

South African Wheat Crop



Quality Report
2019/2020 Season



Compiled and issued by:
The Southern African Grain Laboratory NPC



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South African

COMMERCIAL WHEAT QUALITY FOR THE 2019/2020 SEASON



Acknowledgements

With gratitude to:

- The Winter Cereal Trust for its financial support in conducting this survey.
- Agbiz Grain and its members for their cooperation in providing the samples to make this 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 wheat and wheat products.

Summary

The 2019/20 season's commercial wheat crop was set at 1 535 000 tons, which is 333 000 tons (17.8%) lower than the previous season's crop. A total area of 540 000 hectares was utilised for wheat production and the average yield was 2.84 tons per hectare (Figures obtained from the CEC).

The whole wheat protein average of 12.9% increased by 0.8% compared to the previous season. The percentage samples from this crop survey with a protein content equal or higher than 12.5% (minimum protein content for Super Grade) was 64.2%. The average hectoliter mass of 78.9 kg/hl was lower than the 81.3 kg/hl of the 2018/19 season and also the lowest since the 2010/11 season, when the use of an instrument that complies to ISO standard 7971-3 (e.g. Kern 222) became compulsory. The ten-year national average is 80.5 kg/hl. 16.5% of the samples reported values below the minimum requirement of 76 kg/hl for Super Grade, Grade 1 and Grade 2.

The average falling number this season was 353 seconds. 32 of the samples analysed gave falling number values below 250 seconds and of these 28 were below 220 seconds. The previous season these figures were five and one respectively. The average mixogram peak time of 3.0 minutes was slightly longer than the 2.8 minutes of the previous season. The ten-year average is 2.9 minutes.

Introduction

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

During the harvesting season (October to December for the southern production regions and November to January for the northern production regions), a representative sample of each delivery of wheat was taken according to the prescribed wheat regulation by the commercial grain storage companies.

A sub-sample of each of these grading samples was collected in a container according to class and grade per silo bin/bag/bunker at each depot. This composite sample was then divided and a 3 kg sample was forwarded to SAGL for the annual wheat crop quality survey. SAGL analysed 333 samples to provide as best possible a proportional representation of the production of wheat in all the different production regions.

The samples were graded, visual cultivar identification performed and the thousand kernel mass determined. Sub-samples were milled on a Quadromat Junior mill for mixograph analyses. Composite samples per class and grade for each production region were milled on a Bühler MLU 202 laboratory mill. Moisture, protein, ash and colour determinations were done and RVA analyses conducted. Rheological analyses, namely gluten, mixogram, farinogram, alveogram, extensogram and 100-gram baking tests, were then performed. Multi-mycotoxin analyses were performed on 40 samples randomly selected to represent the different production regions. The amino acid profiles of a selection of samples were also determined.

The results (as averages per region) are made available weekly on the SAGL website (www.sagl.co.za) soon after the first samples are received. The report, in an easy to page format, is available on the website. Hard copy reports are also distributed to all Directly Affected Groups and interested parties.

In addition to the quality information compared over a number of seasons, production figures (obtained from the CEC) relating to hectares planted, tons produced and yields obtained on a national as well as provincial basis, over a ten season period, are provided in this report. Sales figures of seed sold by the commercial grain storage companies were requested to calculate national total quantities per cultivar.

SAGIS supply and demand figures over several seasons are presented in table and graph format. Information with regards to the processing of wheat per province, the manufacture, import and export of wheat products as well as the manufacture of pan baked products nationally and also per bakery group, is incorporated into the report.

Data on wheat imported for domestic use during the 2018/19 (previous) season is included and compared to the quality of the local crop over the corresponding period.

The national bread wheat grading regulations as published in the Government Gazette of 29 November 2019 are provided as the last section of the report.

The goal of this crop quality survey is to accumulate quality data on the commercial wheat crop on a national level. This valuable data reveals general tendencies and highlights quality differences in the commercial wheat produced in different local production regions. A detailed database containing reliable analytical data collected over several seasons is essential to enable industry to comment on proposed legislative levels and to supply reliable data for targeted research projects.

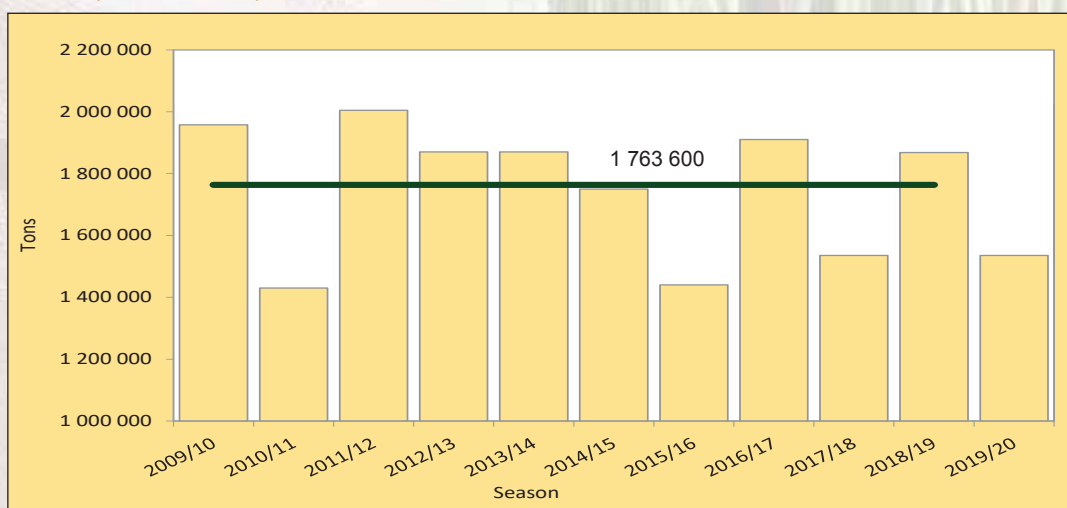
Production

Wheat contributed 77% to the total winter cereal crop production in South Africa this season. Other winter crops produced are malting barley, canola and cereal oats.

South Africa (comprising nine provinces) is divided into 36 crop production regions with wheat planted in approximately 28 of these regions. Please see Figure 1 (RSA Provincial map) and Figure 2 (RSA Crop Production Regional map) on pages 32 and 33.

The national CEC's estimated total production figures were revised, using as basis for the calculations, SAGIS' published figures of actual deliveries. Figures to determine on-farm usage and retentions obtained from a wheat utilisation survey conducted by DALRRD, were added to the SAGIS delivery figures to calculate the final crop production figures.

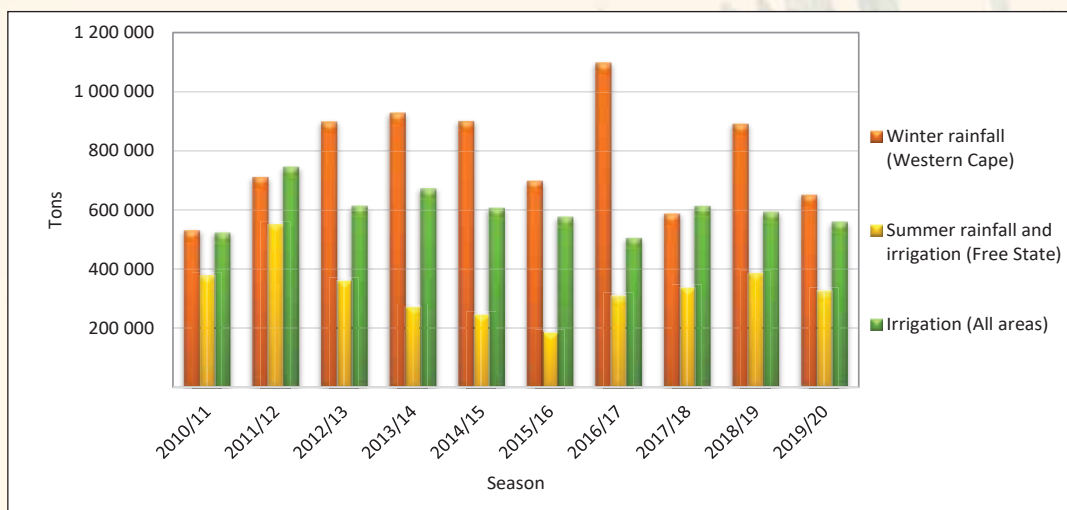
Graph 1: Wheat production in the RSA from the 2009/10 to 2019/20 seasons



Figures provided by the CEC.

The final production figure of 1 535 000 tons is 13% lower than the ten-year production average of 1 763 600 tons (2009/10 to 2018/19 seasons). The Western Cape produced 650 000 tons of wheat this season, contributing 42.3% of the total crop, compared to the 47.7% of the previous season. The Free State's wheat production (326 000 tons) declined by 15% year on year, but was still the second highest provincial production figure. The irrigation areas of the Northern Cape, the third largest wheat producing area this season, produced 262 500 tons, 32 000 tons (11%) less than last season. The remainder of the wheat was produced mainly in Limpopo with 120 000 tons, representing a decrease of 6% compared to the 2018/19 season and North West, where production decreased by 7% to 79 000 tons. Please see Graphs 1 and 2.

Graph 2: Wheat production figures per production area over ten seasons



Figures provided by the CEC.

The area utilised for wheat production increased by 7.3% to 540 000 hectares from 503 350 hectares in the previous season. Hectares cultivated under wheat in the Western Cape increased by 2.2%, while a 28% increase was observed in the Free State. Nationally, dry land area increased by 7.9% year on year and irrigation area showed an increase of 5.4%. Please see Graph 3.

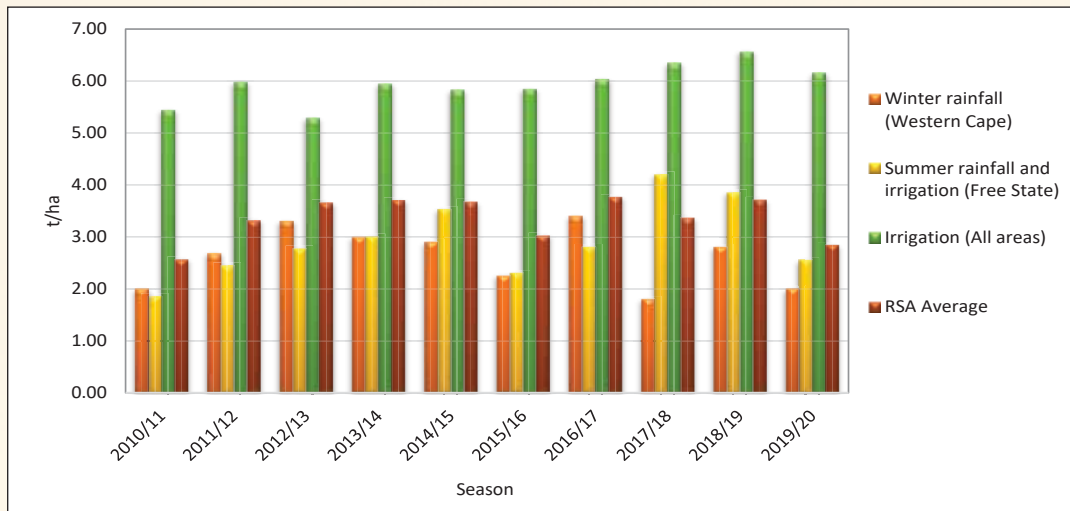
Graph 3: Area planted per production area over ten seasons



Figures provided by the CEC.

The yield in the main production areas ranged from 2.00 tons per hectare (t/ha) in the winter rainfall area of the Western Cape to 7.00 t/ha for irrigation wheat produced in the Northern Cape. The Free State (summer rainfall and irrigation areas) averaged 2.55 t/ha. The national yield average decreased from 3.71 t/ha in the previous season to 2.84 t/ha this season. Please see Graph 4 as well as Table 1 on the next page.

Graph 4: Average yield per production area over ten seasons



Figures provided by the CEC.

Table 1 provides an overview of the dry land versus irrigation wheat production over the last two seasons.

Table 1: Wheat production overview over two seasons

Province	Type of production	2019/20			2018/19		
		Hectares planted, ha	Production, tons	Yield, t/ha	Hectares planted, ha	Production, tons	Yield, t/ha
Western Cape	Dryland	317 000	618 800	1.95	315 700	880 600	2.79
	Irrigation	8 000	31 200	3.90	2 300	9 900	4.30
	Total	325 000	650 000	2.00	318 000	890 500	2.80
Northern Cape	Dryland	-	-	-	150	90	0.60
	Irrigation	37 500	262 500	7.00	37 850	294 410	7.78
	Total	37 500	262 500	7.00	38 000	294 500	7.75
Free State	Dryland	84 500	97 500	1.15	58 000	124 500	2.15
	Irrigation	43 500	228 500	5.25	42 000	260 500	6.20
	Total	128 000	326 000	2.55	100 000	385 000	3.85
Eastern Cape	Dryland	190	255	1.34	400	1 000	2.50
	Irrigation	2 910	17 895	6.15	1 250	9 730	7.78
	Total	3 100	18 150	5.85	1 650	10 730	6.50
KwaZulu-Natal	Dryland	-	-	-	-	-	-
	Irrigation	7 500	45 750	6.10	7 000	43 400	6.20
	Total	7 500	45 750	6.10	7 000	43 400	6.20
Mpumalanga	Dryland	-	-	-	-	-	-
	Irrigation	4 000	25 200	6.30	3 500	22 740	6.50
	Total	4 000	25 200	6.30	3 500	22 740	6.50
Limpopo	Dryland	3 200	10 000	3.13	1 000	2 500	2.50
	Irrigation	16 800	110 000	6.55	19 000	125 500	6.61
	Total	20 000	120 000	6.00	20 000	128 000	6.40
Gauteng	Dryland	90	270	3.00	-	-	-
	Irrigation	1 310	8 130	6.21	1 200	7 800	6.50
	Total	1 400	8 400	6.00	1 200	7 800	6.50
North West	Dryland	-	-	-	-	-	-
	Irrigation	13 500	79 000	5.85	14 000	85 330	6.10
	Total	13 500	79 000	5.85	14 000	85 330	6.10
RSA	Dryland	404 980	726 825	1.79	375 250	1 008 690	2.69
	Irrigation	135 020	808 175	5.99	128 100	859 310	6.71
	Total	540 000	1 535 000	2.84	503 350	1 868 000	3.71

Figures provided by the CEC.

Supply and Demand

World wheat production for the 2019/20 season is estimated at 764.83 million metric tons according to the *World Agricultural Supply and Demand Estimates (WASDE) report 602 of 10 July 2020*, world production for 2020/21 is projected to be 773.43 million metric tons.

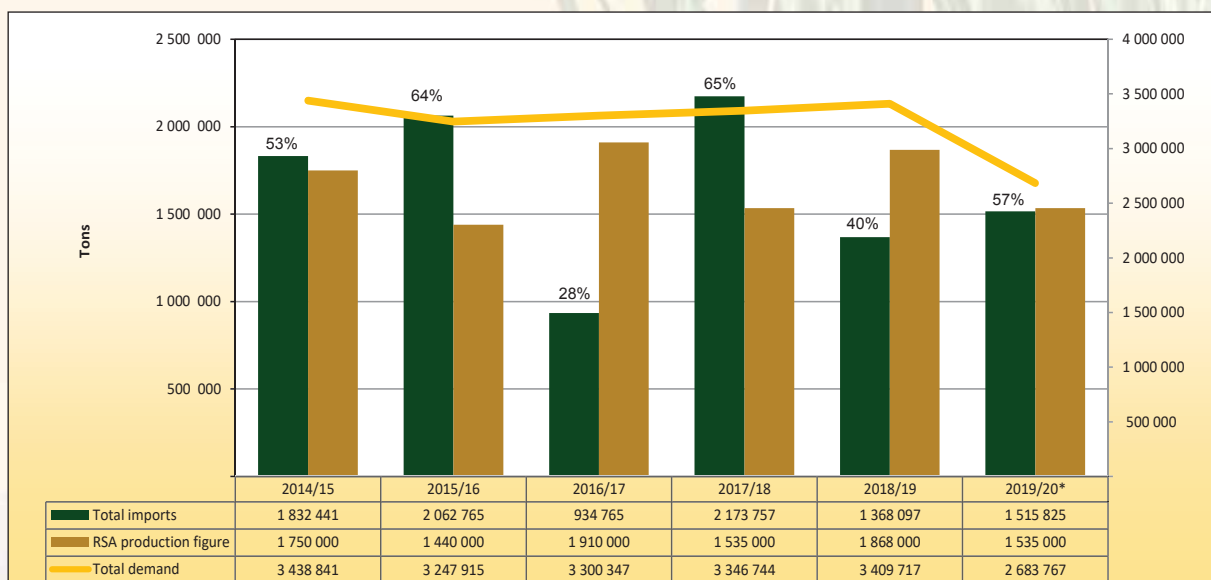
South Africa is a net importer of wheat and relies on imports to supply local demand. Wheat processing demand (human, animal and gristing) in 2018/19 was the highest of the past 21 seasons (3 254 656 tons). Nine months into the 2019/20 season, this figure stands at 2 559 663 tons, 79% of the previous season's figure.

During the 2018/19 season, 1 368 097 tons of wheat were imported. This figure is 37% lower than the amount of wheat imported during 2017/18. The ten-year import average is 1 760 728 tons. 55% of the wheat imported during the 2018/19 season for local use, originated in the Russian Federation (29%) and Germany (26%). Please see pages 88 to 107 for the quality of the wheat imported during 2018/19. 129 189 tons of local wheat were exported to countries such as Botswana, Zimbabwe and Zambia during the corresponding period.

The amount of wheat imported for local consumption during the current marketing season (up to 17 July 2020), amounts to 1 545 999 tons according to SAGIS. The majority of this wheat originated in Poland (28%), the Russian Federation (19%), Germany (18%) and Lithuania (13%).

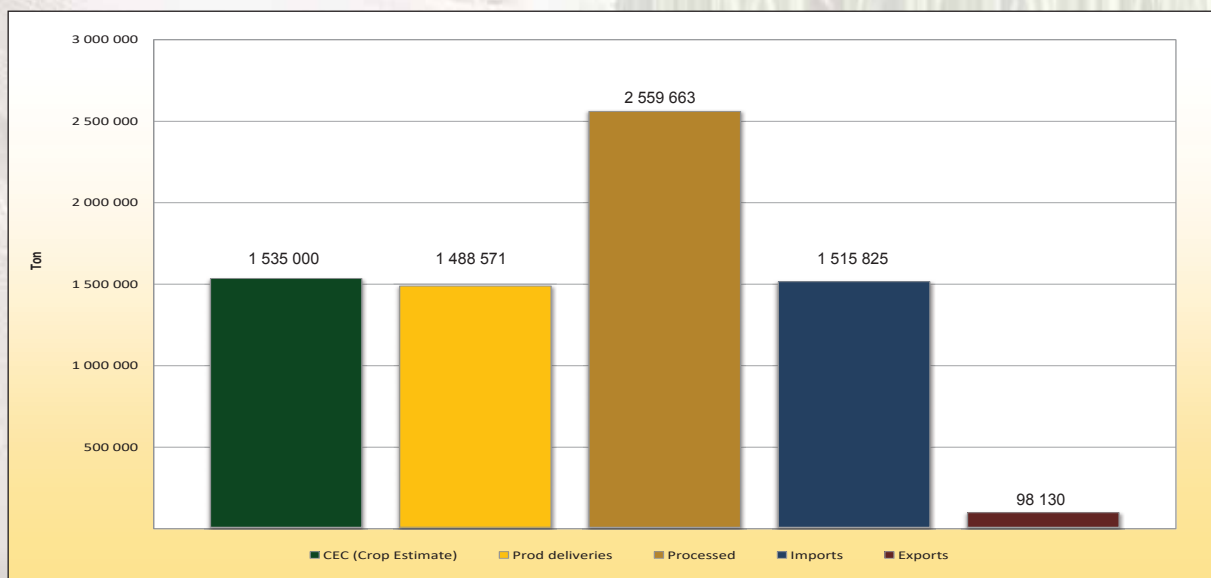
The South African wheat marketing season commences on the 1st of October every year.

Graph 5: Wheat import figures as a percentage of the total demand over six seasons



*2019/20 season figure includes imports and total demand from October to June.

Graph 6: Wheat supply and demand overview 2019/20 season (Oct ~ June)



Figures provided by SAGIS, (Publication date: 2020-07-29)

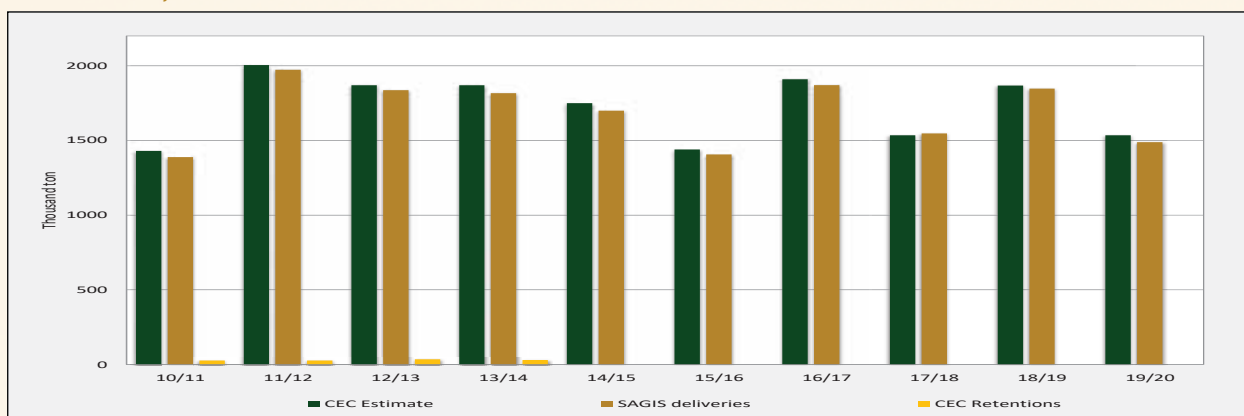
WHEAT: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO

Publication date: 2020-07-29

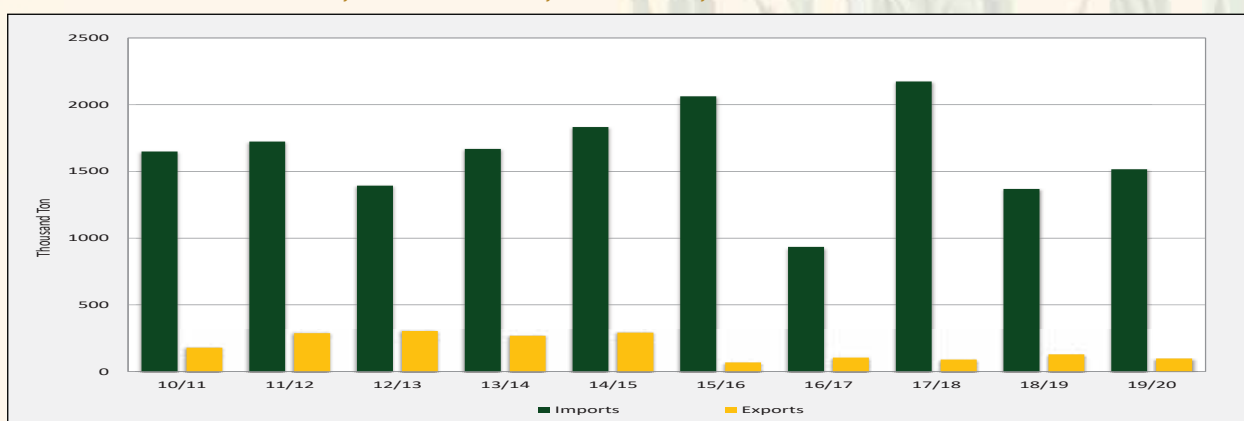
	Season (Oct - Sep)																Current Season Oct - Jun	10 YEAR AVERAGE 2009/10-2018/19
	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	
CEC (Crop Estimate)	1 540 000	1 680 000	1 905 000	2 105 000	1 905 000	2 130 000	1 958 000	1 430 000	2 005 000	1 870 000	1 870 000	1 750 000	1 440 000	1 910 000	1 535 000	1 868 000	1 535 000	1 917 100
CEC (Retention)	40 000	38 000	50 000	40 000	42 000	43 000	29 000	27 000	26 500	35 000	30 000	0	0	0	0	0	0	14 750
SUPPLY																		
Opening stock (1 Oct)	897 000	598 000	574 000	582 000	376 000	509 000	694 000	579 000	478 000	651 180	489 253	488 526	596 823	827 232	341 424	721 534	539 079	640 605
Prod deliveries	1 512 000	1 670 000	1 893 000	2 045 000	1 876 000	2 130 000	1 910 000	1 389 000	1 973 000	1 837 137	1 816 981	1 699 546	1 406 752	1 870 525	1 547 486	1 847 171	1 488 571	1 878 617
Imports	1 042 000	1 227 000	1 055 000	777 000	1 396 000	1 192 000	1 285 000	1 649 000	1 724 000	1 393 215	1 668 412	1 832 441	2 062 765	934 765	2 173 757	1 368 097	1 515 825	1 760 728
Surplus	6 000	6 000	9 000	32 000	0	13 000	0	23 000	14 000	0	0	15 151	8 807	9 249	5 611	11 994	6 299	9 411
Total supply	3 457 000	3 501 000	3 531 000	3 436 000	3 648 000	3 844 000	3 889 000	3 640 000	4 189 000	3 881 532	3 974 646	4 035 664	4 075 147	3 641 771	4 068 278	3 948 796	3 549 774	4 289 361
DEMAND																		
Processed	2 653 000	2 736 000	2 793 000	2 820 000	2 845 000	2 857 000	3 017 000	2 945 000	3 202 000	3 040 086	3 175 834	3 112 718	3 144 414	3 163 196	3 229 861	3 254 656	2 559 663	3 384 443
-human	2 652 000	2 734 000	2 781 000	2 818 000	2 844 000	2 849 000	2 991 000	2 944 000	3 086 000	3 008 378	3 122 134	3 109 022	3 142 077	3 160 660	3 226 649	3 251 410	2 537 320	3 355 865
-animal	1 000	2 000	12 000	2 000	1 000	8 000	26 000	1 000	136 000	31 694	53 695	3 696	2 337	2 536	3 212	3 246	22 343	28 576
-gristing	0	0	0	0	0	0	0	0	0	14	5	0	0	0	0	0	0	2
-bio-fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Withdrawn by producers	13 000	7 000	10 000	7 000	12 000	12 000	14 000	6 000	4 000	3 934	3 127	1 320	1 834	1 880	884	941	1 710	3 963
Released to end-consumers	2 000	2 000	4 000	4 000	2 000	5 000	3 000	6 000	7 000	7 322	3 095	2 802	1 907	1 256	1 990	2 186	1 498	3 806
Seed for planting purposes	21 000	18 000	26 000	17 000	22 000	26 000	17 000	13 000	18 000	15 998	18 198	22 705	18 800	24 067	18 237	19 222	16 493	20 172
Net receipts(-)/disp(+)	12 000	6 000	5 000	1 000	26 000	19 000	15 000	13 000	19 000	19 990	16 172	7 468	12 435	5 101	4 992	3 523	6 273	12 295
Deficit	0	0	0	0	9 000	0	4 000	0	0	713	1 243	0	0	0	0	0	0	596
Exports	158 000	158 000	111 000	211 000	223 000	231 000	240 000	179 000	288 000	304 236	268 451	291 828	68 525	104 847	90 780	129 189	98 130	206 299
Total Demand	2 859 000	2 927 000	2 949 000	3 060 000	3 139 000	3 150 000	3 310 000	3 162 000	3 538 000	3 392 279	3 486 120	3 438 841	3 247 915	3 300 347	3 346 744	3 409 717	2 683 767	3 631 573
Ending Stock (30 Sep)	598 000	574 000	582 000	376 000	509 000	694 000	579 000	478 000	651 000	489 253	488 526	596 823	827 232	341 424	721 534	539 079	866 007	657 788
- processed p/month	221 100	228 000	232 800	235 000	237 100	238 100	251 400	245 400	286 800	253 341	264 653	259 393	262 035	263 600	269 155	271 221	284 407	289 140
- months' stock	2.7	2.5	2.5	1.6	2.1	2.9	2.3	1.9	2.4	1.9	1.8	1.8	3.2	1.3	2.7	2.0	3.0	2

