.81	39.09	37.45	41.16	39.96	43.46	36.91	35.84	39.79	39.22	40.89	39.51	39.07	42.52	39.61	38.32	39.99
NS 6448 R	41.48	40.86	39.18	37.21	35.71	41.87	40.00	39.34	39.46	33.33	39.97	39.97	41.43	35.84	38.64	40.64	38.55	40.53	39.51	38.75	42.20	39.08	38.38	39.74
RA6520 RS	39.68	39.89	37.29	39.10	37.87	38.45	38.13	38.33	38.59	29.28	37.33	39.43	42.02	36.48	32.40	38.21	36.45	40.45	39.45	37.91	42.06	38.27	38.36	39.42
Y657	40.19	39.59	39.53	38.13	40.49	41.65	39.22	40.49	39.91	37.89	41.11	40.34	42.95	36.24	38.04	38.91	39.35	40.38	40.27	40.41	41.98	40.38	38.84	40.38
DM68R09	-	39.17	38.64	38.38	41.20	41.55	38.28	40.65	39.70	36.29	40.60	41.55	42.76	36.92	39.39	39.12	39.52	40.45	40.10	37.77	41.66	39.45	38.47	39.65
PAN 1644 R	39.93	39.45	39.93	38.35	41.89	42.09	39.90	40.39	40.24	27.36	39.83	40.66	42.59	36.24	40.57	40.06	38.19	41.84	40.56	40.25	43.27	40.27	39.53	40.95
DM 6,8i RR	39.84	38.00	36.77	36.81	39.38	38.25	37.85	39.08	38.25	26.27	40.62	39.15	40.83	35.60	39.00	38.66	37.16	39.38	40.03	37.98	40.85	39.32	38.14	39.28
P71T74 R	40.74	40.42	38.38	36.82	40.66	39.91	-	40.58	39.64	37.55	40.41	40.94	42.14	37.44	35.10	39.02	38.94	41.48	40.59	38.58	41.57	39.76	38.95	40.16
Gem/Mean	40.08	39.97	38.32	38.34	38.73	40.82	39.29	39.57	39.39	34.34	40.54	39.54	42.11	36.72	35.84	39.41	38.36	40.56	39.93	38.14	39.78	38.47	38.60	39.24

Tabel 17: Gemiddelde van die olie-en proteïen persentasie saamgevoeg (Protolie), 2021/22
Table 17: Average of the oil and protein percentage joined (Profat),2021/22

Kultivar Cultivar	Koel/Cool									Matig/Moderate								Warm						
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Delmas	Standerton	Winterton	Gem/Mean	Barberspan	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal (Agri-Seeds)	Groblersdal ARC	Hoopstad	Pyramid	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	60.59	62.81	61.77	60.52	59.09	61.22	63.36	60.89	61.28	57.69	64.89	60.66	61.87	58.14	59.54	60.77	60.51	63.41	63.10	58.87	62.83	59.01	61.13	61.39
DM 5953RSF	59.87	61.45	60.25	61.00	60.55	62.94	62.76	62.14	61.37	59.10	65.47	60.52	62.00	59.79	56.48	61.03	60.63	63.12	63.44	60.22	61.37	59.81	61.63	61.60
NS 5258 R	60.85	61.42	61.73	60.81	60.46	62.45	63.88	62.16	61.72	59.01	64.20	61.23	62.38	59.13	56.63	61.20	60.54	64.13	64.84	59.14	60.84	60.20	60.91	61.68
RA4918 R	60.87	60.55	61.14	60.33	59.46	62.36	63.22	61.50	61.18	48.93	64.15	61.07	62.23	58.95	58.01	60.72	59.15	62.53	62.86	58.39	64.14	59.63	61.93	61.58
DM 5351RSF	58.73	59.99	60.35	59.92	58.04	60.90	62.07	62.08	60.26	57.60	62.97	59.87	60.36	57.33	53.03	59.41	58.65	61.99	62.44	56.59	57.89	59.89	60.64	59.91
SSS 5449 (tuc)	60.19	60.48	60.08	59.88	61.43	61.61	61.08	61.23	60.75	59.06	63.69	61.35	62.09	59.82	55.23	61.48	60.39	64.09	62.99	60.39	58.43	59.57	61.61	61.18
Y540	58.77	59.19	58.92	58.51	55.87	61.31	61.70	60.48	59.34	58.23	63.91	59.13	61.53	57.37	59.11	60.87	60.02	62.82	62.94	59.63	62.57	59.49	60.63	61.35
RA565 R	59.58	60.28	59.53	58.59	58.60	61.10	61.20	61.85	60.09	49.04	63.56	61.62	61.62	58.95	60.35	60.02	59.31	62.87	61.28	60.88	62.94	60.53	60.41	61.49
LS 6851 R	60.69	61.67	59.91	57.90	59.88	61.87	61.32	63.50	60.84	58.70	64.71	63.76	63.26	58.78	54.29	61.36	60.69	63.29	62.12	62.22	62.91	63.22	62.58	62.72
SSS 5052 (tuc)	60.14	59.21	59.24	58.53	60.25	60.93	60.63	61.48	60.05	58.29	62.19	59.94	61.66	57.67	55.71	60.11	59.37	61.81	61.96	57.78	61.89	58.56	60.66	60.44
P57T19 R	59.27	60.93	60.35	59.94	59.32	62.46	62.90	65.14	61.29	58.82	64.54	64.52	63.65	59.13	55.98	61.11	61.11	65.31	64.17	61.74	63.85	60.72	61.32	62.85
PAN 1555 R	58.76	58.31	59.76	58.00	51.76	60.93	61.10	61.52	58.77	57.03	63.50	61.05	62.31	57.73	60.09	60.30	60.29	62.40	62.70	61.43	60.34	61.01	60.62	61.42
PAN 1521 R	58.47	59.58	58.87	58.45	59.56	61.72	60.98	63.02	60.08	56.60	63.03	60.63	62.10	57.86	51.40	60.03	58.81	63.41	61.95	59.50	58.31	60.06	58.92	60.36
DM 5302RSF	60.06	60.67	60.62	60.59	58.40	61.88	62.92	62.77	60.99	60.98	63.42	61.75	61.07	59.59	61.09	61.45	61.34	64.12	63.33	61.86	60.07	60.77	58.98	61.52
RA5921 R	58.33	58.56	57.64	56.67	57.61	60.57	61.28	61.83	59.06	50.86	62.09	59.24	62.05	55.19	57.87	58.47	57.97	62.74	61.57	58.04	58.95	58.06	54.93	59.05
PAN 1588 R	60.44	60.07	60.77	58.27	60.16	61.51	61.59	63.43	60.78	55.18	63.52	61.82	62.39	58.08	58.40	60.11	59.93	63.87	62.21	59.34	62.69	61.10	61.62	61.81
NS 5909 R	59.89	60.75	60.00	58.66	55.86	61.37	61.43	62.45	60.05	58.87	63.30	60.51	61.64	57.31	58.14	60.19	59.99	63.08	61.68	60.75	59.74	59.98	59.50	60.79
RA660 R	60.68	61.26	60.64	59.08	55.91	62.32	62.23	62.87	60.62	51.74	63.10	62.37	62.32	59.76	58.98	61.86	60.02	64.62	63.09	61.02	58.67	62.33	61.19	61.82
DM59R03	59.09	59.85	59.51	58.89	58.37	61.01	60.13	63.50	60.04	57.74	63.51	62.84	62.01	57.66	58.05	59.66	60.21	63.06	62.24	61.24	59.14	61.52	57.80	60.83
LS 6164 R	58.54	59.64	58.65	58.17	58.65	59.70	61.05	63.05	59.68	56.05	62.37	61.77	62.78	57.58	55.82	59.95	59.47	63.15	62.84	59.20	58.89	61.17	57.69	60.49
LS 6860 R	59.12	59.60	58.81	56.06	55.87	58.85	60.06	62.37	58.84	46.73	63.31	60.15	62.27	57.94	52.36	59.92	57.53	62.28	61.36	59.58	60.08	60.48	57.27	60.18
P62T16 R	58.54	59.40	58.33	55.90	51.77	60.08	60.29	62.72	58.38	57.98	63.50	62.21	61.90	56.61	56.16	60.11	59.78	62.52	61.23	59.54	62.90	61.14	58.72	61.01
Y627	58.43	58.88	58.89	56.63	57.88	59.93	59.90	62.53	59.13	56.32	61.26	60.53	60.52	55.94	54.06	58.80	58.20	61.32	60.12	58.21	60.58	58.65	57.80	59.45
PAN 1692 R	61.10	61.60	59.85	58.33	61.08	62.14	62.02	63.78	61.24	55.72	64.00	62.34	61.54	57.11	59.69	60.65	60.15	64.25	62.38	61.74	63.26	61.50	58.29	61.90
P64T39 R	59.25	59.50	58.80	57.48	53.73	60.61	59.78	62.51	58.96	58.30	63.05	59.43	61.84	57.29	56.84	59.52	59.47	63.32	61.39	60.22	61.67	60.85	58.68	61.02
NS 6448 R	60.78	60.85	60.69	57.87	56.03	62.62	61.96	62.83	60.45	55.29	62.91	60.62	61.95	57.54	60.54	60.99	59.98	63.14	62.07	61.16	62.46	61.64	60.06	61.76
RA6520 RS	57.76	58.61	58.26	57.89	55.91	59.17	59.95	61.32	58.61	50.97	60.70	60.36	62.23	57.30	54.90	59.03	57.93	62.56	61.72	59.73	60.29	60.11	59.43	60.64
Y657	58.92	59.93	60.07	58.20	59.44	61.20	61.02	61.75	60.07	58.67	62.95	59.85	61.16	56.97	58.76	59.05	59.63	63.01	61.96	61.16	62.67	61.21	59.38	61.57
DM68R09	-	59.22	59.13	57.33	58.76	60.82	59.74	63.28	59.75	57.52	62.82	61.93	61.75	57.49	60.32	58.84	60.10	63.12	62.70	59.28	61.99	60.71	59.40	61.20
PAN 1644 R	59.42	59.72	60.14	57.80	60.10	61.87	61.27	62.29	60.33	48.93	62.47	60.70	61.24	57.22	61.56	60.24	58.91	64.48	62.18	61.61	63.13	61.38	60.34	62.19
DM 6,8i RR	60.21	57.52	56.93	55.79	61.61	58.03	58.76	61.47	58.79	45.49	62.10	59.37	60.50	55.27	58.72	58.18	57.09	61.61	61.93	58.42	59.97	59.75	58.58	60.04
P71T74 R	58.54	58.53	57.64	55.42	58.58	58.62	-	61.42	58.39	57.08	61.30	60.20	60.33	56.31	55.35	58.20	58.40	61.96	61.30	58.53	60.29	59.75	58.31	60.02
Gem/Mean	59.54	60.00	59.60	58.36	58.12	61.07	61.34	62.35	60.04	55.58	63.20	61.04	61.83	57.78	57.30	60.11	59.55	63.11	62.32	59.92	61.12	60.43	59.72	61.10