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

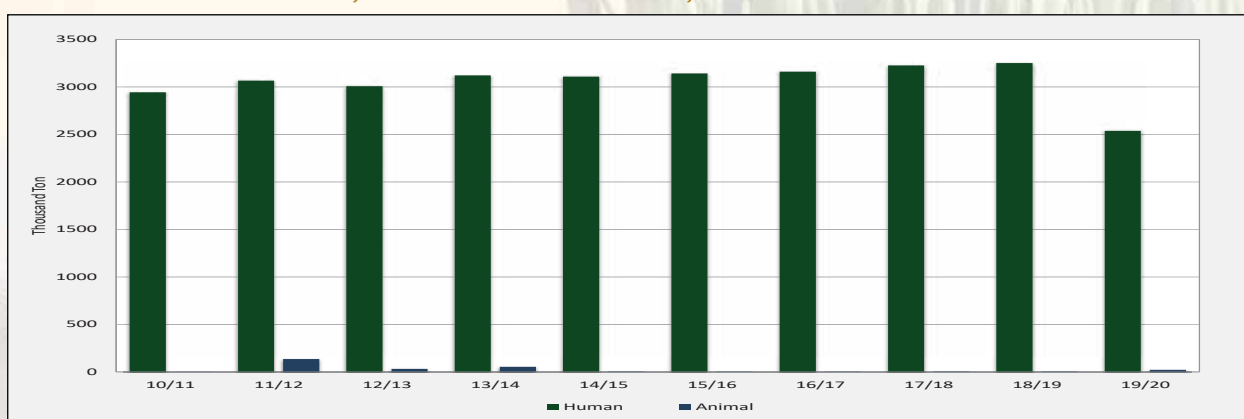
Graph 7: Wheat: CEC Estimate, Retentions and SAGIS deliveries over ten seasons



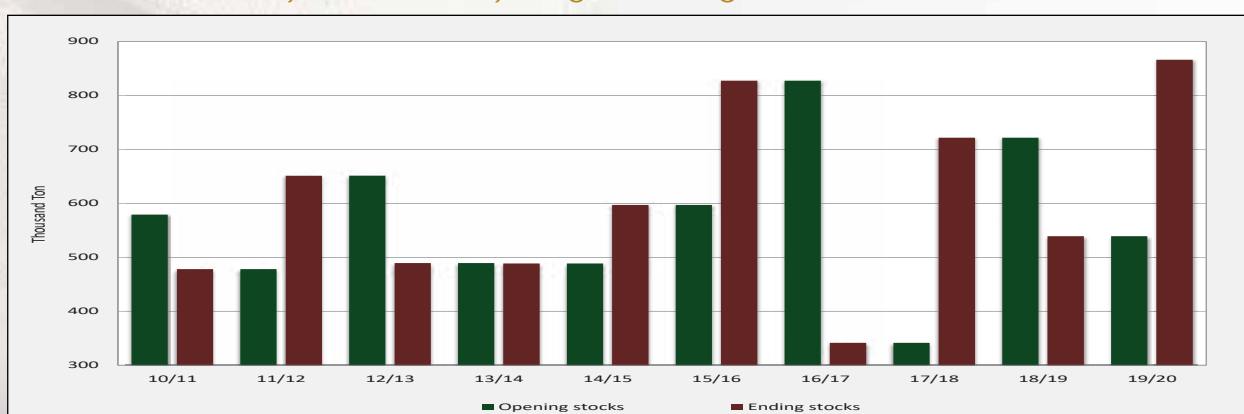
Graph 8: Wheat: Imports and exports over ten seasons



Graph 9: Wheat: RSA consumption over ten seasons



Graph 10: Wheat: Opening and ending stocks over ten seasons



Figures provided by SAGIS, 19/20 figures (Oct - Jun)

WHOLE WHEAT PROCESSED PER PROVINCE

PROGRESSIVE: October 2015 to September 2016 (2015/16 Full Marketing Year)

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	247 532	598 194	541 651	802	552 103	1 218 649	3 158 931

PROGRESSIVE: October 2016 to September 2017 (2016/17 Full Marketing Year)

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	242 358	594 069	602 895	120	575 048	1 160 655	3 175 145

PROGRESSIVE: October 2017 to September 2018 (2017/18 Full Marketing Year)

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	258 424	612 419	633 743	35	593 084	1 147 087	3 244 792

PROGRESSIVE: October 2018 to September 2019 (2018/19 Full Marketing Year)

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	267 196	608 601	671 189	50	613 125	1 115 427	3 275 588

PROGRESSIVE: October 2019 to September 2020 (2019/20 Marketing Year)

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	237 908	487 580	545 224	8 557	464 832	845 783	2 589 884

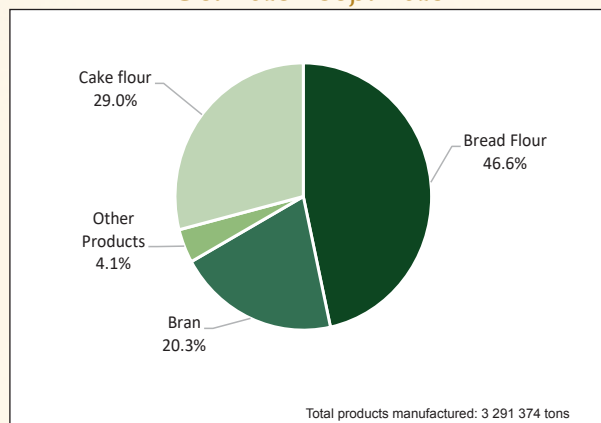
* Please note that included are the products destined for exports

Wheat Product Information

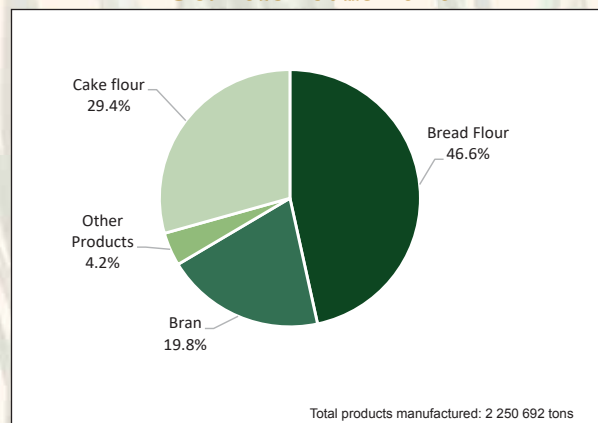
The Minister of Agriculture, Land Reform and Rural Development approved the proposed continuation and amendment of statutory measures, namely registration and the keeping of information and submitting monthly returns in respect of maize products and wheaten products manufactured, processed, imported and/or exported, to SAGIS, for a further period of four years, to lapse on 14 November 2022.

Please see graphs 11 to 16 below as well as the tables on pages 10 and 11 for wheat product and pan baked product figures received by SAGIS. Figures for pan baked products manufactured per bakery group, are provided on pages 12 and 13.

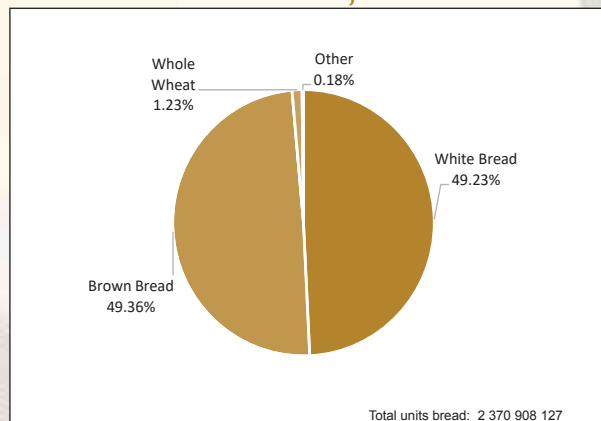
Graph 11: Wheat products manufactured from Oct 2018 - Sept 2019



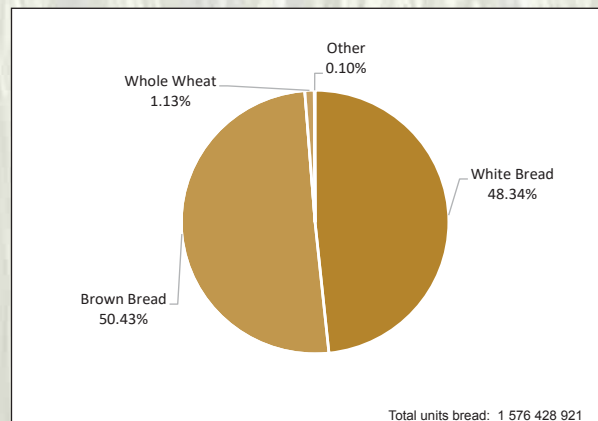
Graph 12: Wheat products manufactured from Oct 2019 - June 2020



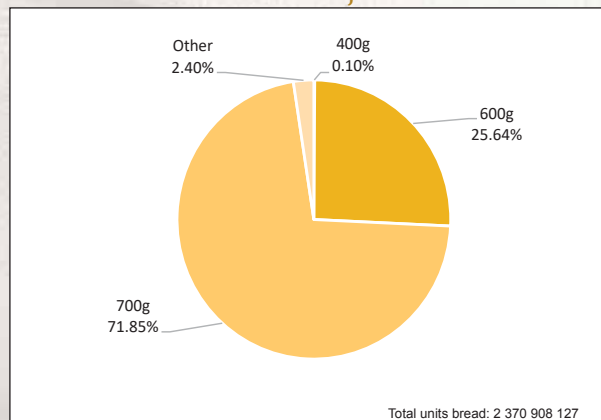
Graph 13: Pan baked bread per type from Oct 2018 - Sept 2019



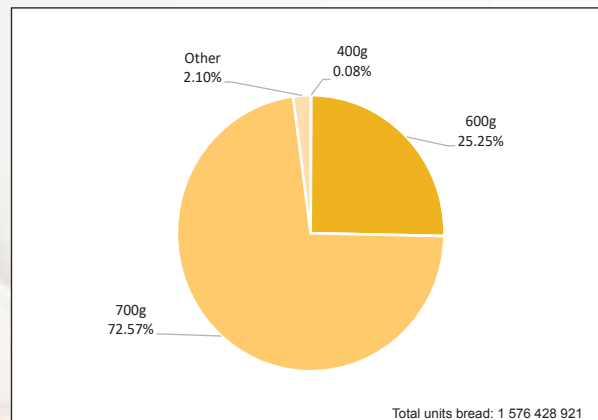
Graph 14: Pan baked bread per type from Oct 2019 - June 2020



Graph 15: Pan baked bread per mass Oct 2018 - Sept 2019



Graph 16: Pan baked bread per mass Oct 2019 - June 2020



WHEATEN PRODUCTS MANUFACTURED PER MARKETING YEAR					
	Marketing year: Oct 2015 - Sep 2016 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2016 - Sep 2017 Manufactured Tons Progressive: 12 Months	Marketing year:Oct 2017 - Sep 2018 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2018 - Sep 2019 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Manufactured Tons Progressive: 8 Months (Oct - May)
Cake Flour	821 935	859 666	884 754	953 185	662 245
Self-Raising Flour	16 210	17 845	17 169	19 464	12 599
White Bread Flour	1 114 696	1 086 256	1 139 270	1 131 181	768 274
Brown Bread Flour	402 431	427 996	408 574	396 131	261 816
Other Flour (Industrial)	141 380	143 889	121 959	108 941	78 298
Whole Wheat Meal	3 027	3 566	3 196	5 445	19 298
Bran	629 298	630 287	653 359	669 835	445 400
Semolina	16 334	18 782	18 675	7 192	2 762
Total	3 145 311	3 188 287	3 246 956	3 291 374	2 250 692
WHEATEN PRODUCTS IMPORTED PER MARKETING YEAR					
	Marketing year: Oct 2015 - Sep 2016 Imported Tons Progressive: 12 Months	Marketing year: Oct 2016 - Sep 2017 Imported Tons Progressive: 12 Months	Marketing year: Oct 2017 - Sep 2018 Imported Tons Progressive: 12 Months	Marketing year: Oct 2018 - Sep 2019 Imported Tons Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Imported Tons Progressive: 8 Months (Oct - May)
Cake Flour	40	0	4 998	5 934	3 684
Self-Raising Flour	0	0	30	50	24
White Bread Flour	840	0	9 740	11 436	8 233
Brown Bread Flour	40	0	8 589	8 353	5 063
Other Flour (Industrial)	0	0	0	0	0
Whole Wheat Meal	0	0	0	0	0
Bran	450	243	915	5 742	4 814
Semolina	0	0	0	0	0
Total	1 370	243	24 272	31 515	21 818
WHEATEN PRODUCTS EXPORTED PER MARKETING YEAR					
	Marketing year: Oct 2015 - Sep 2016 Exported Tons Progressive: 12 Months	Marketing year: Oct 2016 - Sep 2017 Exported Tons Progressive: 12 Months	Marketing year: Oct 2017 - Sep 2018 Exported Tons Progressive: 12 Months	Marketing year: Oct 2018 - Sep 2019 Exported Tons Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Exported Tons Progressive: 8 Months (Oct - May)
Cake Flour	2 125	1 714	2 396	5 667	2 866
Self-Raising Flour	0	29	35	248	733
White Bread Flour	7 274	1 966	8 662	4 271	3 572
Brown Bread Flour	1 853	3 796	19 130	5 404	12 556
Other Flour (Industrial)	1 976	86	115	61	49
Whole Wheat Meal	0	0	24	27	17
Bran	393	223	612	1 118	845
Semolina	0	0	0	8	11
Total	13 621	7 814	30 974	16 804	20 649

PAN BAKED PRODUCTS MANUFACTURED PER YEAR					
	Marketing year: Oct 2015 - Sep 2016 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2016 - Sep 2017 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2017 - Sep 2018 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2018 - Sep 2019 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Manufactured Units Progressive: 8 Months (Oct - May)
WHITE BREAD					
400g (Units)	2 536 957	2 772 734	1 828 673	1 580 130	848 437
600g (Units)	184 045 416	192 408 295	249 818 607	268 757 988	165 072 090
700g (Units)	830 681 443	839 930 529	854 936 392	883 820 063	588 629 148
Other (Units)	9 294 235	7 153 230	9 648 404	13 142 668	7 511 367
White Bread (Total Units)	1 026 558 051	1 042 264 788	1 116 232 076	1 167 300 849	762 061 042
BROWN BREAD					
400g (Units)	1 064 964	1 131 378	859 906	811 216	436 668
600g (Units)	213 511 631	235 801 836	302 612 906	338 257 246	232 442 556
700g (Units)	771 863 722	805 745 291	804 768 160	813 553 145	551 437 467
Other (Units)	20 137 121	16 638 015	17 726 350	17 669 489	10 668 830
Brown Bread (Total Units)	1 006 577 438	1 059 316 520	1 125 967 322	1 170 291 096	794 985 521
WHOLE WHEAT					
400g (Units)	27 137	16 565	14 648	13 968	10 689
600g (Units)	507 374	617 299	576 869	595 774	325 536
700g (Units)	8 707 512	7 397 611	6 032 062	6 023 626	3 838 349
Other (Units)	22 726 394	22 364 064	23 390 073	22 413 722	13 659 617
Whole Wheat (Total Units)	31 968 417	30 395 539	30 013 652	29 047 090	17 834 191
OTHER					
400g (Units)	61 892	56 236	62 396	38 205	15 067
600g (Units)	385 483	431 695	290 477	397 131	187 617
700g (Units)	487 173	399 645	136 163	112 121	82 672
Other (Units)	1 946 688	2 833 618	3 066 399	3 721 635	1 262 811
Other (Total Units)	2 881 236	3 721 194	3 555 435	4 269 092	1 548 167
Total	2 067 985 142	2 135 698 041	2 275 768 485	2 370 908 127	1 576 428 921

PAN BAKED PRODUCTS MANUFACTURED PER BAKERY GROUP PER MARKETING YEAR

SUPERMARKET GROUPS	Oct 2015 - Sept 2016	Oct 2016 - Sept 2017	Oct 2017 - Sept 2018	Oct 2018 - Sept 2019
WHITE BREAD				
400g (Units)	2 011 263	1 708 887	980 345	606 900
600g (Units)	60 157 529	67 867 486	105 739 976	114 444 552
700g (Units)	8 383 998	9 082 503	6 494 600	6 986 343
Other (Units)	1 123 384	739 982	1 478 805	1 299 940
White Bread (Total Units)	71 676 174	79 398 858	114 693 726	123 337 735
BROWN BREAD				
400g (Units)	797 794	567 628	507 773	292 319
600g (Units)	56 002 004	80 174 746	127 508 240	145 809 635
700g (Units)	7 645 208	7 007 442	5 442 190	5 445 780
Other (Units)	1 024 276	1 214 836	1 863 458	1 203 893
Brown Bread (Total Units)	65 469 282	88 964 652	135 321 661	152 751 627
WHOLE WHEAT				
400g (Units)	6 065	-	-	-
600g (Units)	454 351	540 024	500 022	495 269
700g (Units)	1 369 478	1 589 267	1 594 414	1 740 562
Other (Units)	-	-	-	4
Whole Wheat (Total Units)	1 829 894	2 129 291	2 094 436	2 235 835
OTHER				
400g (Units)	-	-	-	-
600g (Units)	-	-	-	-
700g (Units)	-	-	-	-
Other (Units)	1 665 871	2 622 203	2 889 186	2 130 828
Other (Total Units)	1 665 871	2 622 203	2 889 186	2 130 828
Total	140 641 221	173 115 004	254 999 009	280 456 025

Note: Supermarket chain stores who will submit one return for all processing units in the specific group.

BAKERY GROUPS	Oct 2015 - Sept 2016	Oct 2016 - Sept 2017	Oct 2017 - Sept 2018	Oct 2018 - Sept 2019
WHITE BREAD				
400g (Units)	-	-	-	165 688
600g (Units)	88 644 328	80 324 523	84 504 991	84 113 612
700g (Units)	792 037 806	795 030 558	811 564 534	820 062 468
Other (Units)	5 718 231	2 889 156	2 420 401	2 605 639
White Bread (Total Units)	886 400 365	878 244 237	898 489 926	906 947 407
BROWN BREAD				
400g (Units)				181 022
600g (Units)	123 959 197	112 110 830	109 838 873	104 643 715
700g (Units)	743 180 683	770 418 129	766 277 755	761 916 315
Other (Units)	16 341 886	12 412 987	12 702 186	12 770 639
Brown Bread (Total Units)	883 481 766	894 941 946	888 818 814	879 511 691
WHOLE WHEAT				
400g (Units)	-	-	-	-
600g (Units)	-	-	-	-
700g (Units)	7 038 456	5 425 364	4 086 745	3 937 854
Other (Units)	22 711 060	22 347 510	23 373 606	22 403 350
Whole Wheat (Total Units)	29 749 516	27 772 874	27 460 351	26 341 204
OTHER				
400g (Units)	-	-	-	-
600g (Units)	-	-	-	-
700g (Units)	-	-	-	-
Other (Units)	-	-	-	-
Other (Total Units)	0	0	0	0
Total	1 799 631 647	1 800 959 057	1 814 769 091	1 812 800 302

Note: Plant bakeries who will submit one return for all the processing units in the specific group.

PAN BAKED PRODUCTS MANUFACTURED PER BAKERY GROUP PER MARKETING YEAR

INDEPENDENT BAKERIES	Oct 2015 - Sept 2016	Oct 2016 - Sept 2017	Oct 2017 - Sept 2018	Oct 2018 - Sept 2019
WHITE BREAD				
400g (Units)	-	66 090	148 214	135 349
600g (Units)	3 113 968	8 543 599	26 082 469	34 042 890
700g (Units)	17 366 674	18 074 488	19 319 718	39 407 253
Other (Units)	119 134	421 944	2 546 092	6 396 891
White Bread (Total Units)	20 599 776	27 106 121	48 096 493	79 982 383
BROWN BREAD				
400g (Units)		724	1 808	26 445
600g (Units)	3 463 775	7 459 079	28 544 450	44 596 357
700g (Units)	9 731 886	10 695 586	17 383 098	34 054 069
Other (Units)	232 042	374 945	806 675	1 413 562
Brown Bread (Total Units)	13 427 703	18 530 334	46 736 031	80 090 433
WHOLE WHEAT				
400g (Units)	-	-	-	-
600g (Units)	1 019	1 440	1 235	1 937
700g (Units)	80 140	93 640	104 694	112 768
Other (Units)	8 400	7 248	5 640	5 134
Whole Wheat (Total Units)	89 559	102 328	111 569	119 839
OTHER				
400g (Units)	-	-	-	76 101
600g (Units)	-	-	-	-
700g (Units)	-	1 265	2 408	1 396 277
Other (Units)	-	-	-	-
Other (Total Units)	0	1 265	2 408	1 472 378
Total	34 117 038	45 740 048	94 946 501	161 665 033

Note: Privately owned independent bakeries not part of a group.

INDEPENDENT SUPERMARKETS	Oct 2015 - Sept 2016	Oct 2016 - Sept 2017	Oct 2017 - Sept 2018	Oct 2018 - Sept 2019
WHITE BREAD				
400g (Units)	525 694	997 757	730 464	672 193
600g (Units)	32 129 591	35 672 687	33 770 423	36 156 934
700g (Units)	12 892 965	17 742 980	19 162 517	17 363 999
Other (Units)	2 333 486	3 102 148	3 195 367	2 840 198
White Bread (Total Units)	47 881 736	57 515 572	56 858 771	57 033 324
BROWN BREAD				
400g (Units)	267 170	563 026	347 836	311 430
600g (Units)	30 086 655	36 057 181	37 103 999	43 207 539
700g (Units)	11 305 945	17 624 134	16 303 093	12 136 981
Other (Units)	2 538 917	2 635 247	2 353 988	2 281 395
Brown Bread (Total Units)	44 198 687	56 879 588	56 108 916	57 937 345
WHOLE WHEAT				
400g (Units)	21 072	16 565	14 460	13 968
600g (Units)	52 004	75 835	107 734	98 568
700g (Units)	219 438	289 340	268 201	232 442
Other (Units)	6 934	9 306	10 827	5 234
Whole Wheat (Total Units)	299 448	391 046	401 222	350 212
OTHER				
400g (Units)	61 892	56 236	68 805	38 205
600g (Units)	385 483	431 695	292 276	321 030
700g (Units)	487 173	398 380	133 755	112 121
Other (Units)	280 817	211 415	204 399	194 530
Other (Total Units)	1 215 365	1 097 726	699 235	665 886
Total	93 595 236	115 883 932	114 068 144	115 986 767

Note: Supermarket chain stores (which are individually owned under a franchise agreement) will submit an individual or combined return for each processing unit (e.g. Spar, OK, Seven Eleven, Cambridge foods, etc.)

Assuring the quality of South African wheat

South Africa has three major wheat-breeding programs. A new or introduction cultivar is only released for planting if it possesses improved agronomical as well as improved flour quality characteristics compared to the cultivars planted commercially in a specific area.

The classification of wheat cultivars is an attempt to provide the wheat industry with new cultivars that perform well agronomically and possess suitable milling, rheological and baking characteristics. Analytical procedures and classification norms are compiled in conjunction with wheat breeders, millers and bakers to ensure market-directed and quality-driven wheat production in the interest of wheat producers and processors. The availability of new and improved wheat varieties is important as a constant demand exists for higher yields, better quality, better processing properties and increased disease resistance.

Classification norms use cultivars as biological quality standards as a frame of reference against which new breeding lines are evaluated. Only cultivars that are successfully grown commercially and possess acceptable agronomical and quality characteristics may be considered as biological quality standards.

As the breeding and development of new wheat varieties with suitable quality characteristics is an expensive, long-term project, classification norms and quality standards are provided to breeders as guidelines that should stand the test of time. Changing the classification norms and establishing new quality standards are for this reason thoroughly investigated and carefully considered to ensure that the long-term goals of breeding programs are achieved. Recent amendments include reducing the number of years' data (from three to two) required for final release of irrigation cultivars as well as relaxed quality criteria with regards to certain quality parameters for high yielding lines.

The effect of climate, rainfall, environmental interaction, cultivation practices and other factors that influence wheat quality, makes the use of fixed criteria or norms for classification purposes impractical. For this reason, cultivars are used as biological quality standards, and acceptable deviations from the standard are established as classification norms. Producers continuously strive to improve the wheat yield and quality by selecting the best cultivars for commercial production in a specific area. High grading standards are set to ensure adequate quality control.

The evaluation of wheat breeder lines and the approval of a new cultivar for release are, since April 2018, performed by the Wheat Forum Cultivar and Technical Committee. A line approved for release, is registered as a cultivar in accordance with the Plant Breeders' Act, Act 15 of 1976, by the applicable breeder company (plant breeder's rights are a form of Intellectual Property rights).