Tabel 18: Die saadopbrengs van elke kultivar by die verskillende lokaliteite, 2021/22
Table 18: The The seed yield of the cultivars at the different localities, 2021/22

Kultivar Cultivar	Koel/Cool									Matig/Moderate								Warm						
	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Delmas	Standerton	Winterton	Gem/Mean	Barberspan	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean	Groblersdal (Agri-Seeds)	Groblersdal ARC	Hoopstad	Pyramid	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	2790	3057	2689	1491	1072	3550	3400	4050	2762	2638	2842	4103	2861	2638	1677	4067	2975	2997	3053	3989	2470	2381	1065	2659
DM 5953RSF	2260	4678	4192	3710	3623	3998	3257	5200	3865	2397	2901	4650	2768	2951	2551	4993	3316	3148	3739	5385	2045	2110	1379	2968
NS 5258 R	2996	4082	3389	1884	2054	4081	2856	5059	3300	1505	2907	4287	3414	2937	2696	5337	3298	3512	3415	5075	2313	3495	1375	3197
RA4918 R	2784	4307	3345	2402	1771	4438	3623	4917	3448	1641	3331	4126	3125	3229	2780	5457	3384	3443	4548	5455	2584	3337	1443	3468
DM 5351RSF	3597	4539	3512	2720	2921	4601	3482	4917	3786	3131	2992	5278	3517	2898	1126	5457	3485	3333	4211	4954	1736	3611	1687	3255
SSS 5449 (tuc)	3078	4108	3634	2421	3300	4003	3770	4792	3638	2420	2848	4014	3100	2721	1386	4917	3058	3636	3493	4156	2330	2704	1223	2924
Y540	3335	4575	4289	2243	2497	3994	2906	5135	3622	3149	3443	4219	2874	2992	3219	4993	3556	3422	3810	5266	2075	3450	1656	3280
RA565 R	3427	3502	4035	1834	2978	4519	3892	5304	3686	2708	3570	4482	3049	3460	3862	5070	3743	3441	4588	5046	2324	2883	1510	3299
LS 6851 R	3068	3970	3813	2325	3151	3144	3879	4841	3524	2359	4010	4683	2957	3766	2889	4895	3651	3823	4823	4152	2883	2524	1850	3343
SSS 5052 (tuc)	2784	2927	3491	1558	2213	3971	3850	4127	3115	2480	3044	4226	2774	3263	1463	4710	3137	4045	4298	4350	1801	3183	1485	3194
P57T19 R	3093	3666	4500	3583	3218	3670	3975	5179	3860	2290	3510	4802	2790	3159	1484	5124	3308	3094	3757	4600	2456	3315	1593	3136
PAN 1555 R	3507	3208	4013	2253	1014	3979	4358	4448	3348	2415	3770	4448	2615	3540	2470	4797	3436	3518	4076	4312	2334	3909	1896	3341
PAN 1521 R	2670	4116	4362	3434	2809	3389	4208	4628	3702	2324	3953	4375	2572	3628	2615	4890	3479	3856	4577	4225	2419	3889	1655	3437
DM 5302RSF	3326	4541	4211	2802	3545	3624	4576	4595	3902	2786	2890	4215	3194	3810	2531	5026	3493	3391	4693	4992	2758	1796	1281	3152
RA5921 R	3411	4428	3753	2439	2490	4108	3776	4541	3618	2607	3717	4486	2922	3019	3460	4503	3531	3987	4205	4446	2384	3210	1786	3336
PAN 1588 R	3042	3280	3684	1636	2338	3488	4191	4492	3269	2215	3441	3678	2727	3426	2351	4612	3207	4083	4801	3403	2299	3431	1829	3307
NS 5909 R	2057	3177	3900	2734	1852	3573	4437	5277	3376	2883	3731	4464	2916	3336	1718	4628	3382	3789	5217	4013	2251	3732	1794	3466
RA660 R	3440	4158	4193	1922	2570	3912	3929	5026	3644	2957	3356	4826	3004	3403	2326	5506	3625	3542	4733	4584	3096	3491	2154	3600
DM59R03	2927	4011	4027	3865	3016	3686	5047	4170	3844	2945	3734	4239	2688	3204	3118	5342	3610	3429	4327	4196	2419	3429	2445	3374
LS 6164 R	2973	3624	4276	3043	1828	3268	4788	4132	3491	2146	3081	4295	2752	3574	2041	5189	3297	3229	4724	3853	2254	3017	1533	3102
LS 6860 R	2715	3243	3605	2580	1329	3725	4435	4852	3310	2383	3063	4334	2449	3057	1458	4372	3017	3390	4704	3671	2591	3598	1810	3294
P62T16 R	3323	3703	4365	2525	985	3059	4263	4764	3373	2000	3613	4318	2641	3415	2362	5467	3402	3670	5074	4399	2572	3625	1932	3545
Y627	3351	3786	3451	2338	2022	3537	4072	6171	3591	2438	3918	4019	2937	3177	3119	4721	3475	3944	5067	4209	2254	4016	1846	3556
PAN 1692 R	3139	3549	3523	2249	2639	3634	4041	5593	3546	2431	3138	4382	2867	3283	2475	5189	3395	3494	4359	3727	2548	3350	1456	3156
P64T39 R	3135	2980	4700	3972	1736	3403	4614	3838	3547	3679	3640	4402	2540	3435	2074	5511	3612	3889	4558	5449	2612	4072	2027	3768
NS 6448 R	2982	3813	3928	2387	1109	3314	4688	6563	3598	3017	3167	4868	2756	3406	2447	4906	3509	3608	5216	4694	2959	3357	1678	3585
RA6520 RS	1359	3202	4188	3080	267	3430	3801	4949	3034	2052	3820	4144	3297	3461	2092	4977	3406	3541	4732	3976	2001	3520	1994	3294
Y657	3934	5017	3929	2322	3518	4155	4468	6094	4180	3181	4448	4018	2903	3438	3811	5298	3871	4066	5360	4851	1636	4201	2071	3698
DM68R09	3548	3970	4549	2819	1639	3795	3927	2921	3396	2957	3303	4667	2919	3653	2659	4895	3579	3526	4853	4460	2439	3374	2197	3475
PAN 1644 R	2785	4136	4367	2407	2960	4187	4041	5048	3741	2980	3666	4877	2981	3693	3628	4808	3805	4215	4942	5203	2700	3109	1910	3680
DM 6,8i RR	1920	3856	3413	2903	1534	3752	4329	5320	3378	3384	3143	5090	2656	3747	4075	5059	3879	2911	4327	5012	2072	3180	2064	3261
P71T74 R	2719	4074	4619	3087	1885	3722	4896	4753	3719	2924	3300	4991	2507	3328	3277	5271	3657	3782	4928	4963	2758	3804	1936	3695
Gem/Mean	2983	3853	3936	2593	2246	3772	4055	4865	3538	2607	3415	4438	2877	3314	2539	5000	3456	3586	4475	4533	2387	3316	1736	3339
CV	13.4	14.1	9.8	16	20.2	7.3	6.9	17.8		9.9	7.8	11.3	8.3	13.9	9.4	12.6		14.5	7.9	5.7	21.8	10.9	16.2	

Tabel 19: Opbrengswaarskynlikheid (%) van kultivars geëvalueer in 2019/20, 2020/21 en 2021/22 vir die koeler droëland produksiegebiede by verskillende opbrengspotensiale
Table 19: Yield probability (%) of cultivars in the 2019/20, 2020/21 and 2021/22 for the cooler dryland production areas as different yield potentials

Kultivar	Opbrengswaarskynlikheid/Yield potential (t/ha)								Regressielyn/Regression line	
Cultivar	1.5	2	2.5	3	3.5	4	4.5	5	Fprob	R2
DM 5953RSF	91	88	84	79	73	65	57	50	0.0038	0.38
DM 5351RSF	79	75	70	64	57	51	44	38	0.0027	0.40
SSS 5449 (tuc)	65	58	51	44	36	29	23	19	<0.001	0.64
LS 6851 R	65	60	53	46	39	33	27	23	<0.001	0.67
SSS 5052 (tuc)	25	25	26	26	27	28	30	31	<0.001	0.79
PAN 1555 R	36	36	37	39	40	41	43	44	<0.001	0.79
PAN 1521 R	88	85	81	77	71	64	58	51	<0.001	0.74
DM 5302RSF	79	74	68	61	53	46	38	31	<0.001	0.58
NS 5909 R	26	31	36	43	49	56	62	68	<0.001	0.89
LS 6164 R	43	42	42	41	40	40	40	40	<0.001	0.83
LS 6860 R	11	15	20	25	32	39	47	56	<0.001	0.88
P64T39 R	49	51	53	55	57	59	60	61	<0.001	0.63
NS 6448 R	19	23	29	35	43	50	58	65	<0.001	0.72
PAN 1644 R	41	45	49	52	57	60	64	67	<0.001	0.84
DM 6.8i RR	37	41	46	51	56	61	66	70	<0.001	0.86
P71T74 R	19	27	37	48	60	71	79	86	<0.001	0.85

Tabel 20: Graanopbrengs (kg/ha^{-1}) van kultivars gedurende die 2020/21 en 2021/22 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 2020/21 and 2021/22 growing season for the various localities situated in the cooler production areas

Kultivar Cultivar	2020/21										2021/22								
	Bapsfontein	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Kinross	Standerton	Villiers	Winterton	Gem/Mean	Bapsfontein PD2	Belfast	Bethlehem PD1	Bethlehem PD2	Clarens	Delmas	Standerton	Winterton	Gem/Mean
PAN 1479 R	2984	3951	3007	2074	2125	1795	2132	1903	3397	2597	2790	3057	2689	1491	1072	3550	3400	4050	2762
DM 5953RSF	2874	3730	4592	4521	3092	3578	2434	2355	4612	3532	2260	4678	4192	3710	3623	3998	3257	5200	3865
NS 5258 R	3005	3334	3372	2166	1828	2425	2427	2377	4474	2823	2996	4082	3389	1884	2054	4081	2856	5059	3300
RA4918 R	3081	4064	3633	2732	2090	2173	2503	2607	4530	3046	2784	4307	3345	2402	1771	4438	3623	4917	3448
DM 5351RSF	2288	4140	4119	3195	2051	3149	2874	2789	4585	3244	3597	4539	3512	2720	2921	4601	3482	4917	3786
SSS 5449 (tuc)	2920	2507	3218	2975	2134	3131	2497	2624	3486	2832	3078	4108	3634	2421	3300	4003	3770	4792	3638
Y540	-	-	-	-	-	-	-	-	-	-	3335	4575	4289	2243	2497	3994	2906	5135	3622
RA565 R	2994	2703	3508	2621	2490	3070	3392	2516	5082	3153	3427	3502	4035	1834	2978	4519	3892	5304	3686
LS 6851 R	3612	2276	3315	3481	2807	2855	3024	2894	4093	3151	3068	3970	3813	2325	3151	3144	3879	4841	3524
SSS 5052 (tuc)	3991	1975	3471	3125	2666	2526	3187	2050	3922	2990	2784	2927	3491	1558	2213	3971	3850	4127	3115
P57T19 R											3093	3666	4500	3583	3218	3670	3975	5179	3860
PAN 1555 R	3272	3438	3280	3012	2785	3595	2721	2962	4281	3261	3507	3208	4013	2253	1014	3979	4358	4448	3348
PAN 1521 R	3897	3751	4521	4111	2972	4110	3268	2542	4281	3717	2670	4116	4362	3434	2809	3389	4208	4628	3702
DM 5302RSF	3120	3636	4454	3041	2541	2874	3285	2644	3397	3221	3326	4541	4211	2802	3545	3624	4576	4595	3902
RA5921 R	-	-	-	-	-	-	-	-	-	-	3411	4428	3753	2439	2490	4108	3776	4541	3618
PAN 1588 R	-	-	-	-	-	-	-	-	-	-	3042	3280	3684	1636	2338	3488	4191	4492	3269
NS 5909 R	3582	2614	3743	3044	2775	3405	3187	2585	4226	3240	2057	3177	3900	2734	1852	3573	4437	5277	3376
RA660 R	3640	2047	3646	3008	3004	2024	3055	3077	4557	3117	3440	4158	4193	1922	2570	3912	3929	5026	3644
DM59R03	2811	1910	4975	3574	2890	3712	3120	2785	4005	3309	2927	4011	4027	3865	3016	3686	5047	4170	3844
LS 6164 R	3232	2544	3630	3391	2708	3083	2680	2984	4281	3170	2973	3624	4276	3043	1828	3268	4788	4132	3491
LS 6860 R	2210	2002	4159	3045	2223	2932	2634	3107	4364	2964	2715	3243	3605	2580	1329	3725	4435	4852	3310
P62T16 R	-	-	-	-	-	-	-	-	-	-	3323	3703	4365	2525	985	3059	4263	4764	3373
Y627	-	-	-	-	-	-	-	-	-	-	3351	3786	3451	2338	2022	3537	4072	6171	3591
PAN 1692 R	-	-	-	-	-	-	-	-	-	-	3139	3549	3523	2249	2639	3634	4041	5593	3546
P64T39 R	3402	2638	4256	4571	2416	3947	3085	2475	4612	3489	3135	2980	4700	3972	1736	3403	4614	3838	3547
NS 6448 R	3489	3043	3654	2781	2577	2989	2754	2425	4944	3184	2982	3813	3928	2387	1109	3314	4688	6563	3598
RA6520 RS	-	-	-	-	-	-	-	-	-	-	1359	3202	4188	3080	267	3430	3801	4949	3034
Y657	-	-	-	-	-	-	-	-	-	-	3934	5017	3929	2322	3518	4155	4468	6094	4180
DM68R09	3496	2707	4252	2523	2515	3501	3474	2458	4226	3239	3548	3970	4549	2819	1639	3795	3927	2921	3396
PAN 1644 R	3814	2198	4562	3219	2712	3545	3237	2901	4971	3462	2785	4136	4367	2407	2960	4187	4041	5048	3741
DM 6,8i RR	3880	3509	4019	3846	2732	2896	3031	3096	4640	3391	1920	3856	3413	2903	1534	3752	4329	5320	3378
P71T74 R	3475	2150	3439	3717	2423	3335	2946	3185	5496	3352	2719	4074	4619	3087	1885	3722	4896	4753	3719
DM52R19	2223	3505	3363	2615	1768	2471	2912	2297	4088	2805	-	-	-	-	-	-	-	-	-
PAN 1532 R	3045	2866	3147	2888	1814	3010	3204	1321	4032	2873	-	-	-	-	-	-	-	-	-
LG60155 R	2790	1800	4047	4285	2270	3553	3062	2365	3845	3113	-	-	-	-	-	-	-	-	-
RA568 R	3278	2938	3467	2976	2803	2203	3263	2649	4253	3092	-	-	-	-	-	-	-	-	-
DM60T05	3863	2873	3979	3348	2893	2495	3177	2081	4916	3292	-	-	-	-	-	-	-	-	-
SSS 6560 (tuc)	3010	2376	3759	2850	2177	2988	2852	2569	3922	2945	-	-	-	-	-	-	-	-	-
P61T38 R	3152	2828	3780	2932	2600	3581	2848	2833	4391	3216	-	-	-	-	-	-	-	-	-
Gem/Mean	3214	2868	3812	3189	2496	3032	2942	2582	4330	3161	2983	3853	3936	2593	2246	3772	4055	4865	3538

Tabel 21: Opbrengswaarskynlikheid (%) van kultivars geëvalueer in 2019/20, 2020/21 en 2021/22 vir die matige droëland produksiegebiede by verskillende opbrengspotensiale
Table 21: Yield probability (%) of cultivars in the 2019/20, 2020/21 and 2021/22 for the moderate dryland production areas as different yield potentials