The Wheat Forum requested that two documents, namely 'Analysis Procedure and Evaluation Norms for the Classification of Wheat Breeders' Lines for the RSA', as well as the Cultivar List be hosted on the website of the SAGL. SAGL was also appointed as responsible party for the maintenance of the aforementioned documents.

The cultivar list hosted on the SAGL website is named the Wheat Forum Cultivar List, to distinguish this list from any other lists in existence. The criteria for listing a cultivar on the Wheat Forum Cultivar List is the minuted approval of the cultivar by the Cultivar and Technical Committee of the Wheat Forum. Approval indicates that the cultivar has passed the evaluation process as described in the 'Analysis Procedure and Evaluation Norms for the Release of Bread Wheat Breeders' lines for the RSA' document.

Any addition or elimination of a cultivar to/from the Wheat Forum Cultivar List, shall be based on a resolution documented in Minutes of meetings of the Wheat Forum Cultivar and Technical Committee. The Wheat Forum Cultivar List shall be updated annually upon receipt of the Minutes of the Wheat Forum Cultivar and Technical Committee meeting. The May 2020 revision of both these documents are available on the SAGL website.

Since wheat is a self-pollinating crop, meaning that grain produced has the same genetic composition as the parent, seed can be harvested and replanted, which results in less seed being sold. In South Africa, approximately 70% of wheat is planted with farm saved seed. The investment in the development of new cultivars is as a result only covered by a small portion of the market. A lack of return on investment therefore prevent new seed companies and new cultivars from entering the market. This situation is however not unique to South Africa. In order to address this issue, various End Point Royalty systems were investigated and the outcome was a proposal to establish a statutory levy for breeding and technology, in addition to the industry statutory levy that has been implemented for many years.

After meetings and consultations with stakeholders and various experts, the South African Cultivar & Technology Agency NPC (SACTA) was established in June 2016. SACTA has been recommended by role-players in the different industries as the body to administer the breeding and technology levy and will make payments to the seed companies from funds collected by means of the levies. The payments will be according to actual performance, calculated each year based on the market share achieved. It is envisaged that this system will eventually be implemented for all self-pollinating crops.

Wheat grades

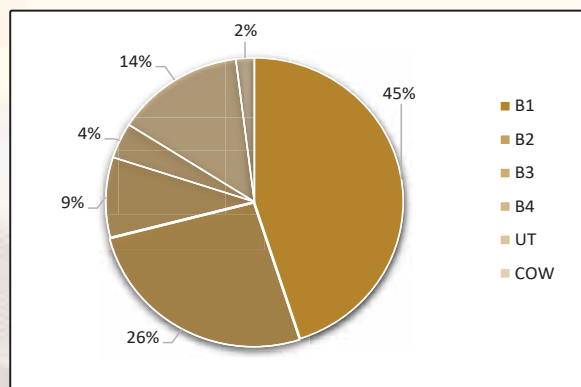
The latest bread wheat grading regulations were published in the Government Gazette No. 42862, dated 29 November 2019. The regulations are detailed in Government Notice NO. R. 1547 of 29 November 2019. According to these regulations the classes of wheat are Bread Wheat and Other Wheat. The grades for Bread Wheat are Super Grade, Grade 1, Grade 2 and Grade 3. No grades are determined for Class Other Wheat.

The previous version of the grading regulations, as detailed in Government Notice NO. R. 64 of 29 January 2016, made provision for five grades of Bread Wheat, namely Grade 1, Grade 2, Grade 3, Grade 4 and Utility Grade.

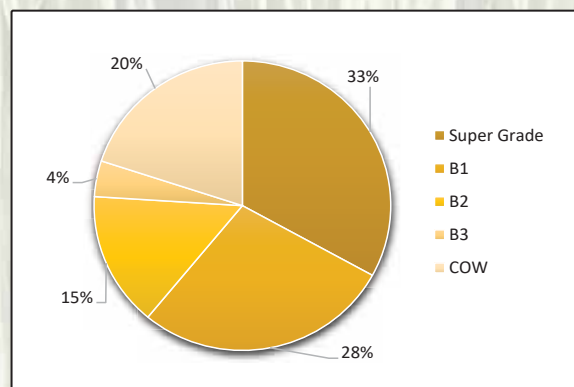
The 333 representative crop samples of the 2019/20 season were graded as follows: 40% was graded Super Grade, 17% was graded B1, 7% was graded B2, 4% was graded B3 and 32% Class Other Wheat (COW). The majority of the samples (59%) downgraded to COW was as a result of the percentage screenings exceeding the maximum allowable level (3%) for Super Grade to Grade 3. The percentages other grain and unthreshed ears and total damaged kernels (mainly sprouted kernels) in combination with the combined deviations also caused a number of downgrades, as did falling number and hectolitre mass. 42% of the downgraded samples originated from the Western Cape, 30% from the Free State and 28% from the irrigation areas.

39% of wheat samples originating in the Free State were graded Super Grade. 41% of the wheat samples from the irrigation areas and 38% of wheat samples from the Western Cape Province graded Super Grade.

Graph 17: Percentage of samples per class and grade in the 2018/19 season according to the previous grading regulations



Graph 18: Percentage of samples per class and grade in the 2018/19 season according to the current grading regulations



Graph 19: Percentage of samples per class and grade in the 2019/20 season

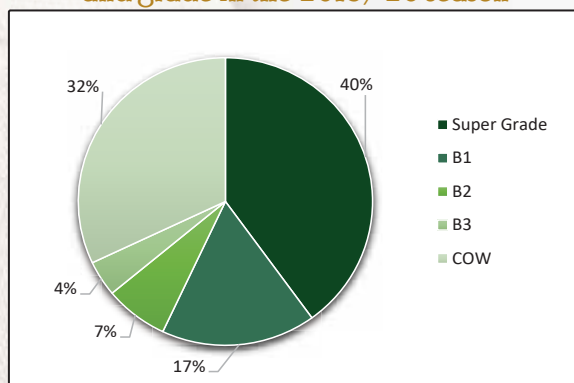


Table 2: Bread Wheat Grading Table ~ Government Notice No. R. 64 of 29 January 2016 (Previous)

Grade	Minimum			Maximum percentage permissible deviation (m/m)									
	Hectolitre mass, kg/hl	Falling number, seconds	Protein content, %	A	B	C	D	E	F	G	H	I	J
				Heavily frost damaged kernels	Field fungi	Storage fungi	Screenings	Other grain and unthreshed ears	Gravel, stones and turf	Foreign matter plus F	Heat damaged kernels	Damaged kernels plus H	Combined deviations (D+E+G+I)
Grade 1	77	220	12	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 2	76	220	11	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 3	74	220	10	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 4	72	200	9	5	2	0.5	4	1	0.5	1	0.5	2	5
Utility grade	70	150	8	10	2	0.5	10	4	0.5	3	0.5	5	10
Other Wheat	<70	<150	<8	>10	>2	>0.5	>10	>4	>0.5	>3	>0.5	>5	>10
Minimum size of working samples	1 kg	300 g clean	Apparatus instructions	25 g sifted	25 g sifted	100 g sifted	500 g unsifted	50 g sifted	100 g sifted	100 g sifted	100 g sifted	25 g sifted	-

Table 3: Bread Wheat Grading Table ~ Government Notice No. R. 1547 of 29 November 2019 (Current)

Grade	Minimum			Maximum percentage permissible deviation (m/m)									
	Hectolitre mass, kg/hl	Falling number, seconds	Protein content, %	A	B	C	D	E	F	G	H	I	J
				Heavily frost damaged kernels	Field fungi	Storage fungi	Screenings	Other grain and unthreshed ears	Gravel, stones and turf	Foreign matter plus F	Heat damaged kernels	Damaged kernels plus H	Deviations (D + E + G + I) collectively
Super Grade	76	220	12.5	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 1	76	220	11.5	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 2	76	220	10.5	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 3	74	220	9.5	5	2	0.5	3	1	0.5	1	0.5	2	5
Class Other Wheat	<74	<220	<9.5	>5	>2	>0.5	>3	>1	>0.5	>1	>0.5	>2	>5
Minimum size of working samples	1.5 kg unsifted	300 g cleaned	Apparatus instructions cleaned	25 g sifted	25 g sifted	100 g sifted	500 g unsifted	50 g sifted	100 g sifted	100 g sifted	100 g sifted	25 g sifted	-

Wheat seed sold by commercial grain storage companies to wheat producers for the 2019 planting season

<u>Cultivar</u>	<u>%</u>	<u>Cultivar</u>	<u>%</u>
SST 0166	25.79	Duzi	0.48
SST 0117	18.01	PAN 3368	0.47
SST 056	10.83	Koonap	0.42
SST 0147	7.16	SST 806	0.37
SST 0127	5.90	SST 8154	0.33
SST 087	5.67	SST 096	0.22
SST 015	4.70	SST 387	0.20
SST 88	3.58	SST 317	0.18
SST 8135	1.99	Elands	0.15
SST 843	1.47	PAN 3111	0.14
SST 835	1.27	SST 875	0.09
PAN 3471	1.26	Senqu	0.077
SST 884	1.25	SST 316	0.075
SST 356	1.12	Koedoes	0.063
PAN 3400	1.11	SST 398	0.056
PAN 3541	0.95	SST 3149	0.056
PAN 3497	0.87	Renoster	0.027
SST 347	0.87	Ratel	0.025
SST 895	0.76	Kariega	0.020
SST 374	0.74	SST 866	0.0080
Matlabas	0.68	PAN 3379	0.0008
PAN 3161	0.55	CRN 826	0.0003
			<hr/> 100 <hr/>

Most popular cultivars according to cultivar identification

Farmers in the Western Cape preferred SST 0117 (24.1%). SST 0166 (17.8%), SST 0127 (15.5%) and SST 087 (14.6%) were also popular cultivars.

In the Vaal and Orange River areas SST 8156 (22.3%), SST 8154 (16.5%), SST 8135 (14.9%) and PAN 3497 (13.0%) were the most popular cultivars.

The most preferred cultivars in North West province were SST 884 (21.6%), followed by SST 8135 (20.0%) and SST 843 (12.4%).

In regions 21 to 24 of the Free State the most planted cultivar was PAN 3368 (30.7%), followed by PAN 3111 (15.3%) and PAN 3161 (12.2%). PAN 3161 was the preferred cultivar in regions 25 to 28 and represented 18.0%. PAN 3368 (13.5%) and SST 8135 (12.6%) were also popular cultivars.

In the irrigation areas of Mpumalanga, Gauteng, Limpopo and KwaZulu-Natal, SST 8135 (36.8%) was the preferred cultivar, followed by SST 884 (17.3%), SST 8156 (11.8 %), SST 8154 (9.4%) and SST 895 (8.7%).

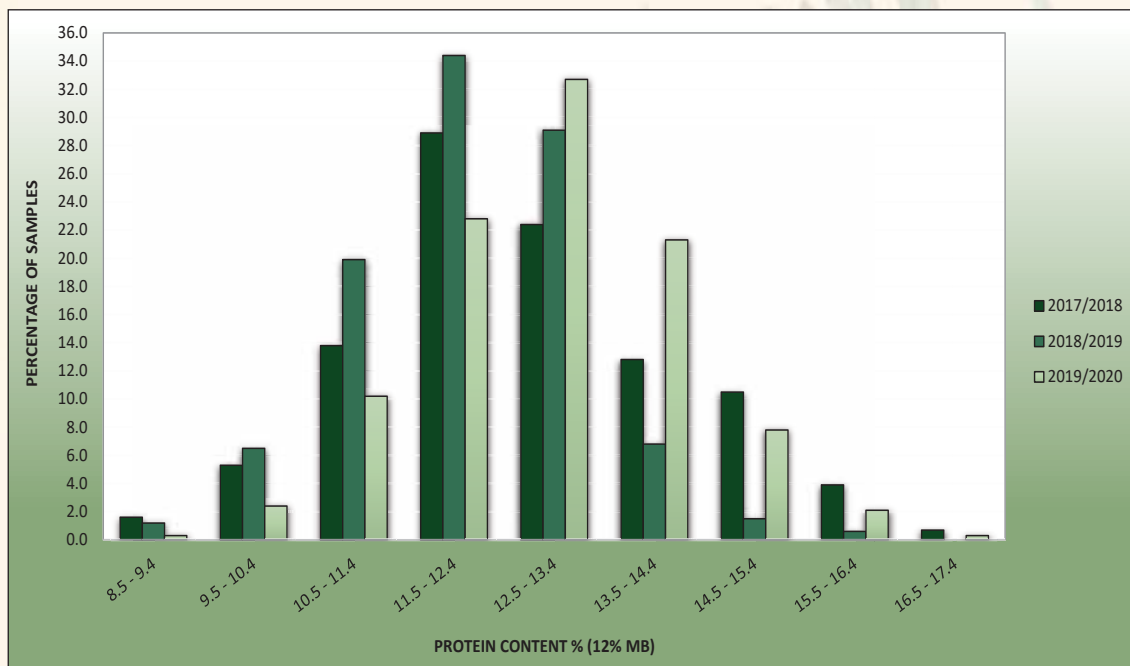
The above-mentioned percentages are weighted averages based on the top five cultivars per region provided on pages 38 to 64. The top five cultivars per region were calculated from the cultivar identification done on each of the 333 crop samples.

Crop quality of the 2019/20 season

All national, seasonal and regional averages provided in this report are weighted averages.

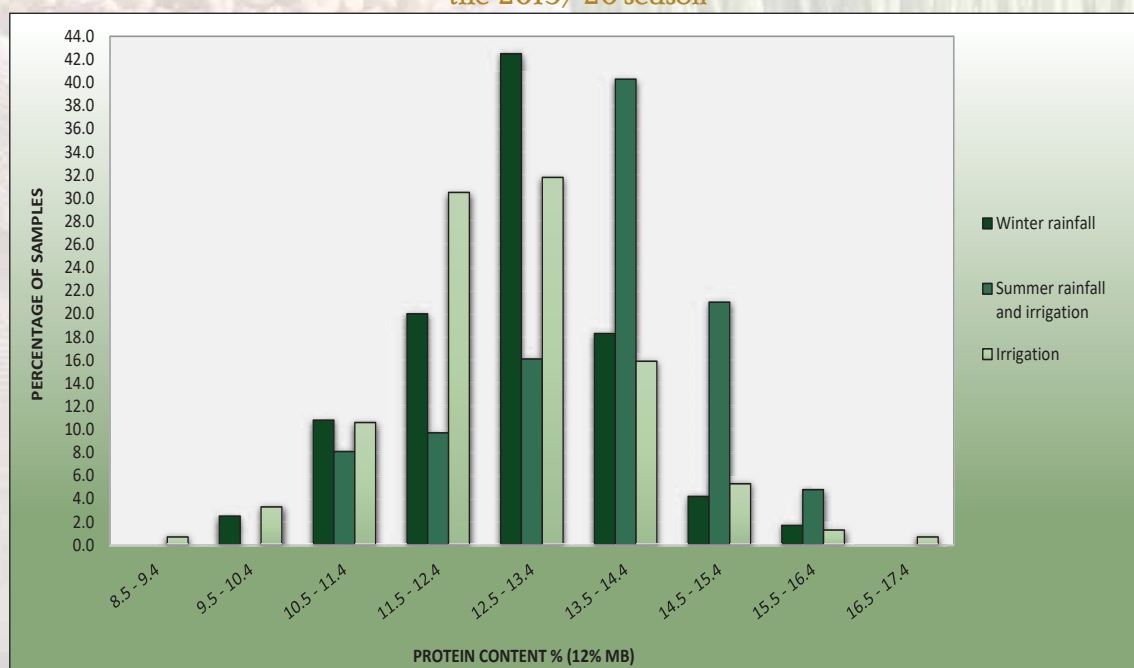
The national whole wheat protein average increased from 12.1% in the previous season to 12.9%. The ten-year national average is 12.1%. Protein content is generally a function of the growing environment (soil and climatic conditions) as well as fertiliser application. Please see Graphs 20 and 21 for the protein content distribution over the last three seasons and between the three major production areas.

Graph 20: Protein content distribution over the last three seasons



The Summer rainfall and Irrigation areas of the Free State reported the highest whole wheat protein average, namely 13.7%. The production regions in the Winter rainfall area of the Western Cape averaged 12.8% and the Irrigation areas 12.6%.

Graph 21: Protein content distribution between the three production areas during the 2019/20 season



Flour protein content is on average 0.5 to 1.2% lower than that of whole wheat and averaged 11.9% this season, one percent higher than the previous season. The protein loss can be attributed to the removal of the bran and aleuron layer as well as the germ during milling. The protein content is reported on a 12% moisture basis.

The average hectoliter mass of 78.9 kg/hl, the lowest average reported over the last ten seasons, decreased by 2.4 kg/hl compared to the previous season. The ten-year national average is 80.5 kg/hl. 55 samples (16.5%) reported values below the 76 kg/hl minimum level for Super grade, Grade 1 and Grade 2 wheat, of these 33 samples originated in the Western Cape (Winter rainfall area), nine in North West, 12 in the Free State and one in Gauteng. Regional averages ranged from 77.2 kg/hl in the Western Cape and 77.4 kg/hl in the Free State to 80.7 kg/hl in the Irrigation areas.

The 1000 kernel mass, reported on a 13% moisture basis, decreased from 39.2 g last season to 35.6 g this season. The 2017/18 season's average was 37.7 g. Averages over production areas varied from 32.4 g in the Free State to 34.0 g in the Winter rainfall areas and 38.2 g in the Irrigation areas. The weighted average percentage screenings obtained with a 1.8 mm slotted sieve was 1.92%, the highest of the past five seasons. The Winter rainfall areas reported the highest average percentage, namely 2.39% and the Irrigation areas the lowest of 1.36%. 62 (18.6%) of the 333 samples exceeded the 3% maximum permissible screenings level for Super grade to Grade 3. Most (59.7%) of these samples originated in the Western Cape.

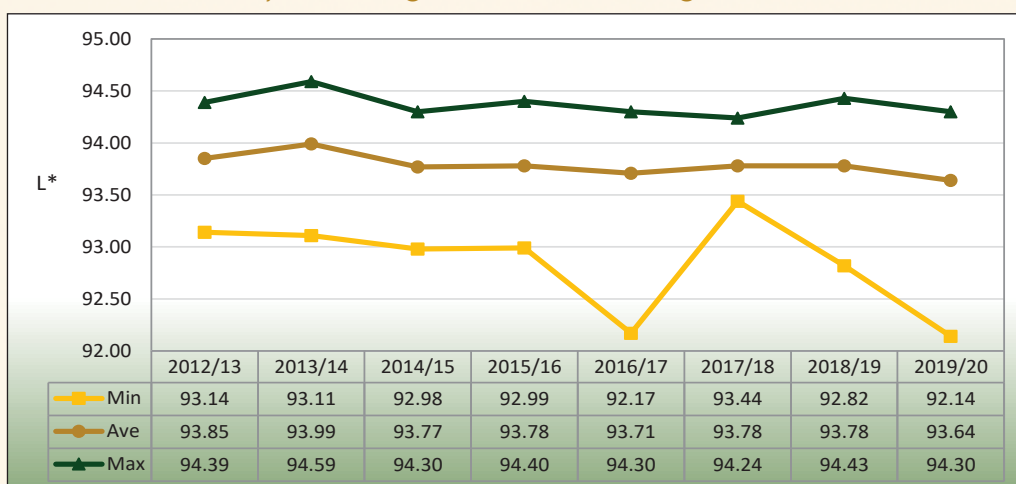
The national weighted average falling number value was 353 seconds, lower than the 397 seconds of last season's average as well as the ten-year weighted average value of 369 seconds. 32 (9.6%) of the samples analysed for this survey reported falling number values below 250 seconds, 28 of these were below 220 seconds and were downgraded to COW as a result. These samples originated from North West (N=13), Free State (N=13) and Gauteng (N=2). Last season only one sample was downgraded to COW due to a low falling number. The highest average falling number value of 367 seconds, was reported for the Western Cape and the lowest, namely 308 seconds for the Free State. All falling number values reported, are corrected for the altitude at which the test is performed.

The weighted mixogram peak time on flour milled on the Quadromat Junior mill averaged 3.0 minutes compared to the 2.8 minutes of the previous season and slightly longer than the ten-year average of 2.9 minutes. The weighted mixogram peak time of the flour from the Bühler mill was 2.6 minutes, equal to the previous four seasons. Mixing time, in general, decreases as protein content increases to about 12.0%, thereafter remaining approximately constant with flour protein increases.

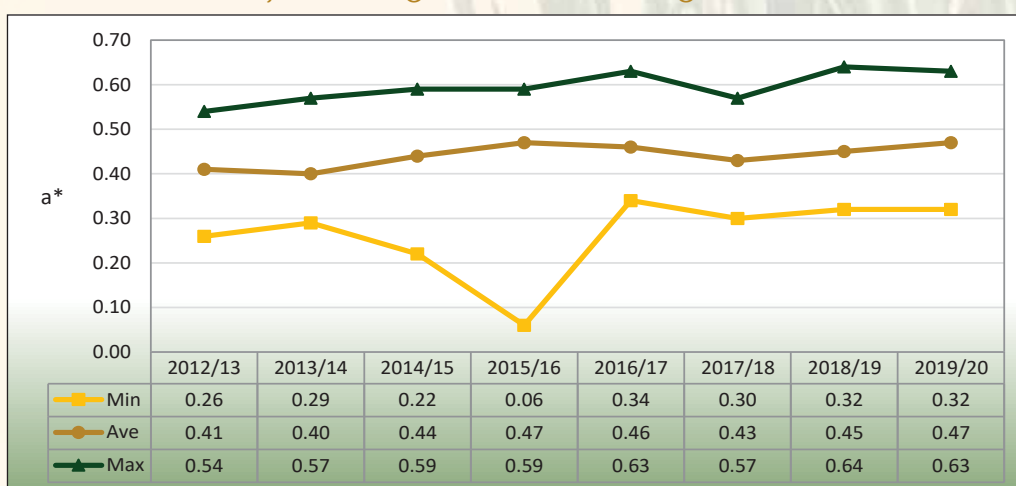
Extraction rate is an indication of the flour yield that can be obtained from a given amount of wheat. The extraction rate achievable on industrial scale mills is a number of percentage points higher than on laboratory scale mills due to an increase in roller surface area. Industrial type mills are also set to obtain optimum extraction rates within certain quality parameters, whereas the milling procedure and laboratory scale mill at SAGL is not set to optimise extraction but rather indicate differences in milling quality. Composite samples per class and grade per production region are cleaned, tempered/conditioned and then milled to facilitate flour and dough quality assessment. The weighted average Bühler MLU 202 laboratory mill extraction for the composite samples was 74.8% compared to the 71.3% of the previous season.

Colour is an important parameter of milled wheat since the colour of wheat flour affects the colour of the finished product, like the crumb colour of a loaf of bread. In general, a bright white colour flour is more desirable for most products. For the past eight seasons, a dry colour determination by means of a Konica Minolta CM-5 spectrophotometer has been done on the composite flour samples. The CIE $L^*a^*b^*$ (CIELAB) colour model uses lightness (L^*) and two colour values (a^* and b^*), these colour coordinates define where a specific sample's colour lies in a Cartesian graph. L^* represents lightness (100 being white and 0 being black), a^* represents green to red variation and b^* represents variation from blue to yellow. Please see Graphs 22 (L^*), 23 (a^*) and 24 (b^*) for a comparison of the ranges in the CIE $L^*a^*b^*$ values obtained. The minimum and maximum values are based on a single composite sample's result in a specific season.

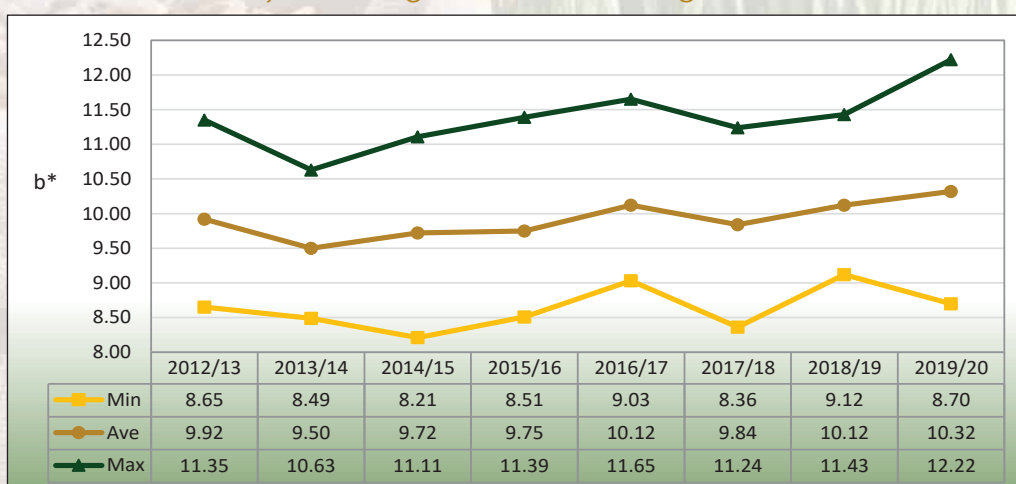
Graph 22: Range of L* values over eight seasons



Graph 23: Range of a* values over eight seasons



Graph 24: Range of b* value over eight seasons



The average ash content was 0.64 % on a dry basis (moisture free basis), compared to the 0.60% of the previous season. According to the Wheat product regulations (Government Notice No. R. 405 of 5 May 2017), cake flour's ash content should not exceed 0.65%, white bread flour's ash content should be between 0.60 to 1.00% and that of all-purpose wheat flour between 0.55 and 0.75%.

The Rapid Visco Analyser (RVA) average peak viscosity of the samples analysed was 1852 cP (centipoise), the minimum viscosity 1407 cP and the final viscosity 2049 cP. Last season the values were 2218 cP, 1675 cP and 2516 cP respectively. The effect of sprout damage on the starch and gelatinisation properties of wheat samples were well illustrated this season. The analysis conditions were kept constant during all the analyses. Results are reported on a 14% moisture basis.

The wet gluten (14% mb) averaged 31.1% and the dry gluten, also on a 14% moisture basis, 10.6%. The previous season, these values averaged 30.1% and 10.1% respectively. The average gluten index value was 95 (94 last season), ranging between 79 and 99. The gluten index provides an indication of the gluten strength (higher being better) and is not influenced by the protein content. A value between 70 and 100 is generally accepted as good quality for pan bread baking purposes.

The farinograph analysis resulted in an average water absorption of 60.2% (60.5% the previous season) and an average development time of 5.4 minutes (5.0 minutes the previous season). The stability value of 8.1 minutes was one minute longer than the previous average. The mixing tolerance index equaled that of the previous season, namely 41 BU.