Kultivar	Opbrengspotensiaal/Yield potential (t/ha)								Regressielyne/Regression	
Cultivar	1.5	2	2.5	3	3.5	4	4.5	5	Fprob	R2
DM 5953RSF	66	62	58	53	48	44	40	36	<0.001	0.78
DM 5351RSF	12	22	36	54	71	83	92	96	<0.001	0.92
SSS 5449 (tuc)	40	37	33	29	26	24	22	20	<0.001	0.82
LS 6851 R	40	42	43	46	47	49	51	53	<0.001	0.93
SSS 5052 (tuc)	49	40	32	24	18	13	9	7	<0.001	0.81
PAN 1555 R	32	34	35	38	41	42	46	49	<0.001	0.94
PAN 1521 R	70	65	59	53	46	40	34	29	<0.001	0.90
DM 5302RSF	36	34	33	33	32	31	32	31	<0.001	0.88
NS 5909R	50	47	41	36	31	27	25	22	<0.001	0.94
LS 6164 R	57	54	52	50	47	45	43	40	<0.001	0.87
LS 6860 R	39	35	31	28	25	23	22	20	<0.001	0.89
P64T39 R	69	69	69	70	69	68	68	67	<0.001	0.87
NS 6448 R	63	65	66	68	69	68	69	69	<0.001	0.91
PAN 1644 R	62	64	65	67	69	70	71	72	<0.001	0.87
DM 6.8i RR	67	70	73	75	77	78	80	80	<0.001	0.80

Tabel 22: Graanopbrengs (kg/ha^{-1}) van kultivars gedurende die 2020/21 en 2021/22 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 2020/21 and 2021/22 growing season for the various localities situated in the moderate production areas

Kultivar Cultivar	2020/21									2021/22							
	Barberspan	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Stoffberg	Gem/Mean	Barberspan	Bergville	Cedara	Greytown	Kroonstad	Leeudoringstad	Potchefstroom	Gem/Mean
PAN 1479 R	1726	3396	4299	2274	2392	1946	2566	3456	2757	2638	2842	4103	2861	2638	1677	4067	2975
DM 5953RSF	3321	4201	4337	2599	2380	2075	3110	3631	3207	2397	2901	4650	2768	2951	2551	4993	3316
NS 5258 R	1253	3365	4509	2405	2356	2031	2664	3801	2798	1505	2907	4287	3414	2937	2696	5337	3298
RA4918 R	1706	3584	4747	2511	3532	2000	2832	3852	3096	1641	3331	4126	3125	3229	2780	5457	3384
DM 5351RSF	1647	3476	4826	2541	2913	1402	3248	3919	2997	3131	2992	5278	3517	2898	1126	5457	3485
SSS 5449 (tuc)	1690	2417	3666	2329	3072	1828	2404	4125	2692	2420	2848	4014	3100	2721	1386	4917	3058
Y540	-	-	-	-	-	-	-	-	-	3149	3443	4219	2874	2992	3219	4993	3556
RA565 R	1727	4320	4066	2844	3020	1686	3436	3898	3125	2708	3570	4482	3049	3460	3862	5070	3743
LS 6851 R	1869	3903	4401	2252	3068	1767	3029	3344	2954	2359	4010	4683	2957	3766	2889	4895	3651
SSS 5052 (tuc)	1643	4137	2831	2529	2340	1583	3080	3150	2662	2480	3044	4226	2774	3263	1463	4710	3137
P57T19 R	-	-	-	-	-	-	-	-	-	2290	3510	4802	2790	3159	1484	5124	3308
PAN 1555 R	1662	3907	4092	2625	3207	1232	2612	3341	2835	2415	3770	4448	2615	3540	2470	4797	3436
PAN 1521 R	2549	4270	4516	2470	3229	2071	2777	3340	3153	2324	3953	4375	2572	3628	2615	4890	3479
DM 5302RSF	1438	3382	3701	2601	2593	1683	2718	3670	2723	2786	2890	4215	3194	3810	2531	5026	3493
RA5921 R	-	-	-	-	-	-	-	-	-	2607	3717	4486	2922	3019	3460	4503	3531
PAN 1588 R	-	-	-	-	-	-	-	-	-	2215	3441	3678	2727	3426	2351	4612	3207
NS 5909 R	2123	3891	4190	2565	2933	1979	2673	3393	2968	2883	3731	4464	2916	3336	1718	4628	3382
RA660 R	1448	3820	3780	2933	3245	2348	2990	3814	3047	2957	3356	4826	3004	3403	2326	5506	3625
DM59R03	1532	4405	3858	2390	3120	2161	3361	4158	3123	2945	3734	4239	2688	3204	3118	5342	3610
LS 6164 R	1676	3849	4255	2296	3549	1971	3025	3714	3042	2146	3081	4295	2752	3574	2041	5189	3297
LS 6860 R	1274	3664	3901	2677	2857	1925	2921	3397	2827	2383	3063	4334	2449	3057	1458	4372	3017
P62T16 R	-	-	-	-	-	-	-	-	-	2000	3613	4318	2641	3415	2362	5467	3402
Y627	-	-	-	-	-	-	-	-	-	2438	3918	4019	2937	3177	3119	4721	3475
PAN 1692 R	-	-	-	-	-	-	-	-	-	2431	3138	4382	2867	3283	2475	5189	3395
P64T39 R	1947	4232	3894	2872	3633	2282	3386	4019	3283	3679	3640	4402	2540	3435	2074	5511	3612
NS 6448 R	2038	4115	3904	2508	3175	1864	3318	3703	3078	3017	3167	4868	2756	3406	2447	4906	3509
RA6520 RS	-	-	-	-	-	-	-	-	-	2052	3820	4144	3297	3461	2092	4977	3406
Y657	-	-	-	-	-	-	-	-	-	3181	4448	4018	2903	3438	3811	5298	3871
DM68R09	1739	4399	4178	2828	3162	2069	3009	4074	3182	2957	3303	4667	2919	3653	2659	4895	3579
PAN 1644 R	1247	4220	4252	2588	3306	1719	3098	3745	3022	2980	3666	4877	2981	3693	3628	4808	3805
DM 6,8i RR	1673	3651	5085	2447	2824	2325	3666	3785	3182	3384	3143	5090	2656	3747	4075	5059	3879
P71T74 R	2300	3806	4308	2531	3166	1714	3392	3542	3095	2924	3300	4991	2507	3328	3277	5271	3657
DM52R19	1759	3496	5012	2514	2153	1746	3577	4313	3071	-	-	-	-	-	-	-	-
PAN 1532 R	1489	4061	3915	2467	2911	1679	3114	3327	2870	-	-	-	-	-	-	-	-
LG60155 R	1627	3880	2111	2643	2810	1636	3180	3810	2712	-	-	-	-	-	-	-	-
RA568 R	1187	3525	3569	2513	3508	1852	2718	3453	2791	-	-	-	-	-	-	-	-
DM60T05	1787	4235	4135	2532	3259	1868	2875	3989	3085	-	-	-	-	-	-	-	-
SSS 6560 (tuc)	1731	3775	3590	2699	3091	1277	2808	4218	2899	-	-	-	-	-	-	-	-
P61T38 R	1780	3977	4121	2608	2663	1573	3246	4113	3010	-	-	-	-	-	-	-	-
Gem/Mean	1753	3845	4068	2553	2982	1843	3028	3736	2976	2607	3415	4438	2877	3314	2539	5000	3456