The average alveogram strength was 42.6 cm² and the average P/L value 0.60 (34.6 cm² and 0.81 the previous season). The distensibility of the dough increased on average compared to the previous season, indicating a more elastic dough. The stability value of 79 mm was slightly lower than the 82 mm of the previous season.

The average extensogram strength was 112 cm² (92 cm² previous season), confirming the stronger dough strength trend observed with the Alveograph. The maximum height in Brabender Units were also higher than last season (383 BU in 2019/20 and 350 BU in 2018/19). The average extensibility value increased as well, 211 mm this season compared to 191 mm the previous season.

The 100 g loaves baked using the straight-dough optimised bread making method, received an evaluation rated as “Excellent”. The basis for this evaluation refers to the relationship between the protein content and the bread volume.

Mycotoxin analyses were performed on 40 wheat samples, randomly selected to represent different regions as well as grades. The samples were tested by means of a SANAS ISO/IEC 17025 accredited multi-mycotoxin method using UPLC-MS/MS. With this technique simultaneous quantification and confirmation of Aflatoxin B₁, B₂, G₁, G₂, Fumonisin B₁, B₂, B₃, Deoxynivalenol, 15-ADON, HT-2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A is possible in one run.

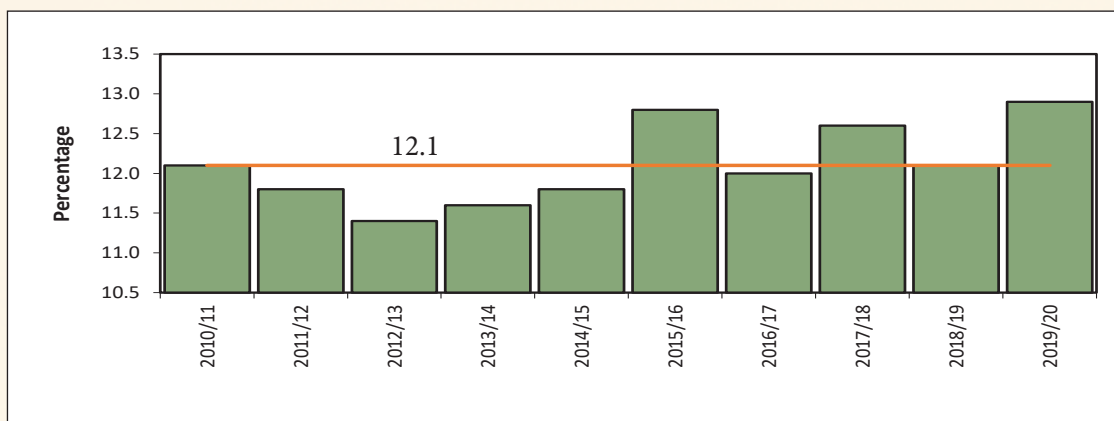
Six samples tested positive for deoxynivalenol (DON) residues but still below the national maximum allowable level of 2 000 µg/kg for cereal grain intended for further processing. The average value of the six positive results was 300 µg/kg (ppb) and the highest value obtained 1 017 µg/kg. Last season, five samples tested positive for DON residues with an average value of 217 µg/kg (ppb), the highest value obtained was 361 µg/kg. Zearalenone (ZON) residues were detected on a wheat crop sample for the first time. A sample from the North West production regions reported a value of 29 µg/kg ZON. Please see the mycotoxin results in Table 7 on pages 67 and 68.

Amino acid profiles of local wheat were determined for the fourth season as part of this survey. Total amino acid analyses that included 18 amino acids namely Aspartic acid, Glutamic acid, Serine, Glycine, Histidine, Arginine, Threonine, Alanine, Proline, Tyrosine, Valine, Isoleucine, Leucine, Phenylalanine, Lysine, Tryptophan, Cystine and Methionine were performed on 35 samples, randomly selected to represent different regions as well as grades. Please see Table 8 on pages 70 and 71 for the results and page 79 for information on the methods followed.

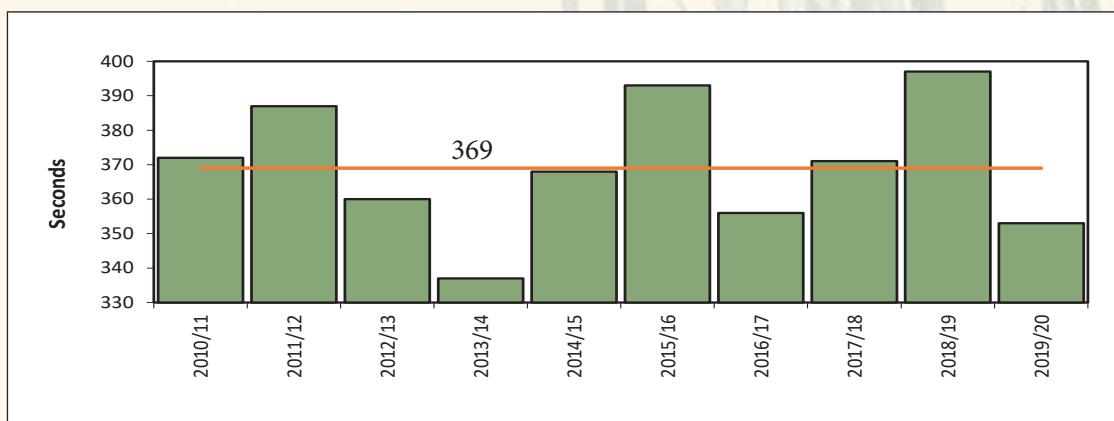
Table 4: Weighted average results for the last three seasons

	2019/20					2018/19					2017/18				
Region	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	n	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	n	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	n
1	12.4	423	76.6	2.7	4	11.9	444	79.2	2.8	3	12.5	391	76.3	2.5	3
2	11.9	381	76.6	3.2	11	11.6	409	79.3	3.1	10	14.3	343	75.9	2.6	13
3	13.3	362	75.8	2.9	41	12.1	411	79.8	2.7	78	14.6	392	78.1	2.6	52
4	12.2	353	77.1	3.1	21	11.1	378	80.9	2.8	22	13.1	373	79.7	2.8	17
5	12.8	342	79.5	2.8	17	11.1	386	80.3	2.9	21	11.9	361	80.7	2.6	42
6	13.0	389	78.3	2.7	26	12.0	341	79.3	2.8	27	11.8	349	80.2	2.6	24
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	12.7	356	82.8	2.5	25	12.1	377	84.5	2.7	30	11.6	365	84.8	2.3	30
11	12.6	421	82.0	2.8	16	12.0	446	83.5	2.8	14	11.8	397	82.6	2.6	14
12	12.2	268	80.4	2.6	3	12.7	439	84.3	2.4	3	12.6	403	81.0	3.3	4
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	14.2	240	80.1	4.4	4	13.5	440	80.2	2.8	3	13.0	432	82.3	4.1	3
15	13.2	401	78.3	3.0	9	11.5	368	80.8	3.0	8	12.4	455	82.2	2.9	7
16	12.6	284	77.5	3.0	4	12.0	399	83.0	2.4	4	11.9	380	81.8	2.8	1
17	13.0	306	77.0	2.9	5	13.0	390	81.8	2.4	2	12.9	378	81.9	3.3	4
18	12.2	436	82.6	2.9	1	11.9	418	81.8	2.5	2	12.2	393	81.5	3.0	1
19	13.6	256	78.0	3.9	14	12.1	403	82.4	3.1	7	11.7	382	81.8	3.6	11
20	12.2	366	79.6	3.1	31	12.1	424	82.6	2.7	18	11.7	372	82.5	2.9	8
21	-	-	-	-	-	12.2	456	83.3	2.9	2	12.5	297	81.9	2.8	1
22	14.2	397	80.4	3.3	1	11.7	387	82.0	2.5	3	11.6	352	80.0	3.0	3
23	14.2	358	76.9	3.1	17	12.9	504	83.1	2.6	2	13.9	388	80.8	2.5	6
24	12.6	349	74.5	3.1	11	12.8	473	81.4	2.8	9	12.4	400	80.3	2.8	11
25	15.0	293	79.6	3.1	4	13.5	405	81.5	3.0	8	-	-	-	-	-
26	13.6	255	77.6	3.1	8	13.5	356	78.5	3.0	4	12.4	290	79.1	3.4	5
27	-	-	-	-	-	-	-	-	-	-	12.2	358	79.4	3.3	3
28	13.6	266	78.7	3.1	21	13.4	353	80.2	3.1	9	12.7	272	79.3	3.0	12
29	12.9	357	79.5	3.3	3	11.9	379	84.5	3.0	2	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	11.7	404	82.9	3.3	7	12.5	338	80.1	3.5	6	11.8	368	83.7	2.9	11
34	12.6	283	79.7	3.0	6	11.4	373	83.1	3.2	7	12.4	363	81.5	2.9	1
35	12.1	431	83.1	2.8	15	12.0	380	83.2	3.1	23	11.3	366	83.5	3.1	8
36	12.8	393	81.8	3.1	10	12.6	450	84.0	2.6	10	12.4	410	83.4	2.7	9
Ave.	12.9	353	78.9	3.0	333	12.1	397	81.3	2.8	337	12.6	371	80.7	2.7	304

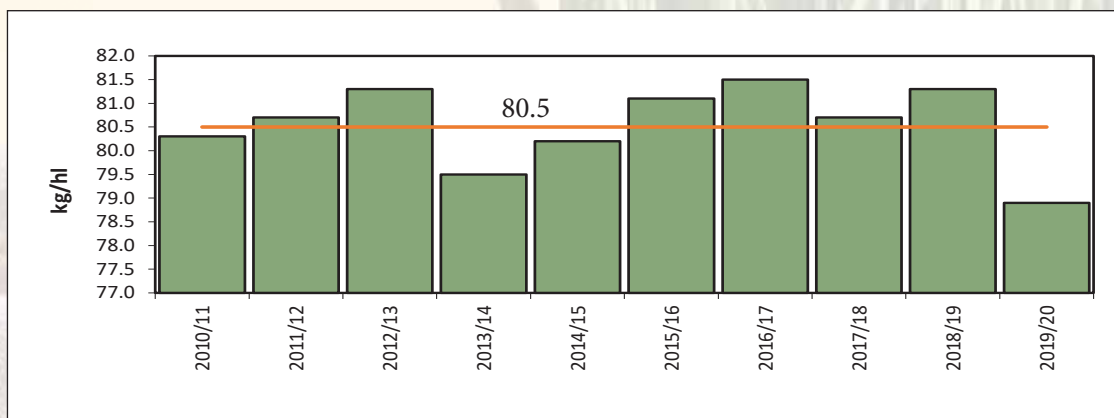
Graph 25a: Weighted average whole wheat protein (12% mb) over ten seasons



Graph 25b: Weighted average falling number over ten seasons



Graph 25c: Weighted average hectolitre mass over ten seasons



Graph 25d: Weighted average mixogram peak time (Quadromat mill) over ten seasons

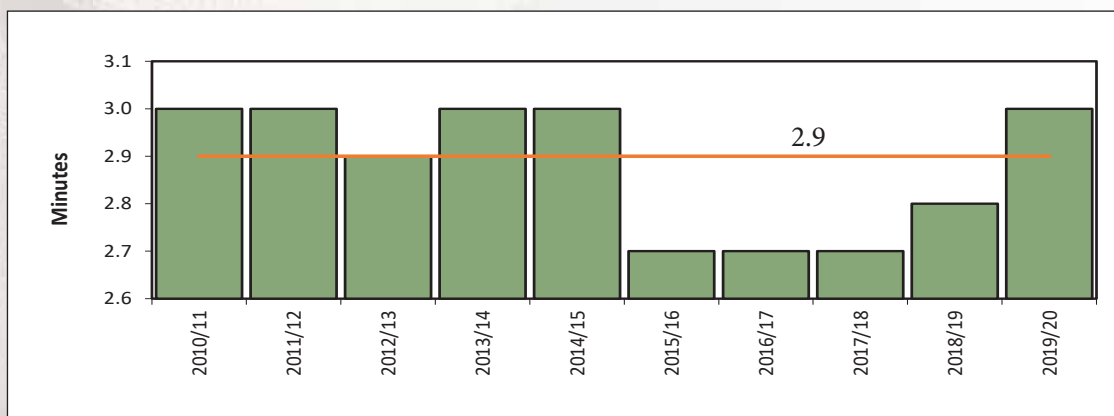


Table 5: Comparison of Flour Quality over the last four seasons

Flour Quality 2019/20 season			
Flour protein (12% mb) (%)	11.9	Farinogram abs. (14% mb) (%)	60.2
Bread volume 100 g (cm ³)	1130	Farinogram dev. time (min)	5.4
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm ²)	42.6
Wet gluten (14% mb) (%)	31.1	Alveogram P/L	0.60
Dry gluten (14% mb) (%)	10.6	Extensogram strength (cm ²)	112

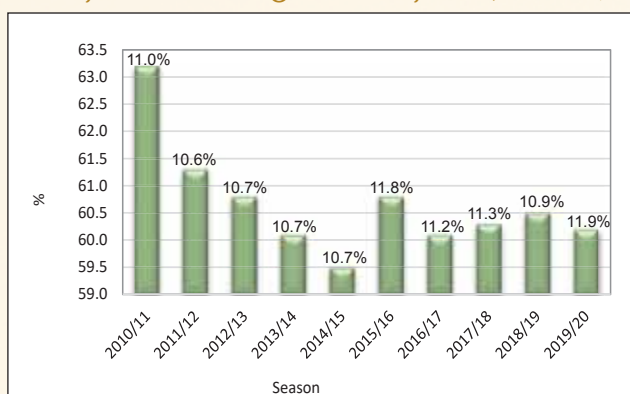
Flour Quality 2018/19 season			
Flour protein (12% mb) (%)	10.9	Farinogram abs. (14% mb) (%)	60.5
Bread volume 100 g (cm ³)	1033	Farinogram dev. time (min)	5.0
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm ²)	34.6
Wet gluten (14% mb) (%)	30.1	Alveogram P/L	0.81
Dry gluten (14% mb) (%)	10.1	Extensogram strength (cm ²)	92

Flour Quality 2017/18 season			
Flour protein (12% mb) (%)	11.3	Farinogram abs. (14% mb) (%)	60.3
Bread volume 100 g (cm ³)	1096	Farinogram dev. time (min)	5.5
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm ²)	39.2
Wet gluten (14% mb) (%)	30.7	Alveogram P/L	0.81
Dry gluten (14% mb) (%)	10.4	Extensogram strength (cm ²)	106

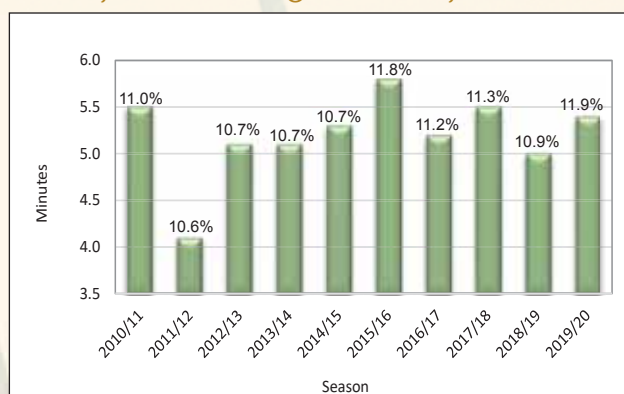
Flour Quality 2016/17 season			
Flour protein (12% mb) (%)	11.2	Farinogram abs. (14% mb) (%)	60.1
Bread volume 100 g (cm ³)	1040	Farinogram dev. time (min)	5.2
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm ²)	37.0
Wet gluten (14% mb) (%)	30.7	Alveogram P/L	0.57
Dry gluten (14% mb) (%)	10.5	Extensogram strength (cm ²)	99

Graph 26a-h: Comparison of rheological quality over ten seasons
(Flour protein content (12% mb) is indicated above each bar)

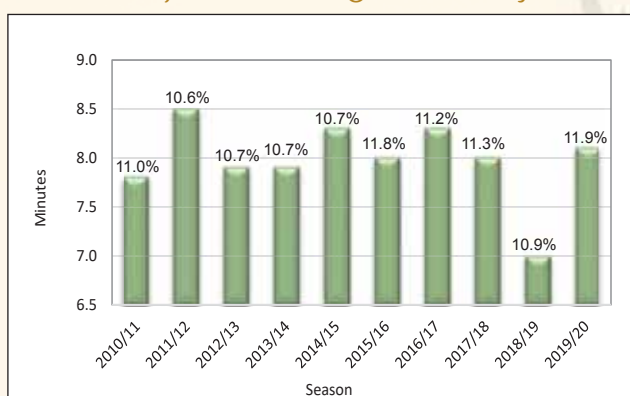
Graph 26a: Farinogram absorption (14%mb)



Graph 26b: Farinogram development time



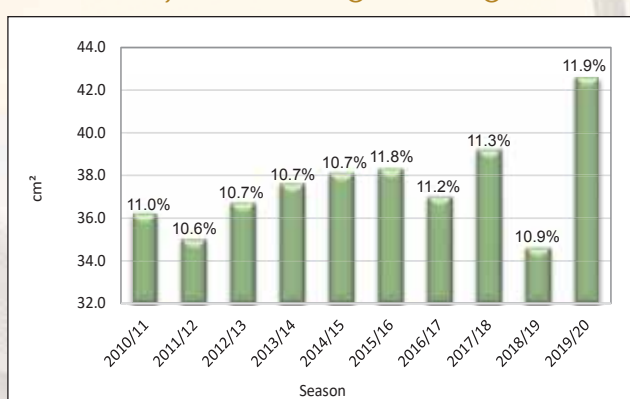
Graph 26c: Farinogram stability



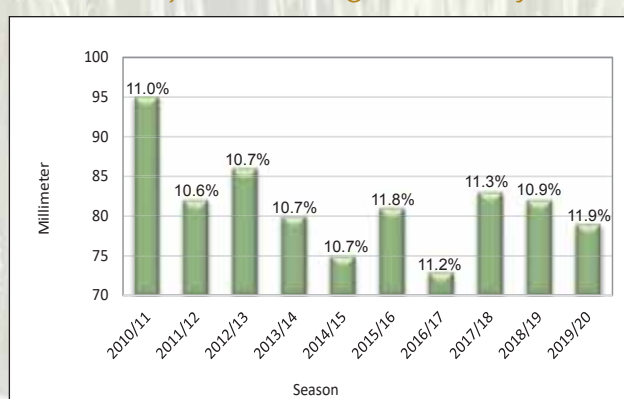
Graph 26d: Extensogram strength



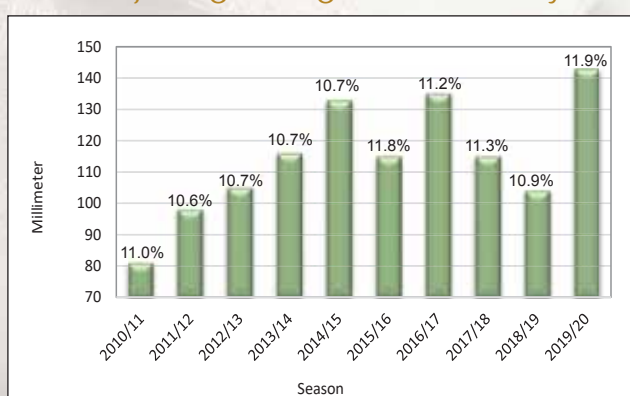
Graph 26e: Alveogram strength



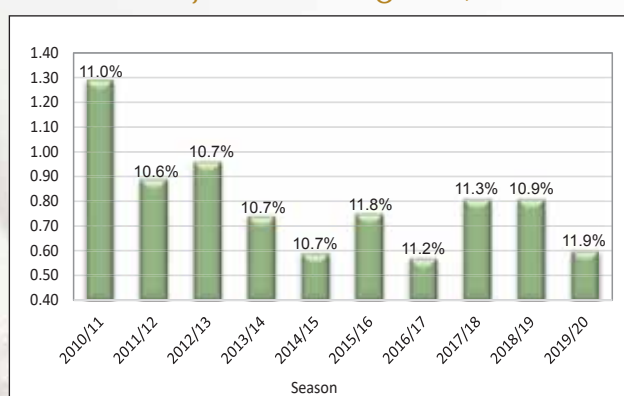
Graph 26f: Alveogram stability



Graph 26g: Alveogram distensibility



Graph 26h: Alveogram P/L



REGIONAL QUALITY SUMMARY

WINTER RAINFALL AREA (Western Cape)

The Western Cape Province has a Mediterranean climate, characterised by cool, wet winters and hot dry summers. More than 80% of the rainfall occurs in winter between April and September, making the Western Cape a predominantly winter rainfall area. Mean annual rainfall varies from 200 to 450 mm. Arable land in this area covers approximately 1.5 million hectares, with winter cereals (wheat, barley, canola and oats) the major crops cultivated. The Swartland (on the West Coast) and the Rûens (Southern Cape) are the main distinguishable geographic regions of the winter rainfall area.

These two separate wheat farming regions are divided into sub regions according to soil and climatic characteristics. The Swartland region is divided into four sub regions: High Rainfall Area, Middle Swartland, Koringberg and Sandveld. The Rûens region is divided into three sub regions namely the Western Rûens, Southern Rûens and Eastern Rûens.

The Rûens generally receives higher rainfall than the Swartland, but some areas of the Swartland have better, deeper soils. Wheat is generally planted from the second half of April until the middle of June and harvested during October and November.

Compared to previous seasons, the climatic conditions in 2019 in the Swartland region was less optimal prior to planting, with most plantings being done in dry soil. Most rain were received during June and July with virtually no rain during the following months up to harvest. There was a marked increase in regional dryspots in the area. Areas in the higher rainfall areas received more rain and conditions were better for higher yields than the rest of the Swartland.

Climatic conditions in the Rûens, leading up to planting, showed bleak prospects for the year ahead. Most plantings were done without any significant soil moisture present. As in the previous two seasons, the Eastern Rûens region was the hardest hit by dry conditions pre and post planting. Although good rains were recorded during June and July, the yield potential was already lower than normal due to the drought conditions earlier in the season.

The hectolitre mass averaged 77.2 kg/hl compared to the previous season's 79.9 kg/hl. The thousand kernel mass averaged 34.0 g, 5.0 g lower than the previous season and 1.6 g lower than the national average of 35.6 g. The average falling number was 367 seconds, the highest of the three production areas. The whole wheat protein content averaged 12.8% (12% mb), a one percent increase compared to the previous season.

The average percentage screenings of 2.39% was slightly more than half a percent higher than in 2018/19 and again the highest average of the three areas, as in previous seasons. The mixogram peak time (Quadromat Junior mill) averaged 2.9 minutes. The Bühler extraction averaged 74.0% (average of wheat grades Super to Grade 3 and COW), compared to the 70.2% in 2018/19. The average wet colour of the flour was -4.7 KJ units and the dry colour L* value (indicating lightness) 93.90, previously 93.93. These colour values indicate a white/light flour that is preferred by millers and bakers and compare well to previous seasons. The average ash content was 0.63%.

The flour protein content averaged 11.7%, compared to the 10.6% of the previous season. The average wet and dry gluten values were 30.6% and 10.4% (14% mb). The gluten index was 95, equal to the previous season. The average farinogram absorption was 59.3% and the development time 5.0 minutes, the stability averaged 7.8 minutes. The average alveogram strength was 40.8 cm² (32.8 cm² previously) and the P/L value averaged 0.48. The average strength on the extensogram was 109 cm² compared to 84 cm² last season. The increase in development time, stability and strength values can be attributed to the higher protein content this season. The mixogram peak time on the Bühler milled flour averaged 2.5 minutes, similar to last season. The 100-gram baking test showed on average an excellent relationship between protein content and bread volume.

SUMMER RAINFALL AND IRRIGATION AREA (Free State)

The summer rainfall area (predominantly the Free State Province) is a major dryland wheat production region of South Africa. Considerable variation in precipitation, soil types and average temperature occurs from east to west. The Free State is therefore commonly divided into four distinct dryland wheat production regions, namely: the South Western Free State, North Western Free State, Central Free State and Eastern Free State.

Rainfall, particularly the distribution thereof through the growing season, is important for successful wheat production in the summer rainfall areas. Planting dates vary from early to late according to region and commences in May and continues until July. Harvesting takes place from late November to January.

Climatic conditions before and during the growing season were very similar to the 2018/19 season. Good rains occurred in the fallow period from January to April in all regions. Rainfall during March and April was significantly higher than the average figures. This led to optimum conditions during planting time and the early stages of development. The good climatic conditions did unfortunately not continue throughout the growing season. The months of June to October 2019 was the driest since 1951 when the weather station at ARC-Small grain started recording. The drought had a disastrous effect on wheat yields, especially in the Eastern and Central Free State. Due to the water table that was restored during the 2018/19 summer season, the situation in the North Western Free State was better.

The average hectolitre mass was 77.4 kg/hl, 3.7 kg/hl lower than in 2018/19. The thousand kernel mass of 32.4 g, was 3.7 g lower than the previous season. The average percentage screenings was 1.85%, similar to the national average of 1.92%. The average whole wheat protein content increased from 13.1% the previous season to 13.7% (12% mb) this season. The falling number of 308 seconds was the lowest average of the three production areas.

The mixogram (Quadromat Junior) peak time was 3.1 minutes, similar to the previous season and slightly higher than the national average of 3.0 minutes. The average Bühler extraction percentage in the Free State was 74.5% and compared well with the national average of 74.8%. The Kent Jones flour colour was -4.1 KJ units and the Konica Minolta CM-5 L* value 92.93, compared to the -4.4 KJ and 93.53 of the previous season. The average ash content was 0.65% and the average flour protein content 1.4% higher than the previous season at 13.0%. The wet gluten content (14% mb) was 34.5% and the dry gluten 11.9%, an increase of 2.6% and 1.3% respectively compared to the previous season. The gluten index averaged 96.

The average farinogram water absorption of 61.6% showed a slight increase compared to the previous season's 61.3% and was also the highest of the three areas this season. The development time averaged 6.2 minutes and the stability 8.6 minutes, respectively 0.7 and 0.9 minutes longer than in 2018/19. The average alveogram strength of 48.1 cm² was 9.5 cm² higher than the previous season, while the extensogram strength increased by 24 cm² compared to last season. These increase can again be attributed to the higher protein content this season. The Bühler milled flour had an average mixograph peak time of 2.6 minutes, equal to the previous season and national average. The 100-gram baking test showed that the relationship between protein content and bread volume was excellent between the different grades.