Tabel 23: Opbrengswaarskynlikheid (%) van kultivars geëvalueer in 2019/20, 2020/21 en 2021/22 vir die warm produksiegebiede by verskillende opbrengspotensialel
Table 23: Yield probability (%) of cultivars in the 2018/19, 2019/20 and 2020/21 for the warm production areas as different yield potentials

Kultivar	Opbrengswaarskynlikheid/Yield potential (t/ha)							Regressielyne/Regression line	
Cultivar	2.0	2.5	3.0	3.5	4.0	4.5	5.0	Fprob	R2
DM 5953RSF	46	44	43	42	41	39	39	<0.001	0.69
DM 5351RSF	38	39	40	41	42	43	44	<0.001	0.84
SSS 5449 (tuc)	30	26	22	18	15	13	11	<0.001	0.78
LS 6851 R	62	60	57	55	52	49	47	<0.001	0.82
SSS 5052 (tuc)	42	43	44	44	45	46	47	<0.001	0.91
PAN 1555 R	48	46	44	41	39	37	35	<0.001	0.83
PAN 1521 R	63	64	64	65	65	65	65	<0.001	0.88
DM 5302RSF	36	37	40	42	45	48	50	<0.001	0.80
NS 5909 R	53	54	57	58	60	62	63	<0.001	0.78
LS 6164 R	52	47	41	36	31	27	24	<0.001	0.82
LS 6860 R	56	53	51	49	47	44	42	<0.001	0.77
P64T39 R	63	64	65	66	67	67	68	<0.001	0.83
NS 6448 R	53	54	56	56	58	58	59	<0.001	0.90
PAN 1644 R	50	54	59	64	69	72	76	<0.001	0.88
DM 6.8i RR	55	58	61	64	66	68	70	<0.001	0.80
P71T74 R	55	57	59	61	62	64	65	<0.001	0.74

Tabel 24: Graanopbrengs (kg/ha^{-1}) van kultivars gedurende die 2020/21 en 2021/22 groeiseisoen ten opsigte van die verskillende lokaliteite wat in die warmproduksiegebiede geleë is
Table 24: Grain yield (kg/ha^{-1}) of cultivars during the 2020/21 and 2021/22 growing season for the various localities situated in the warm production areas

Kultivar/ Cultivar	2020/21							2021/22						
	Brits	Groblersdal (Agricol)	Groblersdal (Agri Seed)	Marble Hall	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem	Groblersdal (Agri-Seeds)	Groblersdal ARC	Hoopstad	Pyramid	Schweizer-Reneke PD1	Schweizer-Reneke PD2	Gem/Mean
PAN 1479 R	3508	3716	3471	2986	2795	2216	3115	2997	3053	3989	2470	2381	1065	2659
DM 5953RSF	3955	3363	3402	3517	3332	2323	3315	3148	3739	5385	2045	2110	1379	2968
NS 5258 R	4324	3793	3195	2470	3909	2134	3304	3512	3415	5075	2313	3495	1375	3197
RA4918 R	5117	4076	3455	3089	3779	2474	3665	3443	4548	5455	2584	3337	1443	3468
DM 5351RSF	3308	3514	3502	2480	4311	1849	3161	3333	4211	4954	1736	3611	1687	3255
SSS 5449 (tuc)	3225	2467	2911	2189	3707	2423	2820	3636	3493	4156	2330	2704	1223	2924
Y540	-	-	-	-	-	-	-	3422	3810	5266	2075	3450	1656	3280
RA565 R	3925	3410	3446	2976	3587	2655	3333	3441	4588	5046	2324	2883	1510	3299
LS 6851 R	4025	4386	3501	2677	4144	2954	3614	3823	4823	4152	2883	2524	1850	3343
SSS 5052 (tuc)	3703	3793	3400	2905	4227	2246	3379	4045	4298	4350	1801	3183	1485	3194
P57T19 R	-	-	-	-	-	-	-	3094	3757	4600	2456	3315	1593	3136
PAN 1555 R	3502	3597	2865	2366	4593	1976	3150	3518	4076	4312	2334	3909	1896	3341
PAN 1521 R	4667	4309	3646	3365	4172	2237	3733	3856	4577	4225	2419	3889	1655	3437
DM 5302RSF	4241	3309	3294	2584	3314	2462	3201	3391	4693	4992	2758	1796	1281	3152
RA5921 R	-	-	-	-	-	-	-	3987	4205	4446	2384	3210	1786	3336
PAN 1588 R	-	-	-	-	-	-	-	4083	4801	3403	2299	3431	1829	3307
NS 5909 R	5319	3063	3103	2630	4157	2333	3434	3789	5217	4013	2251	3732	1794	3466
RA660 R	4070	2985	3382	2721	4627	2681	3411	3542	4733	4584	3096	3491	2154	3600
DM59R03	4659	3442	3646	3711	4000	2260	3620	3429	4327	4196	2419	3429	2445	3374
LS 6164 R	3909	3382	3377	2816	3168	2677	3222	3229	4724	3853	2254	3017	1533	3102
LS 6860 R	4658	3354	2706	2457	3821	2501	3249	3390	4704	3671	2591	3598	1810	3294
P62T16 R	-	-	-	-	-	-	-	3670	5074	4399	2572	3625	1932	3545
Y627	-	-	-	-	-	-	-	3944	5067	4209	2254	4016	1846	3556
PAN 1692 R	-	-	-	-	-	-	-	3494	4359	3727	2548	3350	1456	3156
P64T39 R	4481	3526	3301	2813	3985	2081	3365	3889	4558	5449	2612	4072	2027	3768
NS 6448 R	3718	3871	2875	2934	4161	2501	3343	3608	5216	4694	2959	3357	1678	3585
RA6520 RS	-	-	-	-	-	-	-	3541	4732	3976	2001	3520	1994	3294
Y657	-	-	-	-	-	-	-	4066	5360	4851	1636	4201	2071	3698
DM68R09	3836	4458	3072	2873	4263	2873	3563	3526	4853	4460	2439	3374	2197	3475
PAN 1644 R	3757	3682	3335	2155	4765	2086	3297	4215	4942	5203	2700	3109	1910	3680
DM 6,8i RR	4811	4466	3322	3048	4552	2483	3780	2911	4327	5012	2072	3180	2064	3261
P71T74 R	3797	4385	3035	2643	3689	2235	3297	3782	4928	4963	2758	3804	1936	3695
DM52R19	3973	4433	3749	2670	3250	1891	3327	-		-	-	-	-	-
PAN 1532 R	3954	3872	3453	3007	3400	2302	3331	-		-	-	-	-	-
LG60155 R	4535	3428	2958	2924	3313	2074	3205	-		-	-	-	-	-
RA568 R	4523	4543	3380	2205	4054	2467	3529	-		-	-	-	-	-
DM60T05	4465	4498	3395	3462	4207	2217	3707	-		-	-	-	-	-
SSS 6560 (tuc)	3501	4122	3354	2743	4045	2429	3366	-		-	-	-	-	-
P61T38 R	3204	3701	3608	2764	3976	2304	3260	-		-	-	-	-	-
Gem/Mean	4089	3765	3305	2806	3910	2345	3370	3586	4475	4533	2387	3316	1736	3339