IRRIGATION AREAS (Northern Cape, North West, Mpumalanga, Gauteng, Limpopo and KwaZulu-Natal)

Generally, the irrigation wheat production area of South Africa can be divided into four main geographic regions – the Cooler Central irrigation region in the Northern Cape, the Warmer Northern irrigation region in the North West, Limpopo and Gauteng provinces, the Highveld region in Mpumalanga and the Free State and lastly, the KwaZulu-Natal region.

Planting commences as early as the end of May and continues until late July depending on the region. Harvesting takes place from the end of October to December also depending on the specific region.

Temperature conditions during this season showed slight deviations to the long-term average in all of the production regions. Minimum temperatures in the KwaZulu-Natal and Cooler Irrigation regions were higher than normal during July and August, which could explain the yields obtained in these regions. In the Highveld region, minimum temperatures were higher than the long-term average. In the Warmer Irrigation region, the minimum temperatures were slightly higher than the long-term average.

As in the previous season, the irrigation wheat had the highest weighted average hectolitre mass of the three production areas, namely 80.7 kg/hl. This value is however still 2.4 kg/hl lower than in 2018/19. The thousand kernel mass decreased by 2.0 g to 38.2 g. This is the highest average of the three areas. The average falling number was 360 seconds. The screenings averaged 1.36%, compared to the 1.07% previously and was again the lowest of the three areas as in the previous two seasons.

The whole wheat protein content was on average 12.6%, 0.5% higher than last season but also the lowest average of the three areas. The flour's protein content was 11.6%. The mixogram (Quadromat Junior) peak time averaged 3.0 minutes, equal to the national average. The average Bühler extraction was 75.4%, the highest of the three areas.

The dry colour L* value was 93.72 and the Kent Jones wet colour value -4.8 KJ units, very similar to the previous season. The ash content averaged 0.64%. The average wet and dry gluten values were 30.3% and 10.2% respectively and the gluten index 95, all three these values were slightly higher than in the previous season. The average farinogram water absorption was 60.3% (60.8% during the previous season), the development time and stability averaged 5.4 minutes and 8.0 minutes respectively.

Alveogram strength averaged 41.7 cm² and the P/L 0.65 (34.8 cm² and 0.79 respectively the previous season). The average extensogram strength was 112 cm², compared to 94 cm² last season. The mixogram peak time averaged 2.7 minutes. The relationship between protein content and 100 g bread volume was shown to be excellent.

Production area and climatic condition information were obtained from the National Wheat Cultivar Evaluation Programme reports of the ARC-Small Grain.

Please see the results provided per individual production region on pages 38 to 65.

Table 6: Regional quality weighted averages

	Winter rainfall area (Western Cape)	Summer rainfall and Irrigation area (Free State)	Irrigation areas	RSA average
Number of samples per area	120	62	151	333
Regions	1 - 6	21 - 28	10 - 11, 12 - 20, 29 - 33, 34, 35, 36	All
Hectolitre mass dirty, kg/hl	77.2	77.4	80.7	78.9
1000 kernel mass (13% mb), g	34.0	32.4	38.2	35.6
Falling number, sec	367	308	360	353
Screenings (1.8 mm sieve), %	2.39	1.85	1.36	1.92
Protein (12% mb), % (WWF)	12.8	13.7	12.6	12.9
Mixogram peak time, min (Quadromat Junior)	2.9	3.1	3.0	3.0
<i>Composite samples per class and grade</i>	<i>Super B1 B2</i>	<i>Super B1 B2</i>	<i>Super B1 B2</i>	<i>Super B1 B2</i>
	<i>B3 COW</i>	<i>B3 COW</i>	<i>B3 COW</i>	<i>B3 COW</i>
<i>Composite samples, n = 69</i>	<i>5 4 3</i>	<i>6 1 -</i>	<i>14 8 6</i>	<i>25 13 9</i>
	<i>3 6</i>	<i>- 5</i>	<i>1 7</i>	<i>4 18</i>
Bühler extraction, %	74.2 74.6 74.0	74.7 76.8 -	75.2 76.1 76.7	74.9 75.7 75.8
	73.5 73.6	- 73.8	76.0 73.7	74.1 73.7
Flour colour, KJ (wet)	-4.6 -4.9 -4.7	-4.4 -4.6 -	-4.9 -4.9 -5.0	-4.7 -4.9 -4.9
	-4.8 -4.7	- -3.7	-5.0 -4.4	-4.9 -4.3
Flour colour, Konica Minolta CM-5 (dry)				
L*	93.82 93.92 93.80	92.98 93.57 -	93.69 93.78 93.85	93.54 93.81 93.83
	94.06 93.93	- 92.75	93.79 93.60	93.99 93.48
a*	0.45 0.42 0.41	0.55 0.45 -	0.49 0.49 0.48	0.50 0.46 0.46
	0.37 0.42	- 0.48	0.51 0.42	0.40 0.44
b*	10.45 10.46 10.32	11.09 9.73 -	9.99 10.17 10.63	10.35 10.22 10.53
	10.40 10.56	- 10.78	10.09 9.64	10.32 10.26
Ash (db), %	0.65 0.61 0.64	0.65 0.68 -	0.65 0.66 0.62	0.65 0.65 0.63
	0.62 0.64	- 0.65	0.58 0.61	0.61 0.63

WWF = Whole Wheat Flour

Table 6: Regional quality weighted averages (continue)

	Winter rainfall area (Western Cape)			Summer rainfall and Irrigation area (Free State)			Irrigation areas			RSA average		
Regions	1 - 6			21 - 28			10 - 11, 12 - 20, 29 - 33, 34, 35, 36			All		
Composite samples per class and grade	Super	B1	B2	Super	B1	B2	Super	B1	B2	Super	B1	B2
	B3	COW		B3	COW		B3	COW		B3	COW	
Composite samples, n = 69	5	4	3	6	1	-	14	8	6	25	13	9
	3	6		-	5		1	7		4	18	
Flour protein (12% mb), %	12.3	11.3	10.6	13.3	11.0	-	12.6	11.2	10.2	12.7	11.2	10.3
	11.9	11.8		-	13.1		9.1	11.5		11.2	12.1	
Wet gluten (14% mb), %	32.6	28.9	27.0	35.2	29.2	-	33.3	29.9	26.4	33.6	29.5	26.6
	30.8	31.6		-	34.6		24.1	29.7		29.2	31.7	
Dry gluten (14% mb), %	11.2	9.8	9.0	12.3	10.1	-	11.3	10.0	8.8	11.5	9.9	8.8
	10.5	10.7		-	11.7		7.9	10.0		9.9	10.7	
Gluten Index	94	96	95	96	97	-	95	94	97	95	95	96
	95	96		-	95		98	97		96	96	
Farinogram: Water absorption (14% mb), %	60.1	58.9	57.7	62.5	60.2	-	61.7	60.8	59.6	61.5	60.2	59.0
	58.6	59.9		-	60.9		58.3	57.9		58.6	59.4	
Farinogram: Development time, min	5.0	4.7	4.8	6.7	6.0	-	6.1	5.5	5.7	6.0	5.3	5.4
	4.9	5.4		-	5.7		5.0	4.0		4.9	4.9	
Farinogram: Stability, min	8.0	7.5	7.4	9.0	7.3	-	8.7	7.5	7.9	8.7	7.5	7.8
	8.6	7.8		-	8.2		8.9	7.2		8.7	7.7	
Alveogram: Strength (S), cm ²	42.7	38.5	37.2	51.2	38.2	-	47.3	40.7	36.7	47.3	39.8	36.8
	42.4	41.8		-	46.3		33.6	37.3		40.2	41.3	
Alveogram: P/L	0.45	0.54	0.49	0.63	0.73	-	0.62	0.74	0.85	0.59	0.68	0.73
	0.41	0.49		-	0.67		0.99	0.39		0.56	0.50	
Extensogram: Strength, cm ²	116	107	98	122	112	-	122	104	98	121	106	98
	113	109		-	119		82	115		105	114	
Mixogram peak time, min	2.4	2.6	2.7	2.5	2.8	-	2.6	2.7	2.9	2.5	2.7	2.8
	2.5	2.5		-	2.7		3.3	2.9		2.7	2.7	
Relationship between protein and bread volume	EX	EX	EX	EX	EX	-	EX	EX	EX	EX	EX	EX
	EX	EX		-	EX		EX	EX		EX	EX	

EX = Excellent

RSA Production Regions

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

Figure 1: RSA Provinces map



Provincial map with gratitude to SiQ.

The 9 provinces are divided into 36 grain production regions.

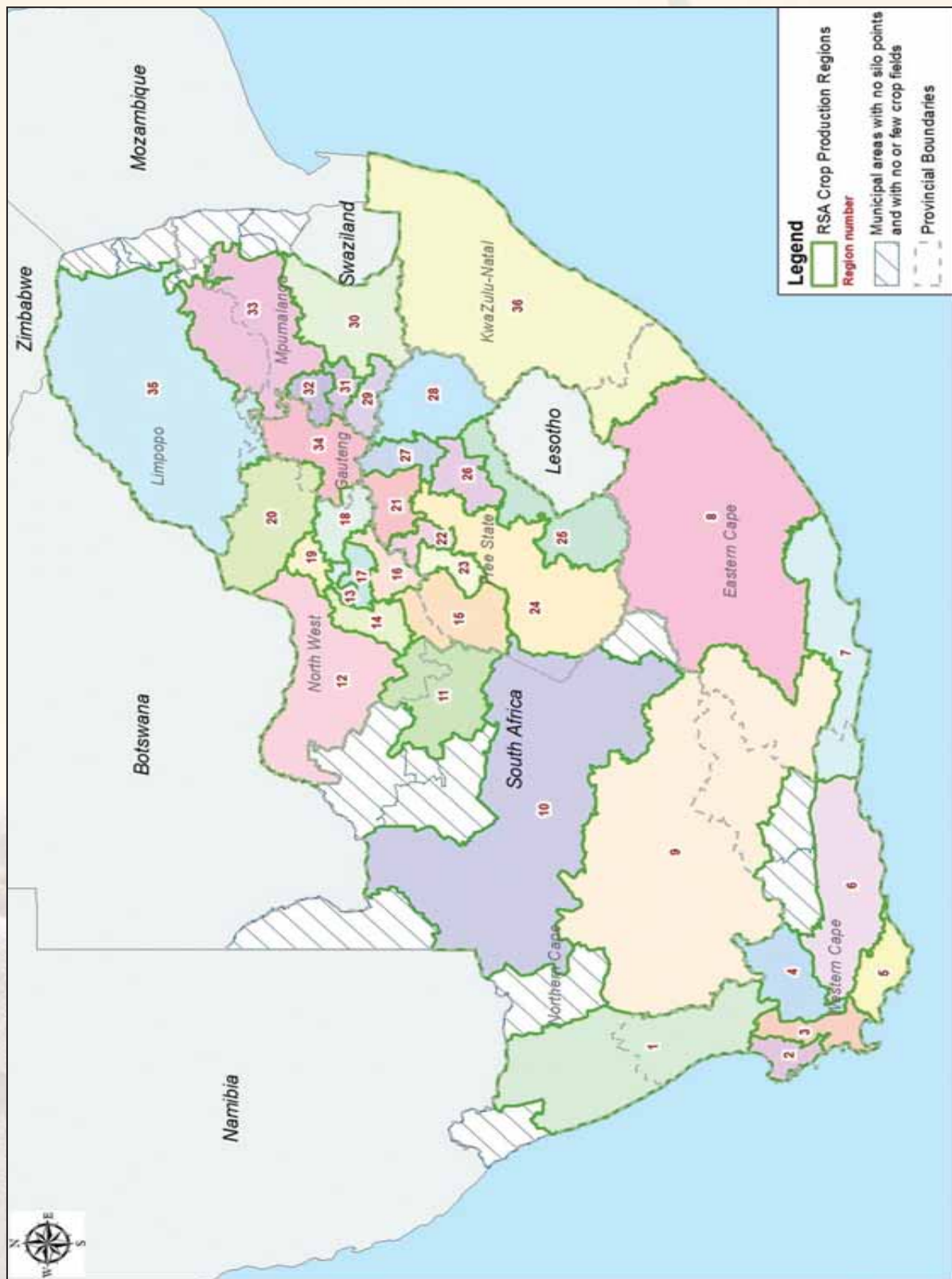
The regions are distributed as follows:

- 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 wheat samples were received for the crop quality survey of the 2019/20 production season, are named and described on pages 34 to 37. 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 map



Regional map with gratitude to Agbiz Grain and SiQ.

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 1: Namakwaland Region

Kaap Agri Graafwater (Bags/Bins)

Region 2: Swartland Western Region

Kaap Agri	Darling (Bins)	Overberg Agri	Bergrivier (Bins)
Kaap Agri	Vredenburg (Bins)	Overberg Agri	Koperfontein (Bins)

Region 3: Swartland Central Region

Kaap Agri	Doornkuil (Bunkers)	Overberg Agri	Moorreesburg (Bins)
Kaap Agri	Eendekuil (Bins)	Overberg Agri	Moravia (Bins)
Kaap Agri	Klipheuwel (Bins)	Afgri	Eensgezindt (Bunkers)
Kaap Agri	Malmesbury (Bins)	Afgri	Eenboom (Bunkers)
Kaap Agri	Piketberg (Bins)	Afgri	Klipfontein (Bunkers)
Kaap Agri	Pools (Bins)	Afgri	Malandam (Bunkers)
Kaap Agri	Ruststasie (Bins)	BKB Grainco	Melkboom (Bunkers)
Overberg Agri	Koringberg (Bins)	BKB Grainco	Pampoenkraal (Bunkers)

Region 4: Swartland Eastern Region

Kaap Agri	Ceres (Bunkers)	Kaap Agri	Porterville (Bins)
Kaap Agri	Ceres (Bins)	Kaap Agri	Riebeeck-Wes (Bins)
Kaap Agri	Gouda (Bins)	Overberg Agri	Leliedam (Bins)
Kaap Agri	Halfmanshof (Bins)	BKB Grainco	Winterhoek (Bunkers)

Region 5: Rûens Western Region

Overberg Agri	Bredasdorp (Bags/Bins/Bunkers)	Overberg Agri	Napier (Bags/Bins)
Overberg Agri	Caledon (Bins/Bunkers)	Overberg Agri	Ou Plaas (Bunkers)
Overberg Agri	Klipdale (Bags/Bins)	Overberg Agri	Protem (Bags/Bins)
Overberg Agri	Krige (Bags/Bins/Bunkers)	Overberg Agri	Rietpoel (Bags/Bins/Bunkers)
Overberg Agri	Lemoenskap (Bunkers)		

Region 6: Rûens Eastern Region

SSK	Albertinia (Bins)	SSK	Krombeks (Bins)
SSK	Ashton (Bags/Bins)	SSK	Protem (Bags/Bins)
SSK	Heidelberg (Bins)	SSK	Riversdal (Bins)
SSK	Herold (Bins)	SSK	Swellendam (Bags/Bins)
SSK	Karringmelk (Bags/Bins)		

Region 10: Griqualand-West Region

GWK	Douglas (Bags/Bins)	GWK	Trans Oranje (Bags/Bins/Bunkers)
GWK	Luckhoff (Bins)	OVK	Havenga Brug (Bins)
GWK	Marydale (Bins)	OVK	Morgenzon (Bins)
GWK	Modderivier (Bags/Bins/Bulk)	OVK	Oranjerivier (Bins/Bunkers)
GWK	Prieska (Bins/Dams)	OVK	Prieska (Bins/Bunkers)
GWK	Rietrivier (Bins)	OVK	Rietrivier (Bins)

Region 11: Vaalharts Region

GWK	Barkly-Wes (Bins/Bulk)	Senwes	Jan Kempdorp (Bins)
GWK	Jan Kempdorp (Bags/Bunkers)	Senwes	Magogong (Bins)
Senwes	Hartswater (Bins)	Senwes	Tadcaster (Bins)

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 12: North West Western Region

NWK	Blaauwbank (<i>Bins</i>)	NWK	Mareetsane (<i>Bins</i>)
NWK	Bührmannsdrif (<i>Bins</i>)	Suidwes Landbou	Kameel (<i>Bins</i>)
NWK	Kameel (<i>Bins</i>)	Suidwes Landbou	Vryburg (<i>Bins</i>)

Region 14: North West Southern Region

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

Region 15: North West South-Eastern Region

Suidwes Landbou	Bloemhof (<i>Bins</i>)	Suidwes Landbou	Kingswood (<i>Bins</i>)
Suidwes Landbou	Christiana (<i>Bins</i>)	Suidwes Landbou	Kruising (<i>Bunkers</i>)
Suidwes Landbou	Hertzogville (<i>Bins</i>)	Suidwes Landbou	Poppieland (<i>Bunkers</i>)
Suidwes Landbou	Hoopstad (<i>Bins</i>)	GWK	Christiana (<i>Bins</i>)

Region 16: North West Central-Eastern Region

Senwes	Regina (<i>Bins</i>)	Suidwes Landbou	Makwassie (<i>Bins</i>)
Suidwes Landbou	Bamboesspruit (<i>Bins</i>)	Suidwes Landbou	Strydpoort (<i>Bins</i>)
Suidwes Landbou	Leeudoringstad (<i>Bins</i>)	Suidwes Landbou	Wolmaranstad (<i>Bins</i>)

Region 17: North West Central-Northern Region (Ottosdal)

NWK	Boschpoort (<i>Bags/Bins/Bulk</i>)	NWK	Vermaas (<i>Bins</i>)
NWK	Kleinarts (<i>Bins</i>)	Senwes	Hartbeesfontein (<i>Bins</i>)
NWK	Ottosdal (<i>Bins</i>)	Senwes	Melliodora (<i>Bins</i>)
NWK	Rostrataville (<i>Bins</i>)	Senwes	Werda (<i>Bins</i>)

Region 18: North West Central Region (Ventersdorp)

NWK	Bodenstein (<i>Bins</i>)	Senwes	Makokskraal (<i>Bins</i>)
NWK	Coligny (<i>Bins</i>)	Senwes	Potchefstroom (<i>Bins</i>)
Senwes	Buckingham (<i>Bins</i>)	Senwes	Ventersdorp Silo A (<i>Bins</i>)
Senwes	Enselspruit (<i>Bins</i>)	Senwes	Ventersdorp Silo B (<i>Bins</i>)

Region 19: North West Central Region (Lichtenburg)

Afgri	Lichtenburg (<i>Bunkers</i>)	NWK	Lottie Halte (<i>Bins</i>)
NWK	Grootpan 1 (<i>Bins</i>)	NWK	Lusthof (<i>Bins</i>)
NWK	Grootpan 2 (<i>Bins</i>)	NWK	Lichtenburg Silo 3 (<i>Bins</i>)
NWK	Halfpad (<i>Bins</i>)	NWK	Lichtenburg Silo 5 (<i>Bins</i>)
NWK	Hibernia (<i>Bins</i>)		

Region 20: North West Eastern Region

Afgri	Battery (<i>Bins</i>)	NWK	Derby (<i>Bins</i>)
Afgri	Beestekraal (<i>Bunker</i>)	NWK	Koster (<i>Bins</i>)
Afgri	Brits (<i>Bins</i>)	NWK	Swartruggens (<i>Bins</i>)
NWK	Boons (<i>Bins</i>)	NWK	Syferbult (<i>Bins</i>)

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	Odendaalsrus (Bins)
Senwes	Bothaville Silo A (Bins)	Senwes	Schoonspruit (Bins)
Senwes	Bothaville Silo B (Bins)	Senwes	Schutteldraai (Bins)
Senwes	Mirage (Bins)	Suidwes Landbou	Misgunst (Bunkers)

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

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

Region 24: Free State Central Region

Senwes	Bloemfontein (Bins)	Senwes	Petrusburg (Bins)
Senwes	Brandfort (Bins)	Senwes	Theunissen (Bins)
Senwes	De Brug (Bins)	Senwes	Van Tonder (Bins)
Senwes	Geneva (Bins)	Senwes	Welgeleë (Bins)
Senwes	Hennenman (Bins)	Senwes	Winburg (Bins)
Senwes	Kroonstad (Bins)		

Region 25: Free State South-Western Region

Afgri	Bethlehem (Bins)	OVK	Marseilles (Bins)
Afgri	Slabberts (Bins)	OVK	Modderpoort (Bins)
OVK	Clocolan (Bins)	OVK	Tweespruit (Bins)
OVK	Ficksburg (Bins)	OVK	Westminster (Bins)
OVK	Fouriesburg (Bins)	Senwes	Dewetsdorp (Bins)

Region 26: Free State South-Eastern Region

Afgri	Kaallaagte (Bins)	Afgri	Monte Video (Bins)
Afgri	Libertas (Bins)	Afgri	Senekal (Bins)
Afgri	Marquard (Bins)	Senwes	Arlington (Bins)
Afgri	Meets (Bins)	Senwes	Steynsrus (Bins)

Region 28: Free State Eastern Region

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

Region 29: Mpumalanga Southern Region

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

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 33: Mpumalanga Northern Region

Afgri	Arnot (<i>Bins</i>)	Afgri	Middelburg (<i>Bins</i>)
Afgri	Driefontein (<i>Bins</i>)	Afgri	Pan (<i>Bins</i>)
Afgri	Lydenburg (<i>Bins</i>)	Afgri	Stoffberg (<i>Bins</i>)
Afgri	Marble Hall (<i>Bins</i>)	Afgri	Wonderfontein (<i>Bins</i>)

Region 34: Gauteng Region

Afgri	Bloekomspruit (<i>Bins</i>)	Afgri	Nigel (<i>Bins</i>)
Afgri	Bronkhorstspuit (<i>Bins</i>)	Afgri	Pretoria Wes (<i>Bins</i>)
Afgri	Glenroy (<i>Bins</i>)	Afgri	Vogelvallei (<i>Bunkers</i>)
Afgri	Goeie Hoek (<i>Bins</i>)	Senwes	Middelvlei (<i>Bins</i>)
Afgri	Kaalfontein (<i>Bins</i>)	Senwes	Oberholzer (<i>Bins</i>)
Afgri	Kliprivier (<i>Bunkers</i>)	Senwes	Raathsvlei (<i>Bins</i>)
Afgri	Meyerton (<i>Bunkers</i>)		

Region 35: Limpopo Region

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

Region 36: KwaZulu-Natal Region

Afgri	Bergville (<i>Bins/Bunkers</i>)	Afgri	Paulpietersburg (<i>Bins</i>)
Afgri	Bloedrivier (<i>Bins</i>)	Afgri	Pietermaritzburg (<i>Bins</i>)
Afgri	Dannhauser (<i>Bins</i>)	Afgri	Vryheid (<i>Bins</i>)
Afgri	Dundee (<i>Bins</i>)	Afgri	Winterton (<i>Bins/Bunkers</i>)
Afgri	Mizpah (<i>Bins</i>)		

South African Quality data per production region

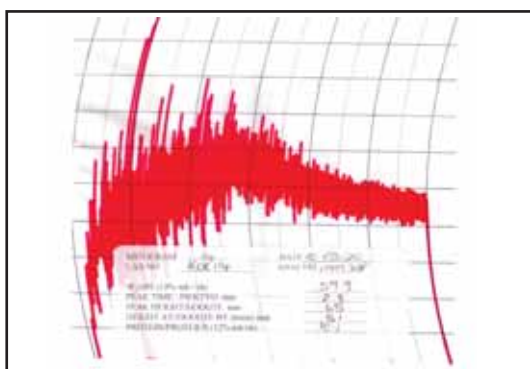
WINTER RAINFALL WHEAT

PRODUCTION REGION	(1) Namakwaland Region					(2) Swartland Western Region				
WHEAT										
	ave	min	max	stdev		ave	min	max	stdev	
Protein (12% mb), %	12.4	11.4	14.3	1.32		11.9	9.7	13.2	1.06	
Falling number, sec	423	411	437	13.23		381	344	449	35.86	
Moisture, %	9.8	9.7	10.0	0.14		10.7	10.3	11.0	0.22	
1000 Kernel mass (13% mb), g	37.6	35.0	40.3	2.34		33.6	29.9	40.8	3.33	
Hectolitre mass (dirty), kg/hl	76.6	74.8	77.8	1.31		76.6	74.3	80.3	1.99	
Screenings (<1.8 mm sieve), %	3.63	3.58	3.67	0.04		2.34	0.49	4.97	1.67	
Total damaged kernels, %	0.71	0.62	0.84	0.10		0.18	0.00	0.40	0.18	
Combined deviations, %	4.75	4.48	5.11	0.29		3.02	1.29	5.57	1.66	
Number of samples	4					11				
CULTIVARS										
	SST 056 26.3					SST 0117 19.5				
cultivars	SST 0127 26.0					SST 0166 17.7				
with highest %	SST 087 16.5					SST 88 16.2				
occurrence	SST 0117 12.8					SST 0127 12.8				
	SST 0166 8.5					SST 087 12.0				
Number of samples	4					11				
MIXOGRAM (Quadromat Junior)										
	ave	min	max	stdev		ave	min	max	stdev	
Peak time, min	2.7	2.5	2.9	0.17		3.2	2.9	4.0	0.36	
Tail height (6 min), mm	50	46	52	2.63		47	40	52	3.47	
Number of samples	4					11				
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	-	-	-	-	72.9	74.1	-	72.5	72.3	74.5
FLOUR										
Protein (12% mb), %	-	-	-	-	11.7	11.8	-	10.7	12.0	10.7
Moisture, %	-	-	-	-	14.0	13.8	-	13.9	13.7	13.6
Ash (db), %	-	-	-	-	0.68	0.74	-	0.71	0.66	0.61
Colour, KJ (wet)	-	-	-	-	-4.8	-4.4	-	-4.5	-4.6	-4.7
Colour, Konica Minolta CM5 (dry)										
L*	-	-	-	-	94.30	93.68	-	93.93	94.03	94.03
a*	-	-	-	-	0.40	0.35	-	0.33	0.35	0.36
b*	-	-	-	-	9.64	10.98	-	10.21	10.54	10.42
RVA										
Peak Viscosity, cP	-	-	-	-	2197	2110	-	2159	2217	2173
Minimum viscosity (Trough), cP	-	-	-	-	1407	1497	-	1560	1529	1590
Final Viscosity, cP	-	-	-	-	2533	2439	-	2502	2571	2505
Peak Time, min	-	-	-	-	7.00	7.00	-	7.00	7.00	7.00
GLUTEN										
Wet gluten (14% mb), %	-	-	-	-	31.2	30.8	-	28.4	32.0	28.3
Dry gluten (14% mb), %	-	-	-	-	10.8	10.6	-	9.4	10.9	9.7
Gluten Index	-	-	-	-	98	93	-	93	95	96
FARINOGRAM										
Water absorption (14% mb), %	-	-	-	-	60.8	57.4	-	58.0	58.6	56.9
Development time, min	-	-	-	-	5.5	5.0	-	4.3	5.7	4.7
Stability, min	-	-	-	-	6.9	8.5	-	7.7	9.4	7.6
Mixing tolerance index, BU	-	-	-	-	42	31	-	35	33	37
EXTENSOGRAM (45 min pull)										
Area, cm²	-	-	-	-	115	106	-	97	110	96
Maximum height, BU	-	-	-	-	388	358	-	366	379	370
Extensibility, mm	-	-	-	-	212	210	-	186	201	186
ALVEOGRAM										
Strength (S), cm²	-	-	-	-	41.4	38.2	-	38.6	43.0	34.1
Stability (P), mm	-	-	-	-	81	62	-	73	71	65
Distensibility (L), mm	-	-	-	-	141	194	-	153	180	138
Configuration ratio (P/L)	-	-	-	-	0.57	0.32	-	0.48	0.39	0.47
MIXOGRAM										
Peak time, min	-	-	-	-	2.3	2.6	-	2.6	2.4	2.9
100 g BAKING TEST										
Loaf volume, cm³	-	-	-	-	1064	1156	-	1085	1171	1125
Evaluation (see page 79)	-	-	-	-	0	0	-	0	0	0

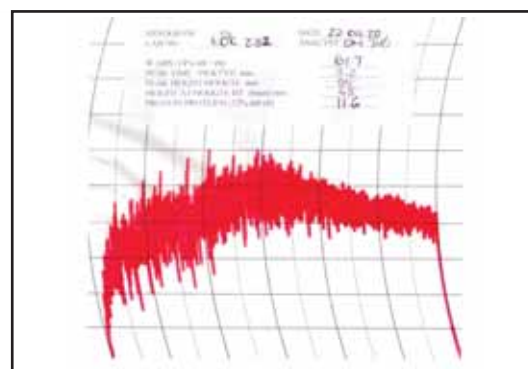
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

1

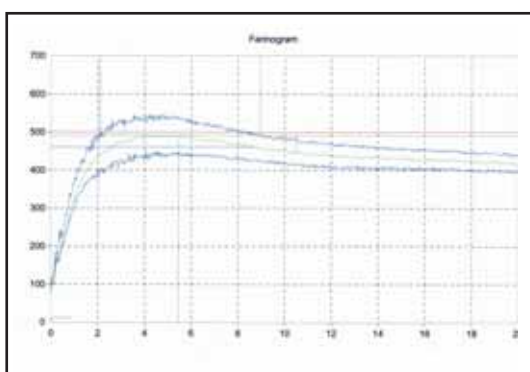


2

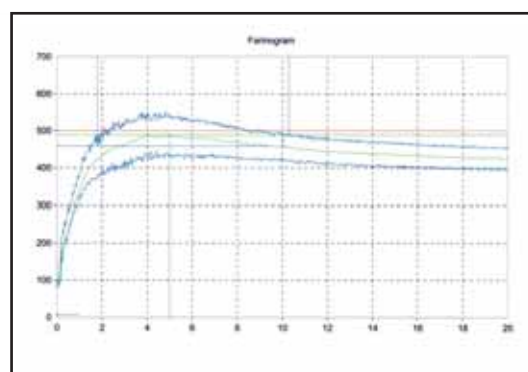


FARINOGRAM

1

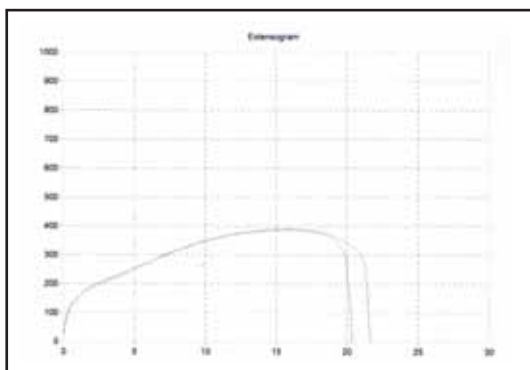


2

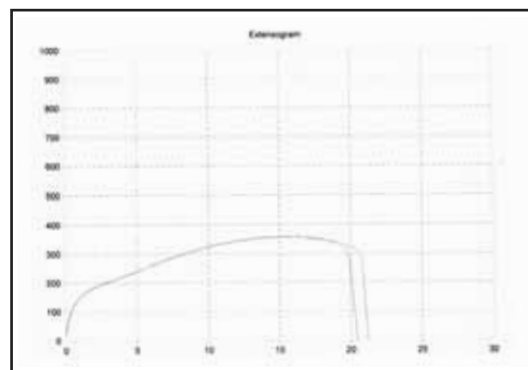


EXTENSOGRAM

1

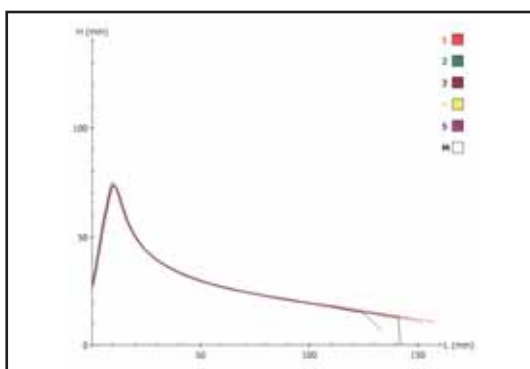


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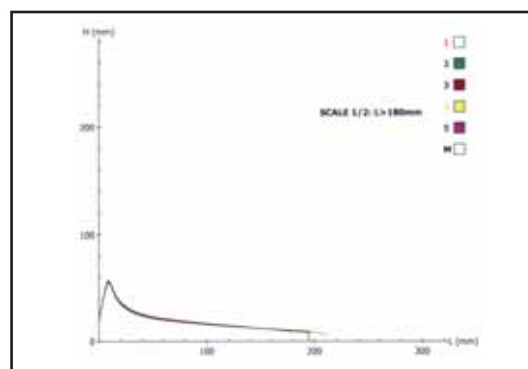


ALVEOGRAM

1



2



South African Quality data per production region

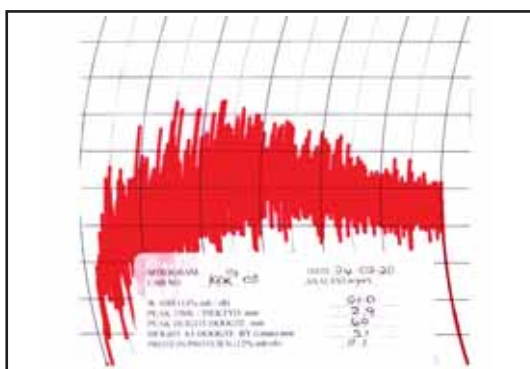
WINTER RAINFALL WHEAT

PRODUCTION REGION	(3) Swartland Central Region					(4) Swartland Eastern Region				
WHEAT	ave	min	max	stdev		ave	min	max	stdev	
Protein (12% mb), %	13.3	11.1	16.0	1.10		12.2	10.2	13.5	0.93	
Falling number, sec	362	284	441	36.36		353	286	407	39.21	
Moisture, %	10.3	8.7	11.2	0.51		10.1	9.2	11.0	0.49	
1000 Kernel mass (13% mb), g	32.0	23.8	38.1	3.41		32.5	28.2	35.6	1.74	
Hectolitre mass (dirty), kg/hl	75.8	71.0	79.3	2.08		77.1	73.9	80.9	1.93	
Screenings (<1.8 mm sieve), %	3.09	0.54	6.68	1.35		2.35	0.27	3.94	1.31	
Total damaged kernels, %	0.16	0.00	0.38	0.11		0.30	0.08	0.68	0.18	
Combined deviations, %	4.12	0.88	8.52	1.80		3.50	0.78	6.02	1.67	
Number of samples	41					21				
CULTIVARS										
	SST 0117 27.0					SST 0117 25.5				
cultivars	SST 0127 18.4					SST 0166 20.2				
with highest %	SST 0166 17.1					SST 0127 19.8				
occurrence	SST 087 12.0					SST 056 13.0				
	SST 056 10.1					SST 087 10.8				
Number of samples	41					21				
MIXOGRAM (Quadromat Junior)										
	ave	min	max	stdev		ave	min	max	stdev	
Peak time, min	2.9	2.6	3.4	0.22		3.1	2.5	3.8	0.36	
Tail height (6 min), mm	51	46	59	2.75		48	40	53	2.80	
Number of samples	41					21				
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	74.3	74.7	75.1	73.4	73.2	73.2	74.0	74.4	74.7	74.4
FLOUR										
Protein (12% mb), %	12.2	11.2	10.5	12.6	13.3	13.0	11.4	10.5	11.0	11.6
Moisture, %	13.6	14.0	13.8	13.5	13.4	13.4	14.1	14.1	13.8	13.4
Ash (db), %	0.61	0.60	0.59	0.61	0.66	0.59	0.61	0.63	0.60	0.63
Colour, KJ (wet)	-4.7	-4.8	-4.6	-4.8	-4.7	-4.9	-5.0	-4.9	-5.0	-4.9
Colour, Konica Minolta CM5 (dry)										
L*	94.02	94.06	93.79	94.02	93.86	94.12	94.11	93.67	94.12	93.98
a*	0.43	0.35	0.48	0.41	0.49	0.41	0.39	0.41	0.34	0.44
b*	9.99	10.41	10.32	10.54	10.69	10.67	10.48	10.44	10.11	10.47
RVA										
Peak Viscosity, cP	1284	2096	2226	2012	2085	1942	1975	2089	1924	2088
Minimum viscosity (Trough), cP	1130	1624	1764	1536	1554	1457	1506	1562	1486	1547
Final Viscosity, cP	1431	2349	2499	2229	2328	2204	2268	2445	2167	2383
Peak Time, min	6.47	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
GLUTEN										
Wet gluten (14% mb), %	32.7	28.6	27.0	33.4	35.7	34.7	28.8	25.7	27.1	29.4
Dry gluten (14% mb), %	11.1	9.8	9.0	11.5	12.2	11.7	9.7	8.6	9.1	9.7
Gluten Index	95	96	96	95	91	93	97	96	96	97
FARINOGRAM										
Water absorption (14% mb), %	59.8	57.1	56.7	59.2	60.9	61.0	58.3	58.5	58.1	58.4
Development time, min	5.0	4.8	5.0	4.5	6.3	5.5	4.7	5.0	4.5	5.2
Stability, min	8.5	8.0	7.7	9.4	10.0	9.6	8.1	6.8	7.1	7.2
Mixing tolerance index, BU	39	36	39	28	31	28	34	42	37	43
EXTENSOGRAM (45 min pull)										
Area, cm²	130	129	104	127	127	138	111	93	101	110
Maximum height, BU	403	422	384	402	383	392	365	338	348	371
Extensibility, mm	232	219	196	228	237	250	221	195	208	216
ALVEOGRAM										
Strength (S), cm²	47.2	38.3	37.1	44.5	45.5	45.1	39.2	35.9	39.6	41.3
Stability (P), mm	71	62	65	72	76	75	71	74	66	69
Distensibility (L), mm	200	174	152	155	166	161	151	131	168	172
Configuration ratio (P/L)	0.35	0.36	0.43	0.46	0.46	0.47	0.47	0.56	0.39	0.40
MIXOGRAM										
Peak time, min	2.4	2.8	3.0	2.6	2.5	2.4	2.6	2.6	2.6	2.5
100 g BAKING TEST										
Loaf volume, cm³	1198	1082	1043	1164	1217	1194	1140	1055	1185	1123
Evaluation (see page 79)	0	0	0	0	0	0	0	0	0	0

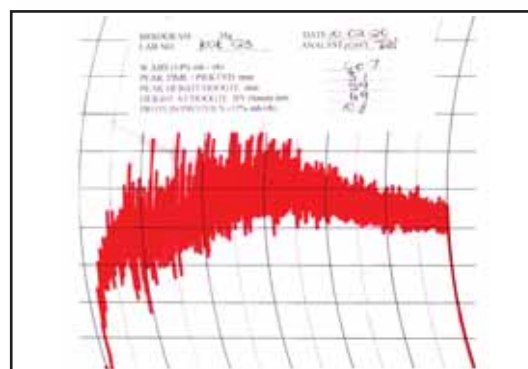
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

3

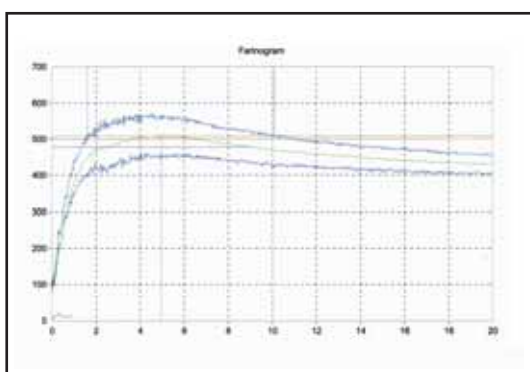


4

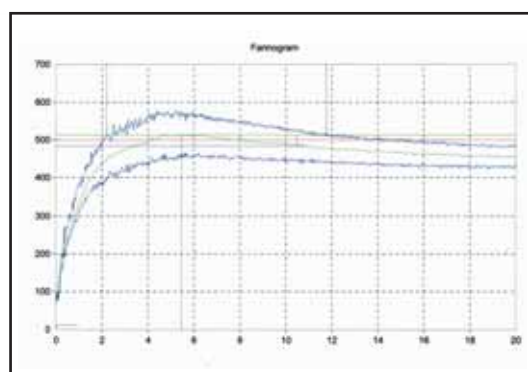


FARINOGRAM

3

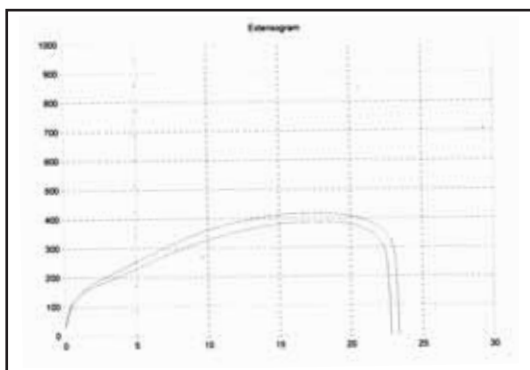


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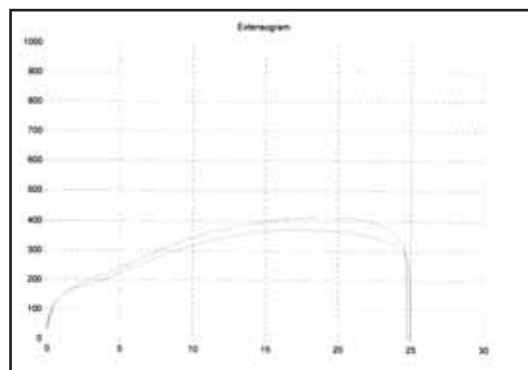


EXTENSOGRAM

3

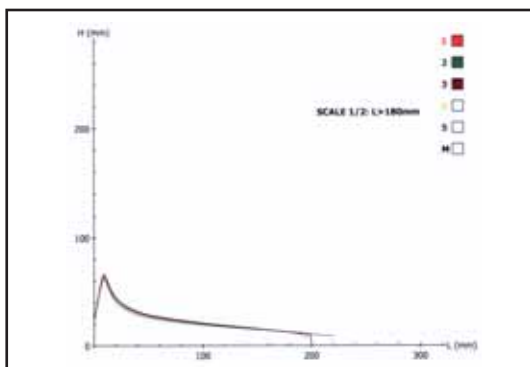


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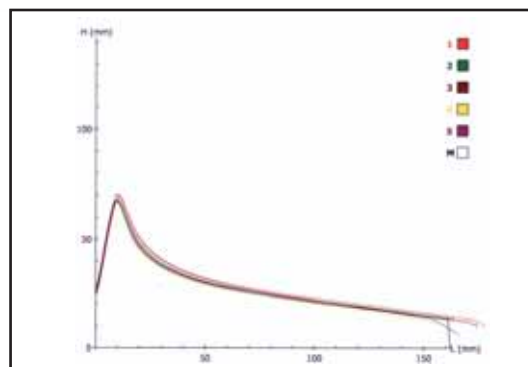


ALVEOGRAM

3



4



South African Quality data per production region

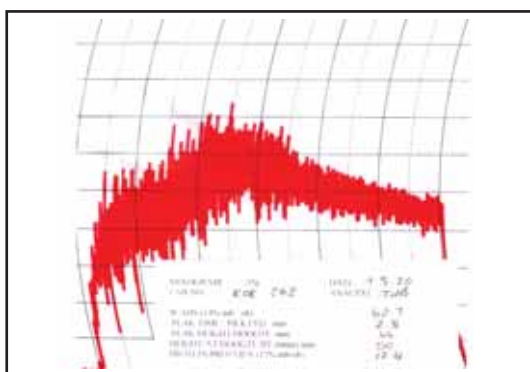
WINTER RAINFALL WHEAT

PRODUCTION REGION	(5) Rûens Western Region					(6) Rûens Eastern Region				
WHEAT	ave	min	max	stdev		ave	min	max	stdev	
Protein (12% mb), %	12.8	9.7	14.1	1.00		13.0	11.1	14.3	0.76	
Falling number, sec	342	289	440	45.61		389	334	447	29.13	
Moisture, %`	10.9	9.7	11.8	0.66		10.6	9.7	12.1	0.53	
1000 Kernel mass (13% mb), g	36.4	26.8	39.6	2.96		36.3	30.9	41.8	2.38	
Hectolitre mass (dirty), kg/hl	79.5	76.5	82.5	1.31		78.3	72.9	81.6	1.92	
Screenings (<1.8 mm sieve), %	1.35	0.27	3.60	1.04		1.83	0.23	4.42	0.86	
Total damaged kernels, %	0.59	0.12	1.24	0.36		0.51	0.16	2.36	0.44	
Combined deviations, %	2.58	1.07	5.54	1.40		2.81	0.85	7.24	1.23	
Number of samples	17					26				
CULTIVARS										
	SST 0117 26.9					SST 087 23.3				
cultivars	SST 0166 25.3					SST 0117 20.4				
with highest %	SST 087 13.6					SST 0127 17.0				
occurrence	SST 0147 12.3					SST 88 14.0				
	SST 88 12.1					SST 0166 13.4				
Number of samples	17					26				
MIXOGRAM (Quadromat Junior)										
	ave	min	max	stdev		ave	min	max	stdev	
Peak time, min	2.8	2.5	3.1	0.19		2.7	2.4	3.2	0.17	
Tail height (6 min), mm	50	44	53	1.90		50	44	55	2.36	
Number of samples	17					26				
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	75.5	75.2	-	-	74.2	74.1	74.3	-	-	72.5
FLOUR										
Protein (12% mb), %	12.3	11.2	-	-	12.4	12.4	11.2	-	-	12.2
Moisture, %	13.6	14.4	-	-	14.1	14.0	13.9	-	-	13.5
Ash (db), %	0.65	0.62	-	-	0.63	0.65	0.61	-	-	0.64
Colour, KJ (wet)	-4.5	-4.8	-	-	-4.7	-4.5	-4.8	-	-	-4.5
Colour, Konica Minolta CM5 (dry)										
L*	93.59	93.73	-	-	93.65	93.71	93.79	-	-	93.78
a*	0.58	0.43	-	-	0.45	0.49	0.50	-	-	0.39
b*	9.97	10.36	-	-	10.44	10.62	10.59	-	-	11.67
RVA										
Peak Viscosity, cP	2188	2092	-	-	2138	2216	2231	-	-	2017
Minimum viscosity (Trough), cP	1682	1639	-	-	1818	1598	1619	-	-	1429
Final Viscosity, cP	2420	2318	-	-	2319	2583	2693	-	-	2334
Peak Time, min	7.00	7.00	-	-	6.33	7.00	7.00	-	-	7.00
GLUTEN										
Wet gluten (14% mb), %	31.5	28.4	-	-	32.0	33.5	29.6	-	-	32.8
Dry gluten (14% mb), %	10.8	9.7	-	-	10.7	11.6	9.9	-	-	11.2
Gluten Index	96	95	-	-	98	94	96	-	-	94
FARINOGRAM										
Water absorption (14% mb), %	60.7	59.8	-	-	60.7	61.5	60.4	-	-	61.6
Development time, min	4.8	4.8	-	-	5.7	4.5	4.5	-	-	4.7
Stability, min	7.1	6.7	-	-	8.5	6.5	7.0	-	-	6.4
Mixing tolerance index, BU	41	41	-	-	37	45	38	-	-	44
EXTENSOGRAM (45 min pull)										
Area, cm²	107	102	-	-	111	98	86	-	-	94
Maximum height, BU	350	372	-	-	356	322	333	-	-	322
Extensibility, mm	215	198	-	-	220	215	186	-	-	205
ALVEOGRAM										
Strength (S), cm²	40.2	39.3	-	-	44.4	42.9	37.0	-	-	43.9
Stability (P), mm	76	80	-	-	76	83	83	-	-	86
Distensibility (L), mm	140	128	-	-	167	149	117	-	-	149
Configuration ratio (P/L)	0.54	0.63	-	-	0.46	0.56	0.71	-	-	0.58
MIXOGRAM										
Peak time, min	2.5	2.4	-	-	2.4	2.0	2.4	-	-	2.1
100 g BAKING TEST										
Loaf volume, cm³	1109	1054	-	-	1143	1137	1030	-	-	1085
Evaluation (see page 79)	0	0	-	-	0	0	0	-	-	0

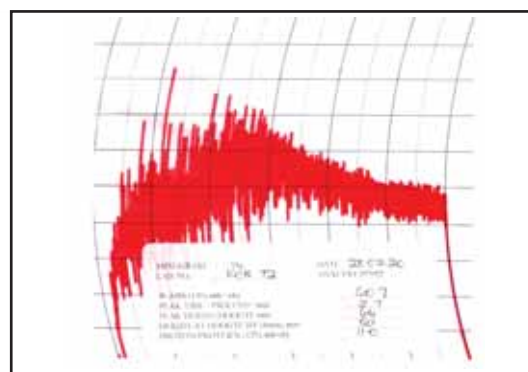
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

5

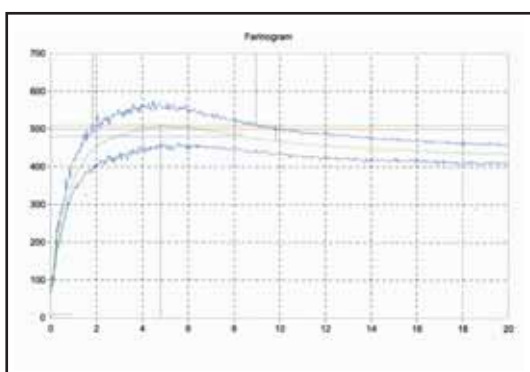


6

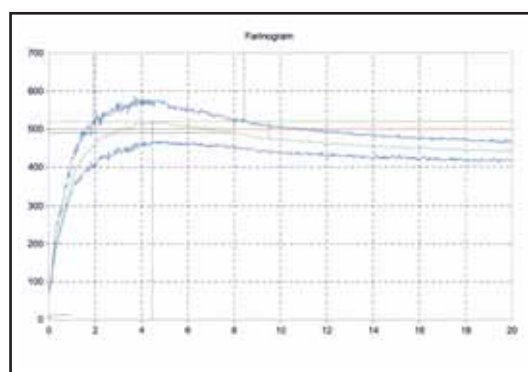


FARINOGRAM

5

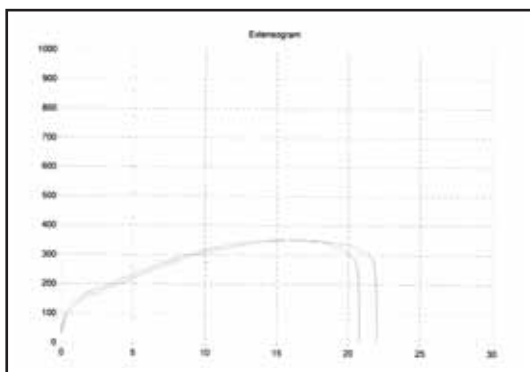


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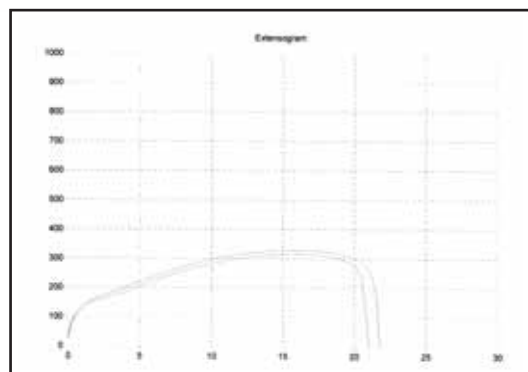


EXTENSOGRAM

5

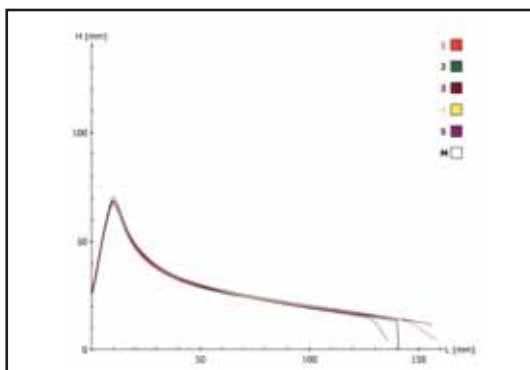


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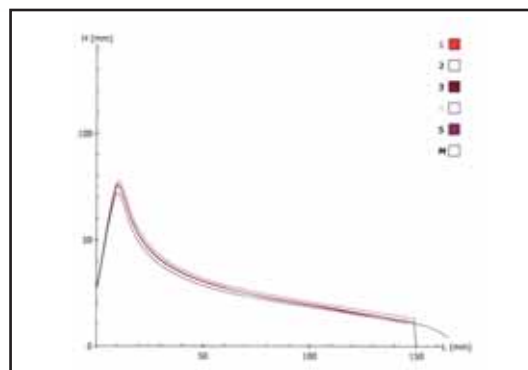