Tabel 25: Saamgevatte inligting van al die lokaliteite in die koel produksiegebiede, 2021/22
Table 25: Summerised information for all the localities in the cool production areas, 2021/22

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/Percen tage undesirable seed	Massa 100 sade/ Mass 100 seeds	Olie persen-tasie/Oil percentage	Ru-proteïen-persentasie/ Crude protein percentage	Opbrengs/ Yield
PAN 1479 R	60	118	154	59	5	1.00	1.62	1.14	200	1.36	17.43	20.91	40.38	2762
DM 5953RSF	59	118	149	61	7	1.00	1.19	1.05	274	0.88	17.21	21.85	39.52	3865
NS 5258 R	59	129	149	55	5	1.00	1.05	1.24	261	0.75	15.65	21.35	40.37	3300
RA4918 R	61	132	150	59	7	1.17	1.05	1.24	248	0.40	15.98	21.70	39.48	3448
DM 5351RSF	58	130	152	65	7	1.17	1.76	1.10	264	0.58	16.58	21.88	38.38	3786
SSS 5449 (tuc)	70	136	156	74	10	1.13	1.14	1.14	260	0.88	14.02	20.73	40.02	3638
Y540	70	135	155	66	9	1.00	1.00	1.00	252	1.10	14.62	21.09	38.26	3622
RA565 R	74	141	159	77	11	1.00	1.05	1.00	257	0.35	15.91	20.99	39.10	3686
LS 6851 R	70	141	162	69	9	1.75	1.05	1.00	265	0.69	13.98	20.97	39.88	3524
SSS 5052 (tuc)	76	142	161	80	11	1.17	1.10	1.00	269	0.86	14.18	20.50	39.55	3115
P57T19 R	72	139	163	85	14	2.42	1.43	1.00	275	0.64	17.61	20.79	40.50	3860
PAN 1555 R	76	139	160	79	14	1.04	1.14	1.00	251	0.57	16.60	20.77	38.00	3348
PAN 1521 R	78	142	161	88	13	2.00	1.10	1.00	246	0.69	16.08	20.47	39.61	3702
DM 5302RSF	75	139	156	72	10	1.17	1.05	1.00	266	0.40	16.28	19.90	41.09	3902
RA5921 R	76	144	167	69	10	1.00	1.10	1.00	250	0.70	15.01	21.60	37.46	3618
PAN 1588 R	77	147	165	86	13	1.17	1.10	1.00	260	0.91	14.28	20.26	40.53	3269
NS 5909 R	76	141	167	78	13	1.08	1.24	1.00	266	0.60	15.57	21.04	39.01	3376
RA660 R	76	145	163	73	11	1.04	1.24	1.00	257	0.49	15.08	21.28	39.35	3644
DM59R03	79	147	168	89	14	1.75	1.24	1.00	267	0.87	16.88	20.00	40.04	3844
LS 6164 R	78	147	171	90	14	2.29	1.33	1.00	259	1.07	19.81	20.35	39.33	3491
LS 6860 R	76	151	174	90	14	1.92	1.29	1.00	248	0.93	16.37	20.28	38.56	3310
P62T16 R	80	156	174	84	13	1.38	1.33	1.00	241	1.23	15.26	21.47	36.91	3373
Y627	79	146	168	79	11	1.13	1.19	1.00	239	0.52	15.37	19.94	39.19	3591
PAN 1692 R	86	154	168	86	14	1.33	1.05	1.00	253	0.71	17.28	20.11	41.13	3546
P64T39 R	82	154	175	93	14	2.00	1.52	1.00	266	1.19	14.63	19.87	39.09	3547
NS 6448 R	79	149	174	73	10	1.13	1.19	1.00	236	1.16	14.80	21.00	39.46	3598
RA6520 RS	84	159	178	88	15	2.46	1.86	1.00	273	2.42	14.63	20.02	38.59	3034
Y657	79	148	164	88	13	1.25	1.05	1.00	262	1.09	14.41	20.16	39.91	4180
DM68R09	81	150	175	77	11	1.79	1.57	1.00	266	0.64	15.64	20.06	39.70	3396
PAN 1644 R	77	150	168	79	11	1.04	1.00	1.00	253	0.71	15.11	20.09	40.24	3741
DM 6,8i RR	78	150	174	87	11	2.25	1.38	1.00	257	0.56	16.02	20.54	38.25	3378
P71T74 R	82	157	177	95	14	1.75	1.38	1.14	266	1.33	14.87	18.75	39.64	3719
Gem/Mean	74	143	164	78	11	1.43	1.24	1.03	256	0.85	15.72	20.65	39.39	3538

Tabel 26: Saamgevatte inligting van al die lokaliteite in die matige produksiegebiede, 2021/22
Table 26: Summerised information for all the localities in the moderate production areas, 2021/22