ALVEOGRAM

5



6



South African Quality data per production region

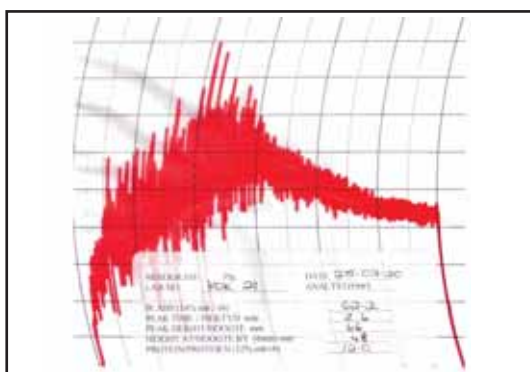
IRRIGATION WHEAT

PRODUCTION REGION	(10) Griqualand West Region					(11) Vaalharts Region				
WHEAT	ave	min	max	stdev		ave	min	max	stdev	
Protein (12% mb), %	12.7	10.8	15.7	1.02		12.6	10.8	14.2	0.90	
Falling number, sec	356	225	440	38.90		421	264	584	90.97	
Moisture, %	9.4	8.2	10.5	0.63		9.8	8.3	10.3	0.45	
1000 Kernel mass (13% mb), g	41.2	36.6	45.4	2.20		38.6	34.5	42.1	2.33	
Hectolitre mass (dirty), kg/hl	82.8	79.8	85.3	1.67		82.0	75.0	84.5	2.78	
Screenings (<1.8 mm sieve), %	0.67	0.05	2.45	0.60		1.29	0.31	3.15	0.89	
Total damaged kernels, %	0.29	0.08	0.48	0.10		0.42	0.00	1.50	0.43	
Combined deviations, %	1.22	0.59	3.05	0.62		2.22	0.51	5.41	1.24	
Number of samples	25					16				
CULTIVARS										
	SST 8135 24.4					SST 8156 29.1				
cultivars	SST 8154 22.9					PAN 3497 23.2				
with highest %	SST 8156 18.0					SST 884 20.8				
occurrence	PAN 3400 13.2					SST 806 9.2				
	PAN 3497 6.4					SST 8154 6.6				
Number of samples	25					16				
MIXOGRAM (Quadromat Junior)										
	ave	min	max	stdev		ave	min	max	stdev	
Peak time, min	2.5	2.1	2.9	0.23		2.8	2.4	3.3	0.24	
Tail height (6 min), mm	47	42	51	2.55		47	45	51	1.86	
Number of samples	25					16				
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	75.1	76.7	77.4	-	-	76.5	77.2	76.5	-	-
FLOUR										
Protein (12% mb), %	12.5	11.2	10.1	-	-	12.4	11.3	10.3	-	-
Moisture, %	13.7	14.1	13.9	-	-	14.0	13.7	13.5	-	-
Ash (db), %	0.62	0.64	0.62	-	-	0.65	0.64	0.65	-	-
Colour, KJ (wet)	-5.0	-5.0	-5.0	-	-	-5.0	-5.0	-5.0	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.73	93.72	93.85	-	-	93.84	93.85	93.87	-	-
a*	0.52	0.56	0.57	-	-	0.49	0.46	0.48	-	-
b*	10.28	10.87	11.47	-	-	10.43	10.38	10.89	-	-
RVA										
Peak Viscosity, cP	2045	1979	1921	-	-	2167	2313	2098	-	-
Minimum viscosity (Trough), cP	1586	1536	1565	-	-	1659	1856	1705	-	-
Final Viscosity, cP	2241	2207	2193	-	-	2344	2512	2393	-	-
Peak Time, min	7.00	7.00	7.00	-	-	7.00	7.00	7.00	-	-
GLUTEN										
Wet gluten (14% mb), %	36.5	32.8	29.3	-	-	32.5	29.5	27.2	-	-
Dry gluten (14% mb), %	12.2	10.7	9.4	-	-	10.8	10.3	8.9	-	-
Gluten Index	81	79	90	-	-	97	97	96	-	-
FARINOGRAM										
Water absorption (14% mb), %	62.4	61.9	61.3	-	-	61.9	61.4	60.5	-	-
Development time, min	4.5	4.2	5.5	-	-	5.7	5.7	5.2	-	-
Stability, min	5.5	5.5	6.6	-	-	6.7	7.4	6.5	-	-
Mixing tolerance index, BU	55	48	52	-	-	46	44	48	-	-
EXTENSOGRAM (45 min pull)										
Area, cm²	84	87	86	-	-	113	112	95	-	-
Maximum height, BU	293	302	326	-	-	364	407	345	-	-
Extensibility, mm	202	202	192	-	-	225	199	199	-	-
ALVEOGRAM										
Strength (S), cm²	40.9	37.5	37.2	-	-	41.7	44.5	35.9	-	-
Stability (P), mm	76	80	86	-	-	79	88	86	-	-
Distensibility (L), mm	149	123	106	-	-	130	125	98	-	-
Configuration ratio (P/L)	0.51	0.65	0.81	-	-	0.61	0.70	0.88	-	-
MIXOGRAM										
Peak time, min	2.0	2.3	2.4	-	-	2.5	2.5	2.5	-	-
100 g BAKING TEST										
Loaf volume, cm³	1263	1131	1036	-	-	1226	1094	1036	-	-
Evaluation (see page 79)	0	0	0	-	-	0	0	0	-	-

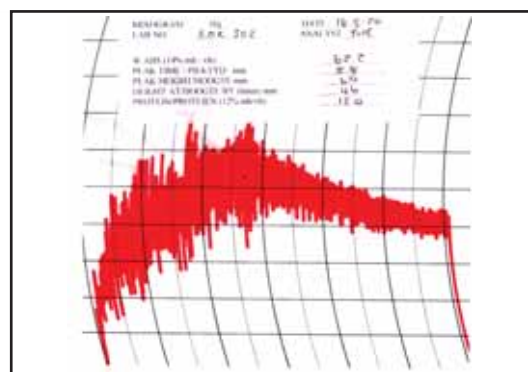
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

10

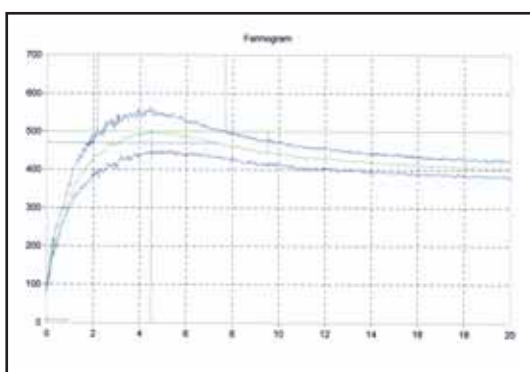


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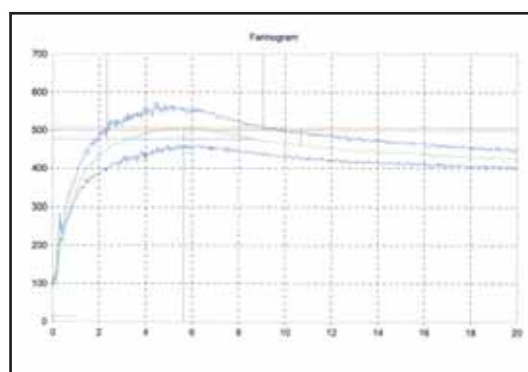


FARINOGRAM

10

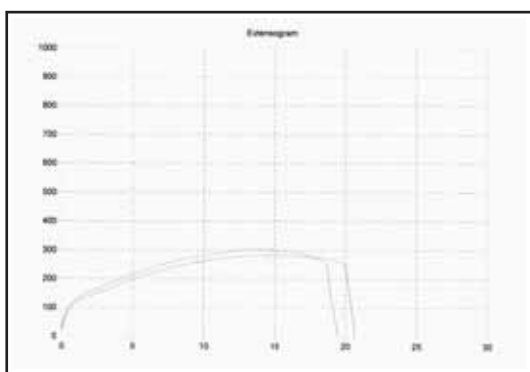


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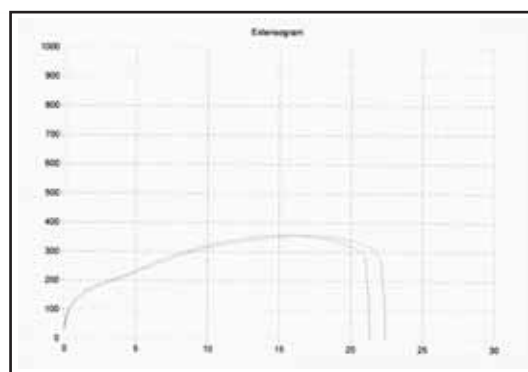


EXTENSOGRAM

10

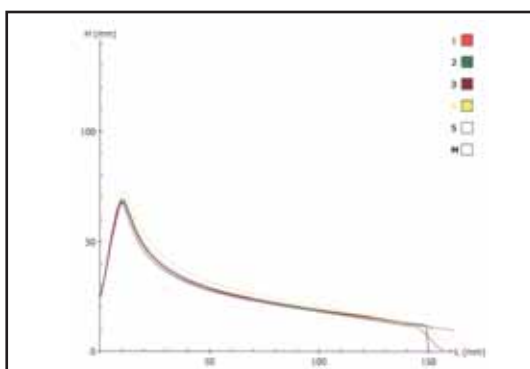


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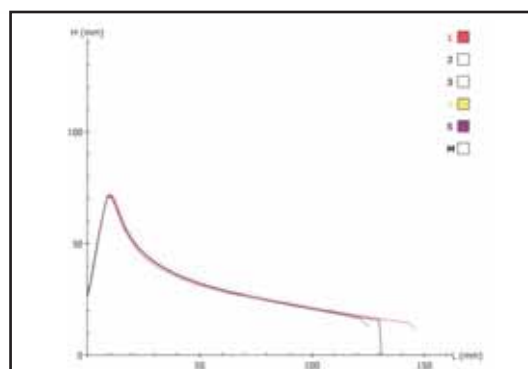


ALVEOGRAM

10



11



South African Quality data per production region

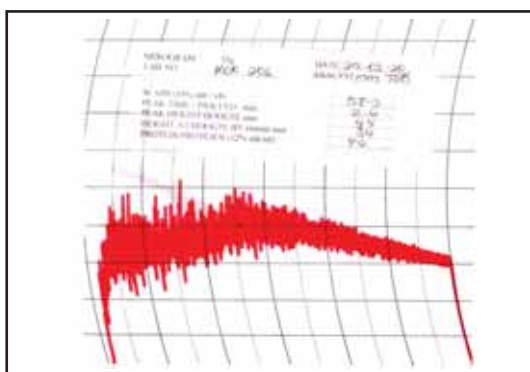
IRRIGATION WHEAT

PRODUCTION REGION	(12) North West Western Region				(14) North West Southern Region					
WHEAT	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	12.2	10.3	14.7	2.26	14.2	13.8	14.5	0.29		
Falling number, sec	268	47	388	191.36	240	104	355	116.54		
Moisture, %`	9.4	8.2	10.5	1.16	10.1	9.3	10.4	0.54		
1000 Kernel mass (13% mb), g	40.6	38.7	42.2	1.77	34.0	31.9	36.0	1.85		
Hectolitre mass (dirty), kg/hl	80.4	73.1	85.4	6.45	80.1	78.2	83.6	2.42		
Screenings (<1.8 mm sieve), %	0.97	0.42	1.34	0.48	0.93	0.45	1.46	0.54		
Total damaged kernels, %	7.04	0.54	15.04	7.37	2.92	0.48	8.60	3.84		
Combined deviations, %	8.15	1.08	16.60	7.85	4.05	1.49	9.05	3.47		
Number of samples	3				4					
CULTIVARS										
	SST 8135 52.7				SST 843 76.2					
cultivars	SST 884 17.0				SST 884 13.0					
with highest %	SST 8156 16.3				SST 875 6.0					
occurrence	SST 8154 7.7				SST 895 4.8					
	PAN 3400 6.3									
Number of samples	3				4					
MIXOGRAM (Quadromat Junior)	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	2.6	1.8	3.3	0.75	4.4	3.5	6.3	1.27		
Tail height (6 min), mm	42	34	49	7.64	56	52	62	4.24		
Number of samples	3				4					
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	76.1	-	-	-	74.1	73.5	-	-	-	71.8
FLOUR										
Protein (12% mb), %	13.9	-	-	-	10.3	13.3	-	-	-	13.2
Moisture, %	13.6	-	-	-	13.6	14.4	-	-	-	14.2
Ash (db), %	0.69	-	-	-	0.54	0.60	-	-	-	0.60
Colour, KJ (wet)	-4.9	-	-	-	-4.7	-5.0	-	-	-	-4.8
Colour, Konica Minolta CM5 (dry)										
L*	93.57	-	-	-	94.05	93.92	-	-	-	93.98
a*	0.49	-	-	-	0.32	0.48	-	-	-	0.40
b*	9.75	-	-	-	9.68	9.46	-	-	-	8.70
RVA										
Peak Viscosity, cP	2390	-	-	-	200	1838	-	-	-	559
Minimum viscosity (Trough), cP	1799	-	-	-	21	1601	-	-	-	237
Final Viscosity, cP	2457	-	-	-	29	1952	-	-	-	426
Peak Time, min	7.00	-	-	-	3.40	6.93	-	-	-	4.67
GLUTEN										
Wet gluten (14% mb), %	-	-	-	-	26.8	32.5	-	-	-	30.3
Dry gluten (14% mb), %	-	-	-	-	9.1	11.4	-	-	-	11.1
Gluten Index	-	-	-	-	99	99	-	-	-	99
FARINOGRAM										
Water absorption (14% mb), %	67.5	-	-	-	55.6	61.4	-	-	-	59.0
Development time, min	4.3	-	-	-	2.4	9.0	-	-	-	6.7
Stability, min	3.5	-	-	-	4.2	15.2	-	-	-	17.2
Mixing tolerance index, BU	57	-	-	-	83	22	-	-	-	18
EXTENSOGRAM (45 min pull)										
Area, cm²	69	-	-	-	105	187	-	-	-	163
Maximum height, BU	242	-	-	-	343	552	-	-	-	525
Extensibility, mm	193	-	-	-	225	249	-	-	-	234
ALVEOGRAM										
Strength (S), cm²	39.0	-	-	-	27.3	62.6	-	-	-	66.1
Stability (P), mm	98	-	-	-	42	90	-	-	-	87
Distensibility (L), mm	107	-	-	-	213	144	-	-	-	140
Configuration ratio (P/L)	0.92	-	-	-	0.20	0.63	-	-	-	0.62
MIXOGRAM										
Peak time, min	1.4	-	-	-	2.6	3.5	-	-	-	4.5
100 g BAKING TEST										
Loaf volume, cm³	1298	-	-	-	1041	1258	-	-	-	1230
Evaluation (see page 79)	0	-	-	-	0	0	-	-	-	0

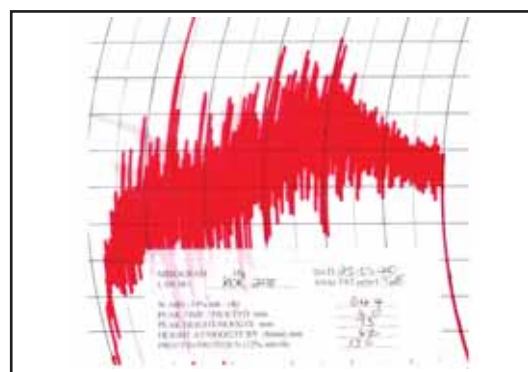
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

12

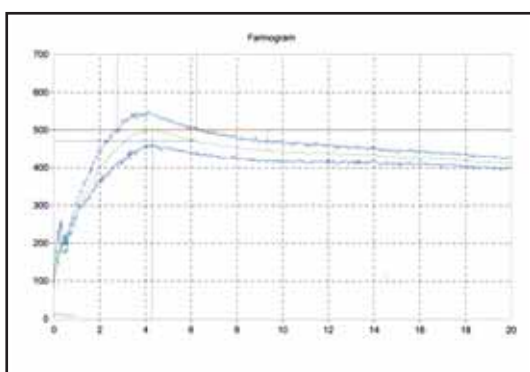


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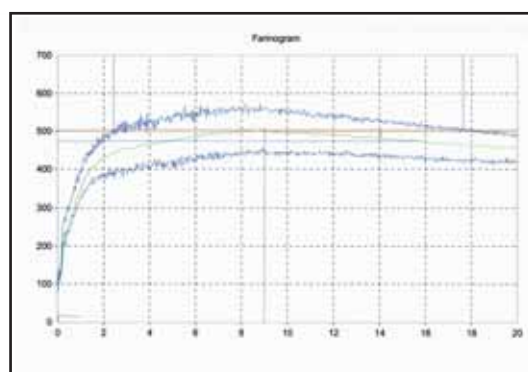


FARINOGRAM

12

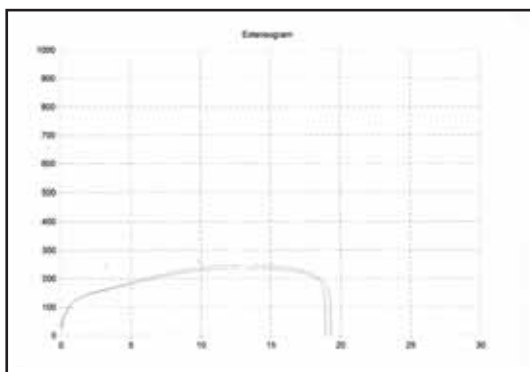


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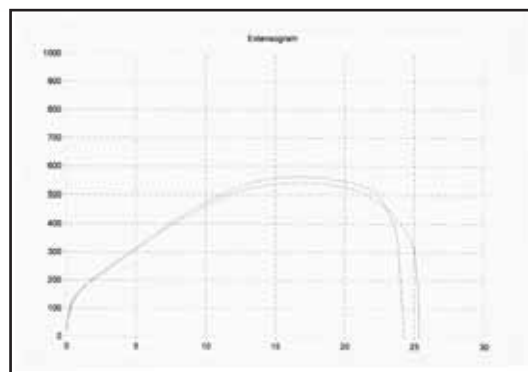


EXTENSOGRAM

12

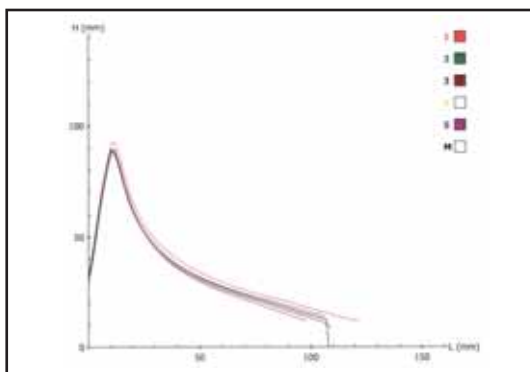


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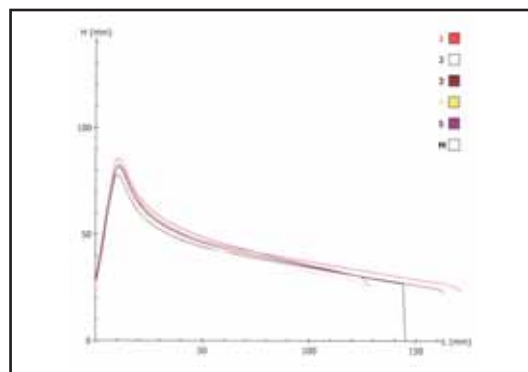


ALVEOGRAM

12



14



South African Quality data per production region

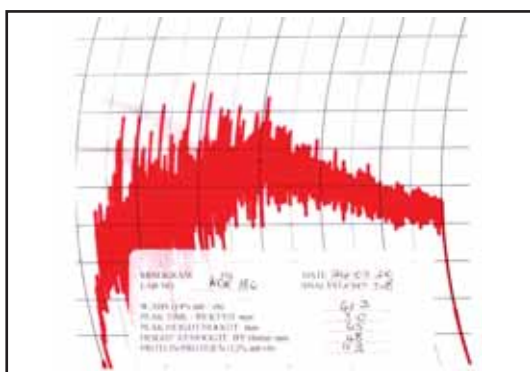
IRRIGATION WHEAT

PRODUCTION REGION	(15) North West South-Eastern Region					(16) North West Central-Eastern Region				
WHEAT	ave	min	max	stdev		ave	min	max	stdev	
Protein (12% mb), %	13.2	11.4	15.6	1.31		12.6	10.9	14.2	1.36	
Falling number, sec	401	320	529	60.33		284	89	399	142.89	
Moisture, %	9.7	8.5	10.8	0.85		10.8	10.6	11.0	0.21	
1000 Kernel mass (13% mb), g	35.7	28.7	38.7	3.19		36.8	31.9	41.7	4.28	
Hectolitre mass (dirty), kg/hl	78.3	75.5	80.1	1.49		77.5	70.5	81.5	4.84	
Screenings (<1.8 mm sieve), %	1.38	0.49	2.36	0.57		2.91	0.96	7.21	2.92	
Total damaged kernels, %	0.35	0.00	1.02	0.29		3.52	0.08	10.60	4.80	
Combined deviations, %	2.11	0.57	3.76	0.87		7.03	1.70	11.90	4.95	
Number of samples	9					4				
CULTIVARS										
	PAN 3368 21.6					PAN 3368 21.3				
cultivars	PAN 3400 19.1					SST 8156 17.5				
with highest %	SST 8135 12.6					SST 8154 16.0				
occurrence	MATLABAS 11.1					PAN 3497 12.5				
	SST 398 10.6					SST 884 12.0				
Number of samples	9					4				
MIXOGRAM (Quadromat Junior)										
	ave	min	max	stdev		ave	min	max	stdev	
Peak time, min	3.0	2.5	3.6	0.38		3.0	2.4	3.8	0.58	
Tail height (6 min), mm	49	47	52	1.45		48	44	52	3.42	
Number of samples	9					4				
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	72.4	73.6	75.2	-	-	-	-	78.5	-	73.9
FLOUR										
Protein (12% mb), %	12.4	10.8	10.2	-	-	-	-	10.1	-	12.1
Moisture, %	14.0	14.3	13.7	-	-	-	-	13.6	-	13.6
Ash (db), %	0.62	0.71	0.60	-	-	-	-	0.64	-	0.61
Colour, KJ (wet)	-4.7	-4.8	-4.9	-	-	-	-	-5.0	-	-4.2
Colour, Konica Minolta CM5 (dry)										
L*	93.60	93.61	93.80	-	-	-	-	93.90	-	93.41
a*	0.44	0.46	0.50	-	-	-	-	0.40	-	0.39
b*	10.97	9.87	10.18	-	-	-	-	11.09	-	10.37
RVA										
Peak Viscosity, cP	1729	2395	2305	-	-	-	-	2365	-	637
Minimum viscosity (Trough), cP	1528	1640	1815	-	-	-	-	1801	-	366
Final Viscosity, cP	1909	2636	2575	-	-	-	-	2677	-	630
Peak Time, min	6.87	7.00	7.00	-	-	-	-	7.00	-	5.13
GLUTEN										
Wet gluten (14% mb), %	33.1	28.4	25.2	-	-	-	-	23.7	-	32.5
Dry gluten (14% mb), %	11.5	9.3	8.3	-	-	-	-	8.2	-	10.8
Gluten Index	97	97	98	-	-	-	-	99	-	97
FARINOGRAM										
Water absorption (14% mb), %	61.4	60.6	59.4	-	-	-	-	58.0	-	60.3
Development time, min	5.3	5.7	6.5	-	-	-	-	5.4	-	4.5
Stability, min	7.3	8.8	11.5	-	-	-	-	8.5	-	5.5
Mixing tolerance index, BU	40	34	23	-	-	-	-	38	-	62
EXTENSOGRAM (45 min pull)										
Area, cm²	108	107	114	-	-	-	-	106	-	91
Maximum height, BU	386	434	507	-	-	-	-	375	-	292
Extensibility, mm	204	179	167	-	-	-	-	205	-	223
ALVEOGRAM										
Strength (S), cm²	45.4	38.4	42.2	-	-	-	-	33.8	-	35.4
Stability (P), mm	85	97	110	-	-	-	-	73	-	59
Distensibility (L), mm	136	90	81	-	-	-	-	103	-	188
Configuration ratio (P/L)	0.63	1.08	1.36	-	-	-	-	0.71	-	0.31
MIXOGRAM										
Peak time, min	2.4	3.0	3.4	-	-	-	-	2.9	-	2.3
100 g BAKING TEST										
Loaf volume, cm³	1163	1036	961	-	-	-	-	1114	-	1287
Evaluation (see page 79)	0	0	0	-	-	-	-	0	-	0

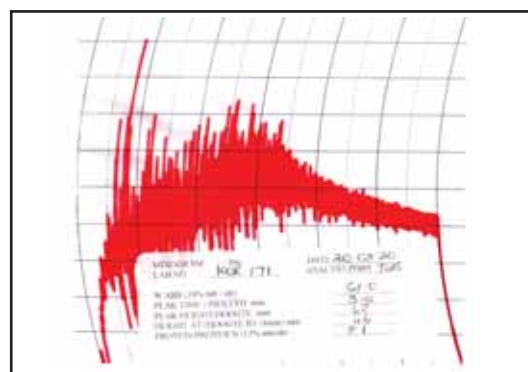
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

15

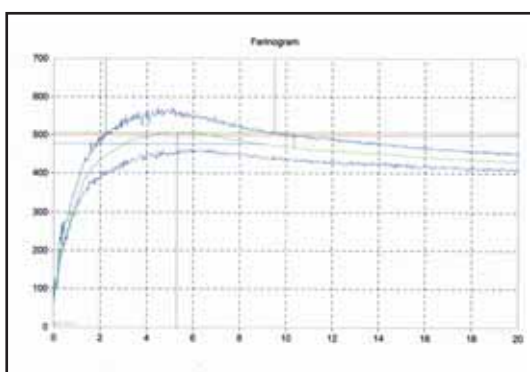


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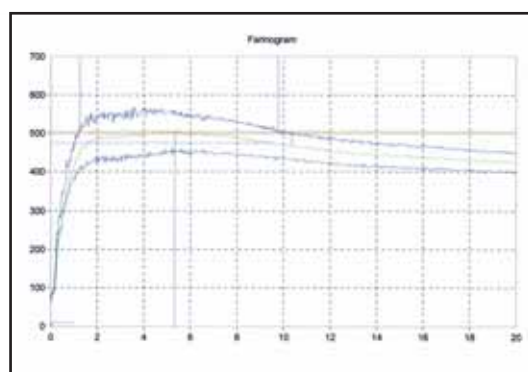