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	Olie persen-tasie/Oil percentage	Ru-proteïen-persentasie/ Crude protein percentage	Opbrengs/ Yield
PAN 1479 R	45	114	139	63	8	1.00	1.62	1.00	208	0.89	17.18	21.04	39.47	2975
DM 5953RSF	46	114	139	69	10	1.00	1.10	1.00	257	1.05	15.94	21.91	38.71	3316
NS 5258 R	48	114	145	68	9	1.00	1.05	1.00	267	0.79	15.13	21.61	38.93	3298
RA4918 R	48	115	139	66	10	1.19	1.19	1.00	278	1.24	15.05	21.74	37.41	3384
DM 5351RSF	47	116	139	75	11	1.00	1.48	1.00	278	0.99	16.52	22.00	36.66	3485
SSS 5449 (tuc)	58	116	139	75	12	1.00	1.33	1.00	267	0.53	14.50	21.76	38.63	3058
Y540	60	115	143	68	11	1.00	1.24	1.00	252	1.38	14.58	21.87	38.16	3556
RA565 R	61	125	145	77	13	1.00	1.10	1.00	246	1.97	15.91	20.92	38.39	3743
LS 6851 R	60	130	149	68	13	1.24	1.29	1.00	293	1.09	14.88	21.97	38.72	3651
SSS 5052 (tuc)	61	128	148	81	14	1.00	1.05	1.00	294	0.97	14.84	21.00	38.37	3137
P57T19 R	63	129	151	82	16	1.19	1.38	1.00	295	0.69	16.92	21.82	39.29	3308
PAN 1555 R	62	132	151	87	16	1.05	1.43	1.00	301	0.64	17.67	20.92	39.36	3436
PAN 1521 R	64	129	148	80	15	1.24	1.05	1.00	224	0.83	16.63	20.99	37.81	3479
DM 5302RSF	60	120	142	70	12	1.00	1.00	1.00	298	1.22	15.97	20.42	40.92	3493
RA5921 R	62	131	152	70	10	1.00	1.14	1.00	229	0.79	14.79	22.83	35.13	3531
PAN 1588 R	64	132	151	83	14	1.00	1.10	1.00	223	0.38	13.96	20.83	39.10	3207
NS 5909 R	63	131	147	82	16	1.00	1.33	1.00	254	0.78	14.58	21.79	38.20	3382
RA660 R	63	125	147	73	14	1.05	1.10	1.00	284	1.49	14.87	21.67	38.34	3625
DM59R03	62	130	153	90	15	1.24	1.38	1.00	279	0.81	16.31	20.77	39.44	3610
LS 6164 R	63	134	153	87	14	1.14	1.24	1.00	280	1.97	15.91	21.29	38.18	3297
LS 6860 R	65	133	152	86	16	1.05	1.38	1.00	207	1.82	16.89	21.17	36.36	3017
P62T16 R	64	136	158	86	15	1.00	1.52	1.00	247	1.20	16.47	22.25	37.53	3402
Y627	64	136	154	80	13	1.00	1.33	1.00	278	0.70	15.46	20.63	37.58	3475
PAN 1692 R	67	133	153	77	14	1.00	1.14	1.00	254	0.70	18.16	20.79	39.36	3395
P64T39 R	68	135	156	89	15	1.05	1.14	1.00	278	0.60	15.53	20.24	39.22	3612
NS 6448 R	65	132	153	76	14	1.00	1.29	1.00	303	0.86	15.95	21.43	38.55	3509
RA6520 RS	65	135	158	83	15	1.14	1.71	1.00	269	1.21	16.04	21.48	36.45	3406
Y657	65	133	150	86	15	1.05	1.10	1.00	266	0.59	14.33	20.28	39.35	3871
DM68R09	66	136	155	81	14	1.14	1.33	1.00	293	1.29	15.43	20.58	39.52	3579
PAN 1644 R	65	133	153	84	15	1.00	1.24	1.00	280	0.77	14.84	20.72	38.19	3805
DM 6,8i RR	65	135	156	98	18	1.29	1.52	1.00	270	1.86	16.27	19.93	37.16	3879
P71T74 R	66	138	158	93	16	1.05	1.86	1.00	256	1.13	16.08	19.45	38.94	3657
Gem	61	128	149	79	14	1.07	1.29	1.00	266	1.04	15.74	21.19	38.36	3456

Tabel 27: Saamgevatte inligting van al die lokaliteite in die warmer produksiegebiede, 2021/22
Table 27: Summerised information for all the localities in the warmer production areas, 2021/22

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	Olie persen-tasie/Oil percentage	Ru-proteïen-persentasie/ Crude protein percentage	Opbrengs/ Yield
PAN 1479 R	40	125	140	66	8	1.08	2.25	1.00	228	2.39	18.24	21.65	39.75	2659
DM 5953RSF	39	125	140	76	10	1.42	1.50	1.00	274	3.21	16.91	22.81	38.79	2968
NS 5258 R	40	125	141	75	9	1.33	1.25	1.00	294	2.95	16.73	22.36	39.31	3197
RA4918 R	40	125	144	75	12	1.42	1.17	1.00	300	1.89	17.11	22.40	39.19	3468
DM 5351RSF	41	125	144	79	10	1.33	3.42	1.00	328	2.37	17.99	22.75	37.16	3255
SSS 5449 (tuc)	50	129	143	89	13	1.08	1.75	1.00	323	1.04	15.53	22.75	38.43	2924
Y540	49	134	146	86	14	1.33	1.42	1.00	276	1.39	16.64	22.90	38.45	3280
RA565 R	53	136	150	87	13	1.17	1.42	1.00	314	2.40	18.47	22.28	39.20	3299
LS 6851 R	48	143	149	71	8	1.00	2.50	1.00	348	2.51	16.23	22.72	40.00	3343
SSS 5052 (tuc)	64	138	150	93	16	1.00	2.42	1.00	319	2.15	16.73	21.73	38.71	3194
P57T19 R	60	138	150	97	17	1.33	2.33	1.00	326	2.42	17.89	22.01	40.85	3136
PAN 1555 R	59	140	149	103	21	1.00	1.92	1.00	277	1.42	18.63	21.57	39.85	3341
PAN 1521 R	59	137	150	94	17	1.00	1.17	1.00	272	1.33	17.86	21.57	38.79	3437
DM 5302RSF	49	132	142	82	11	1.33	1.42	1.00	323	2.55	17.71	21.08	40.45	3152
RA5921 R	56	140	150	86	14	1.00	1.50	1.00	300	0.98	17.09	23.92	35.13	3336
PAN 1588 R	61	139	152	100	16	1.00	1.42	1.00	283	1.03	17.45	21.46	40.35	3307
NS 5909 R	61	139	150	96	17	1.17	1.83	1.00	308	1.87	17.28	22.49	38.30	3466
RA660 R	56	137	150	89	16	1.00	1.50	1.00	336	0.58	17.34	22.54	39.28	3600
DM59R03	55	141	152	105	19	1.33	2.58	1.00	296	1.22	17.84	21.48	39.35	3374
LS 6164 R	56	143	156	109	21	1.33	2.50	1.00	292	1.46	17.62	21.71	38.78	3102
LS 6860 R	66	146	153	111	20	1.00	1.58	1.00	286	1.49	19.83	21.49	38.68	3294
P62T16 R	57	147	153	100	17	1.17	2.33	1.00	255	1.93	17.74	22.86	38.15	3545
Y627	61	143	155	102	19	1.33	1.67	1.00	312	1.68	17.01	21.02	38.43	3556
PAN 1692 R	63	141	151	91	16	1.00	1.33	1.00	236	3.33	18.79	21.00	40.91	3156
P64T39 R	58	144	157	105	19	1.33	2.33	1.00	307	1.91	17.04	21.04	39.99	3768
NS 6448 R	56	142	153	84	13	1.00	1.17	1.00	307	1.20	17.88	22.01	39.74	3585
RA6520 RS	61	147	158	103	19	1.67	2.75	1.00	322	2.00	18.60	21.22	39.42	3294
Y657	63	144	152	111	23	1.00	1.17	1.00	317	1.26	16.48	21.19	40.38	3698
DM68R09	64	144	159	101	18	1.92	2.08	1.00	288	1.86	17.41	21.55	39.65	3475
PAN 1644 R	54	147	153	108	21	1.00	1.92	1.00	301	1.43	17.99	21.23	40.95	3680
DM 6,8i RR	59	147	158	115	21	1.25	2.58	1.00	328	2.49	18.78	20.76	39.28	3261
P71T74 R	64	149	159	116	24	1.50	2.33	1.00	319	1.71	18.26	19.87	40.16	3695
Gem	55	138	150	94	16	1.21	1.89	1.00	300	1.86	17.60	21.86	39.24	3339

GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS

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%