FARINOGRAM

15

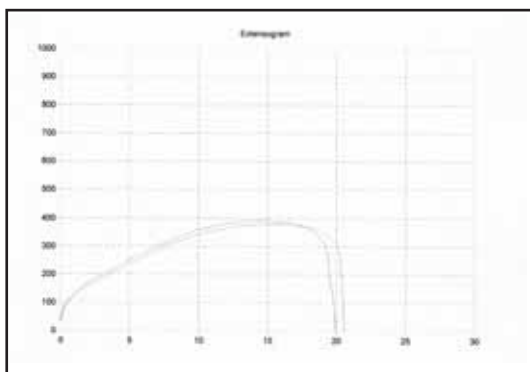


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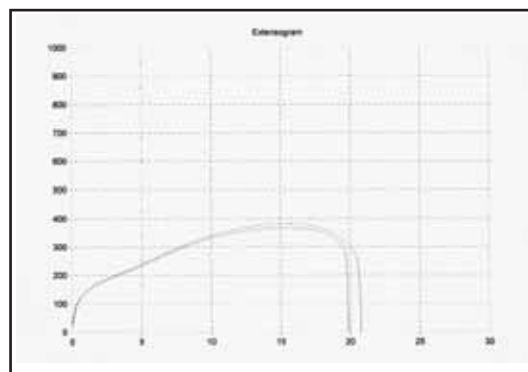


EXTENSOGRAM

15

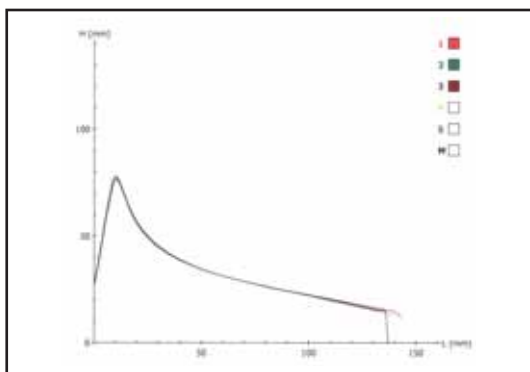


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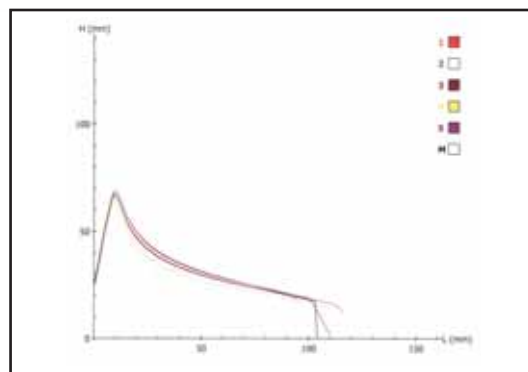


ALVEOGRAM

15



16



South African Quality data per production region

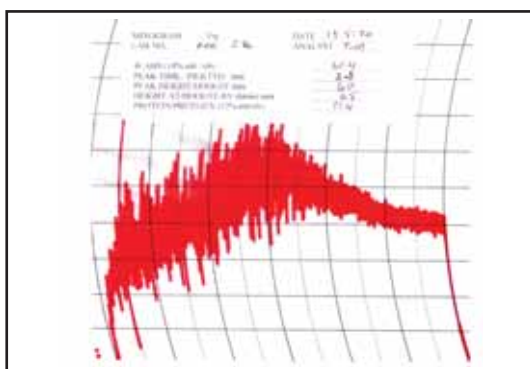
IRRIGATION WHEAT

PRODUCTION REGION	(17) North West Central-Northern Region (Ottosdal)				(18) North West Central Region (Ventersdorp)					
WHEAT	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	13.0	11.7	14.3	1.07	12.2	-	-	-		
Falling number, sec	306	47	423	152.27	436	-	-	-		
Moisture, %	10.0	9.6	10.3	0.27	9.9	-	-	-		
1000 Kernel mass (13% mb), g	35.4	29.2	43.1	5.72	37.5	-	-	-		
Hectolitre mass (dirty), kg/hl	77.0	58.8	83.6	10.27	82.6	-	-	-		
Screenings (<1.8 mm sieve), %	2.80	0.43	11.38	4.80	1.75	-	-	-		
Total damaged kernels, %	2.68	0.24	12.44	5.45	0.46	-	-	-		
Combined deviations, %	5.82	0.75	24.86	10.65	2.45	-	-	-		
Number of samples	5				1					
CULTIVARS										
	SST 884		41.0		SST 884		100.0			
cultivars	SST 8156		15.6		-		-			
with highest %	PAN 3400		12.4		-		-			
occurrence	PAN 3497		10.6		-		-			
	SST 8135		5.4		-		-			
Number of samples	5				1					
MIXOGRAM (Quadromat Junior)	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	2.9	2.5	3.5	0.41	2.9	-	-	-		
Tail height (6 min), mm	45	31	52	8.20	46	-	-	-		
Number of samples	5				1					
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	74.7	76.8	-	-	-	74.6	-	-	-	-
FLOUR										
Protein (12% mb), %	13.1	11.5	-	-	-	11.3	-	-	-	-
Moisture, %	14.4	14.2	-	-	-	13.6	-	-	-	-
Ash (db), %	0.67	0.63	-	-	-	0.70	-	-	-	-
Colour, KJ (wet)	-4.9	-5.0	-	-	-	-4.7	-	-	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.70	94.10	-	-	-	93.52	-	-	-	-
a*	0.52	0.48	-	-	-	0.44	-	-	-	-
b*	9.89	9.40	-	-	-	9.80	-	-	-	-
RVA										
Peak Viscosity, cP	2388	2341	-	-	-	2396	-	-	-	-
Minimum viscosity (Trough), cP	1805	1820	-	-	-	1795	-	-	-	-
Final Viscosity, cP	2612	2610	-	-	-	2556	-	-	-	-
Peak Time, min	7.00	7.00	-	-	-	7.00	-	-	-	-
GLUTEN										
Wet gluten (14% mb), %	34.8	30.2	-	-	-	30.4	-	-	-	-
Dry gluten (14% mb), %	12.0	10.9	-	-	-	10.4	-	-	-	-
Gluten Index	99	98	-	-	-	96	-	-	-	-
FARINOGRAM										
Water absorption (14% mb), %	61.4	59.3	-	-	-	61.1	-	-	-	-
Development time, min	6.3	5.0	-	-	-	4.0	-	-	-	-
Stability, min	9.5	6.5	-	-	-	5.3	-	-	-	-
Mixing tolerance index, BU	33	50	-	-	-	55	-	-	-	-
EXTENSOGRAM (45 min pull)										
Area, cm²	137	109	-	-	-	99	-	-	-	-
Maximum height, BU	421	369	-	-	-	379	-	-	-	-
Extensibility, mm	235	214	-	-	-	188	-	-	-	-
ALVEOGRAM										
Strength (S), cm²	50.6	42.1	-	-	-	39.6	-	-	-	-
Stability (P), mm	83	72	-	-	-	93	-	-	-	-
Distensibility (L), mm	150	166	-	-	-	105	-	-	-	-
Configuration ratio (P/L)	0.55	0.43	-	-	-	0.89	-	-	-	-
MIXOGRAM										
Peak time, min	2.6	2.5	-	-	-	2.3	-	-	-	-
100 g BAKING TEST										
Loaf volume, cm³	1181	1119	-	-	-	1062	-	-	-	-
Evaluation (see page 79)	0	0	-	-	-	0	-	-	-	-

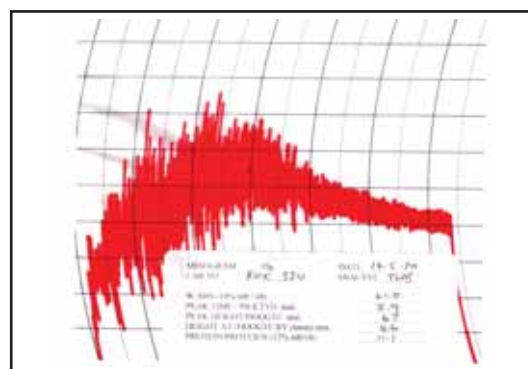
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

17

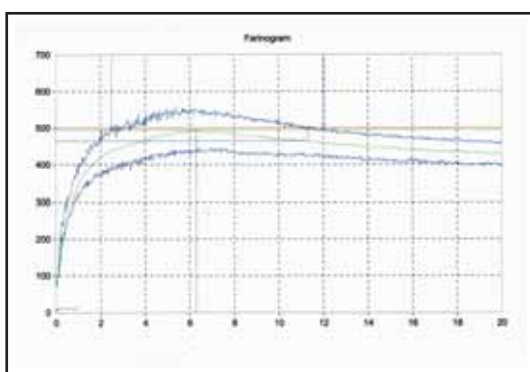


18

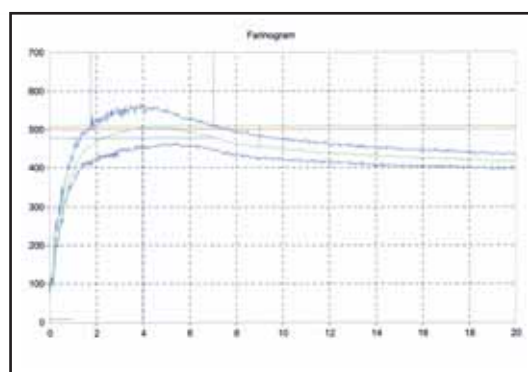


FARINOGRAM

17

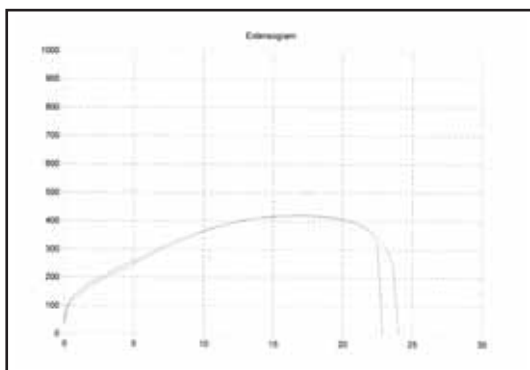


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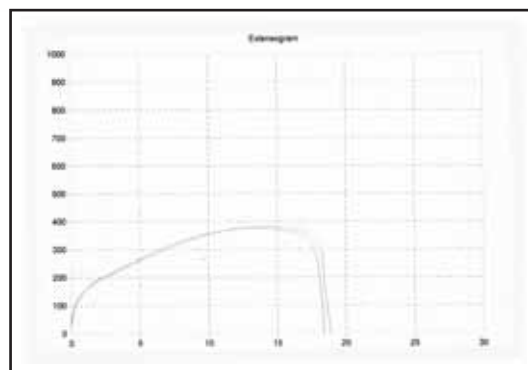


EXTENSOGRAM

17

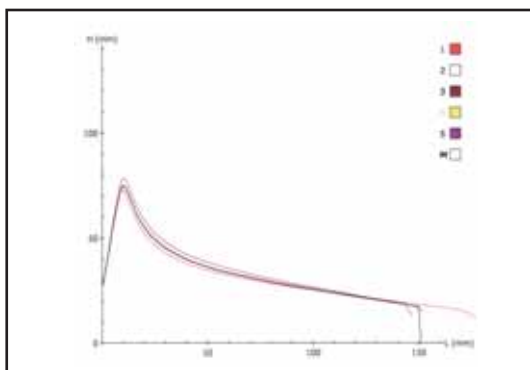


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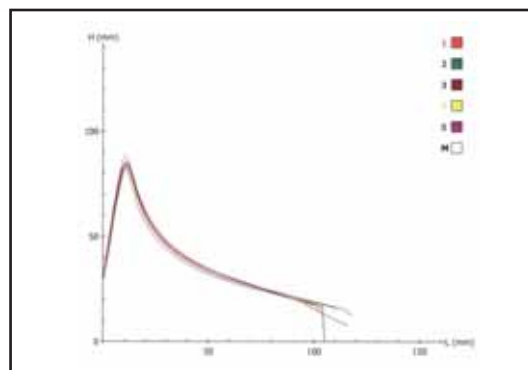


ALVEOGRAM

17



18



South African Quality data per production region

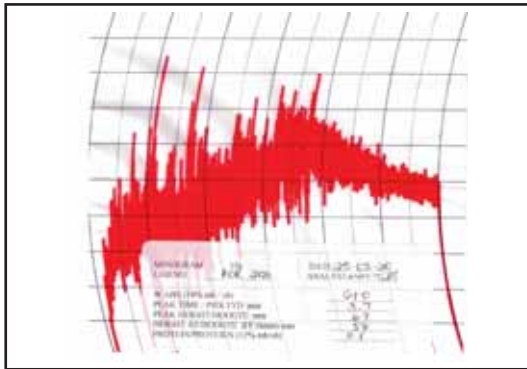
IRRIGATION WHEAT

PRODUCTION REGION	(19) North West Central Region (Lichtenburg)					(20) North West Eastern Region				
WHEAT	ave	min	max	stdev		ave	min	max	stdev	
Protein (12% mb), %	13.6	9.5	17.6	1.85		12.2	11.0	13.9	0.82	
Falling number, sec	256	46	479	160.49		366	47	467	103.56	
Moisture, %	10.3	8.5	11.3	0.82		10.4	8.4	11.4	0.73	
1000 Kernel mass (13% mb), g	34.4	28.3	42.4	4.51		38.0	31.6	44.9	3.20	
Hectolitre mass (dirty), kg/hl	78.0	63.4	82.5	4.78		79.6	71.5	84.3	2.48	
Screenings (<1.8 mm sieve), %	2.05	0.15	4.46	1.64		1.79	0.89	3.16	0.66	
Total damaged kernels, %	5.88	0.00	40.30	10.90		3.09	0.00	69.66	12.53	
Combined deviations, %	8.50	0.47	44.23	11.35		5.34	1.46	72.34	12.61	
Number of samples	14					31				
CULTIVARS										
	SST 843 41.1					SST 8135 28.8				
cultivars	SST 884 23.9					SST 884 23.9				
with highest %	SST 8135 16.4					SST 8154 14.5				
occurrence	SST 875 5.3					SST 8156 9.1				
	SST 8156 4.4					DUZI 6.5				
Number of samples	14					31				
MIXOGRAM (Quadromat Junior)	ave	min	max	stdev		ave	min	max	stdev	
Peak time, min	3.9	2.5	5.7	1.07		3.1	2.1	4.2	0.42	
Tail height (6 min), mm	50	34	64	8.46		48	31	59	4.44	
Number of samples	14					31				
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	73.9	-	-	-	72.5	75.8	76.4	76.0	-	74.7
FLOUR										
Protein (12% mb), %	13.4	-	-	-	12.1	12.2	11.1	10.3	-	11.8
Moisture, %	14.0	-	-	-	13.6	14.1	13.8	13.8	-	13.6
Ash (db), %	0.61	-	-	-	0.61	0.61	0.62	0.62	-	0.63
Colour, KJ (wet)	-5.0	-	-	-	-4.4	-5.0	-5.0	-5.0	-	-4.4
Colour, Konica Minolta CM5 (dry)										
L*	93.98	-	-	-	93.78	93.66	93.82	93.84	-	93.45
a*	0.49	-	-	-	0.41	0.50	0.44	0.43	-	0.42
b*	9.21	-	-	-	9.43	10.20	10.06	9.86	-	9.85
RVA										
Peak Viscosity, cP	2259	-	-	-	324	2350	2336	2387	-	225
Minimum viscosity (Trough), cP	1647	-	-	-	49	1797	1804	1869	-	27
Final Viscosity, cP	2434	-	-	-	64	2622	2639	2683	-	36
Peak Time, min	7.00	-	-	-	3.53	7.00	7.00	7.00	-	3.47
GLUTEN										
Wet gluten (14% mb), %	34.1	-	-	-	32.2	31.6	29.1	27.1	-	31.3
Dry gluten (14% mb), %	11.9	-	-	-	10.7	10.9	9.8	9.2	-	10.6
Gluten Index	99	-	-	-	97	98	99	99	-	97
FARINOGRAM										
Water absorption (14% mb), %	61.3	-	-	-	57.3	60.0	59.5	59.1	-	57.4
Development time, min	9.3	-	-	-	4.3	6.5	5.3	5.5	-	2.8
Stability, min	17.0	-	-	-	8.4	10.0	7.6	7.0	-	4.4
Mixing tolerance index, BU	13	-	-	-	42	31	40	46	-	82
EXTENSOGRAM (45 min pull)										
Area, cm²	174	-	-	-	156	142	112	99	-	100
Maximum height, BU	535	-	-	-	465	460	383	372	-	314
Extensibility, mm	241	-	-	-	247	225	216	195	-	234
ALVEOGRAM										
Strength (S), cm²	62.8	-	-	-	45.4	48.9	39.6	36.1	-	29.6
Stability (P), mm	96	-	-	-	54	81	75	76	-	44
Distensibility (L), mm	128	-	-	-	228	142	134	117	-	214
Configuration ratio (P/L)	0.75	-	-	-	0.24	0.57	0.56	0.65	-	0.21
MIXOGRAM										
Peak time, min	3.6	-	-	-	3.1	2.9	2.9	2.9	-	2.5
100 g BAKING TEST										
Loaf volume, cm³	1204	-	-	-	1240	1124	1115	1032	-	1212
Evaluation (see page 79)	0	-	-	-	0	0	0	0	-	0

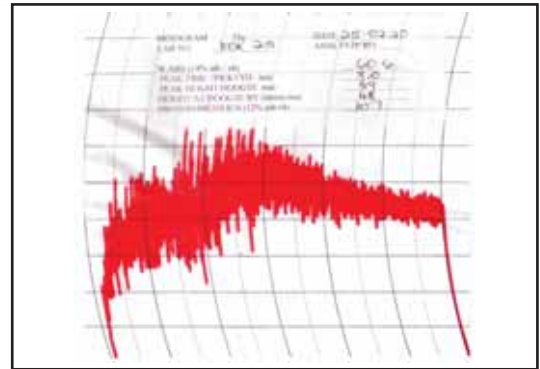
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

19

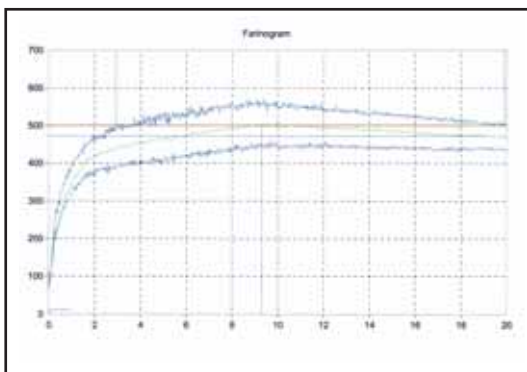


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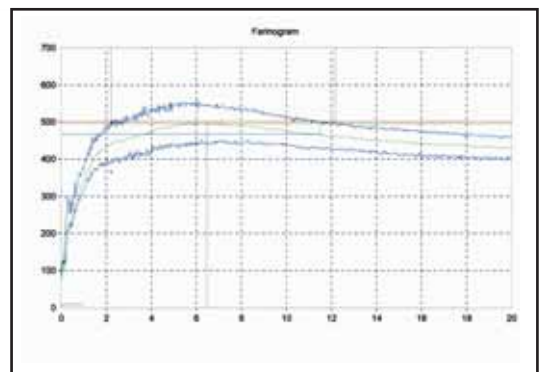


FARINOGRAM

19

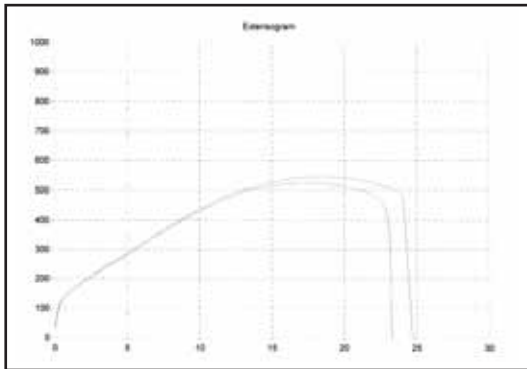


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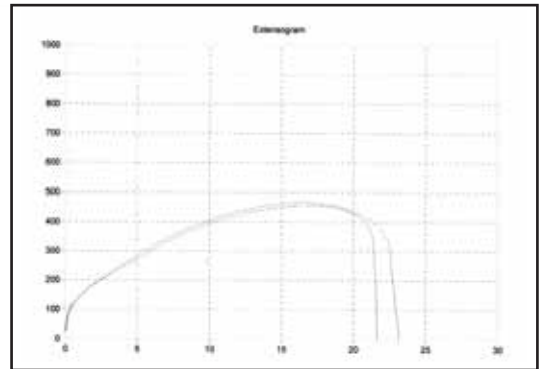


EXTENSOGRAM

19

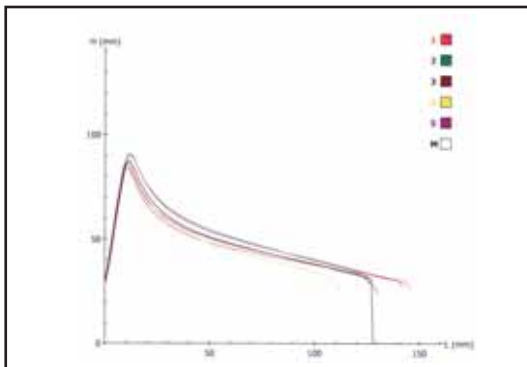


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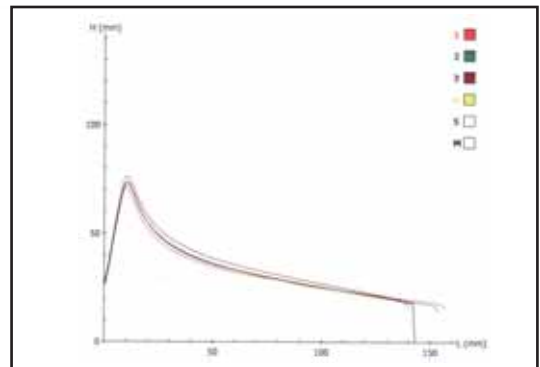


ALVEOGRAM

19



20



South African Quality data per production region

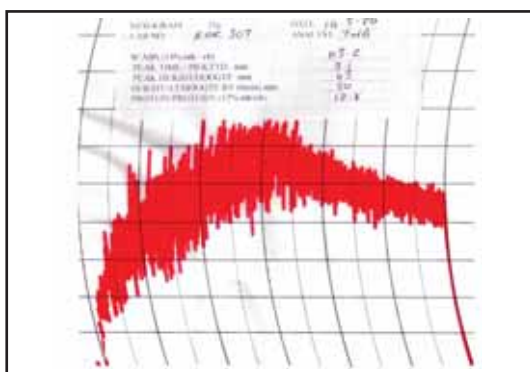
SUMMER RAINFALL AND IRRIGATION WHEAT

PRODUCTION REGION	(22) Free State North-Western Region (Bothaville)					(23) Free State North-Western Region (Bultfontein)				
WHEAT	ave	min	max	stdev		ave	min	max	stdev	
Protein (12% mb), %	14.2	-	-	-		14.2	11.8	15.3	0.86	
Falling number, sec	397	-	-	-		358	145	536	87.54	
Moisture, %	9.7	-	-	-		10.0	9.5	10.4	0.26	
1000 Kernel mass (13% mb), g	33.6	-	-	-		29.5	25.3	32.8	1.71	
Hectolitre mass (dirty), kg/hl	80.4	-	-	-		76.9	70.6	79.7	2.54	
Screenings (<1.8 mm sieve), %	2.82	-	-	-		2.07	0.43	4.63	1.26	
Total damaged kernels, %	0.32	-	-	-		0.56	0.16	2.52	0.61	
Combined deviations, %	3.56	-	-	-		3.31	1.19	9.25	2.26	
Number of samples	1					17				
CULTIVARS										
	PAN 3497 100.0					PAN 3368 36.4				
cultivars	-					PAN 3111 16.2				
with highest %	-					SST 347 13.3				
occurrence	-					PAN 3161 11.0				
	-					SST 317 10.6				
Number of samples	1					17				
MIXOGRAM (Quadromat Junior)	ave	min	max	stdev		ave	min	max	stdev	
Peak time, min	3.3	-	-	-		3.1	2.3	5.2	0.67	
Tail height (6 min), mm	53	-	-	-		50	47	54	1.95	
Number of samples	1					17				
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	76.5	-	-	-	-	72.8	-	-	-	72.7
FLOUR										
Protein (12% mb), %	13.9	-	-	-	-	13.4	-	-	-	13.4
Moisture, %	14.0	-	-	-	-	13.9	-	-	-	13.4
Ash (db), %	0.64	-	-	-	-	0.57	-	-	-	0.63
Colour, KJ (wet)	-4.9	-	-	-	-	-4.5	-	-	-	-4.1
Colour, Konica Minolta CM5 (dry)										
L*	93.33	-	-	-	-	93.05	-	-	-	92.76
a*	0.54	-	-	-	-	0.50	-	-	-	0.55
b*	11.38	-	-	-	-	11.59	-	-	-	11.95
RVA										
Peak Viscosity, cP	1974	-	-	-	-	2118	-	-	-	1036
Minimum viscosity (Trough), cP	1575	-	-	-	-	1790	-	-	-	712
Final Viscosity, cP	2130	-	-	-	-	2454	-	-	-	1155
Peak Time, min	7.00	-	-	-	-	6.93	-	-	-	5.53
GLUTEN										
Wet gluten (14% mb), %	34.7	-	-	-	-	36.0	-	-	-	35.2
Dry gluten (14% mb), %	12.5	-	-	-	-	12.7	-	-	-	11.8
Gluten Index	98	-	-	-	-	95	-	-	-	96
FARINOGRAM										
Water absorption (14% mb), %	61.8	-	-	-	-	63.6	-	-	-	60.3
Development time, min	9.5	-	-	-	-	7.0	-	-	-	6.0
Stability, min	14.7	-	-	-	-	9.4	-	-	-	9.5
Mixing tolerance index, BU	22	-	-	-	-	31	-	-	-	30
EXTENSOGRAM (45 min pull)										
Area, cm²	167	-	-	-	-	105	-	-	-	120
Maximum height, BU	391	-	-	-	-	355	-	-	-	438
Extensibility, mm	300	-	-	-	-	213	-	-	-	201
ALVEOGRAM										
Strength (S), cm²	56.4	-	-	-	-	48.3	-	-	-	45.3
Stability (P), mm	75	-	-	-	-	96	-	-	-	85
Distensibility (L), mm	176	-	-	-	-	115	-	-	-	127
Configuration ratio (P/L)	0.43	-	-	-	-	0.83	-	-	-	0.67
MIXOGRAM										
Peak time, min	2.9	-	-	-	-	2.4	-	-	-	2.8
100 g BAKING TEST										
Loaf volume, cm³	1298	-	-	-	-	1140	-	-	-	1139
Evaluation (see page 79)	0	-	-	-	-	0	-	-	-	0

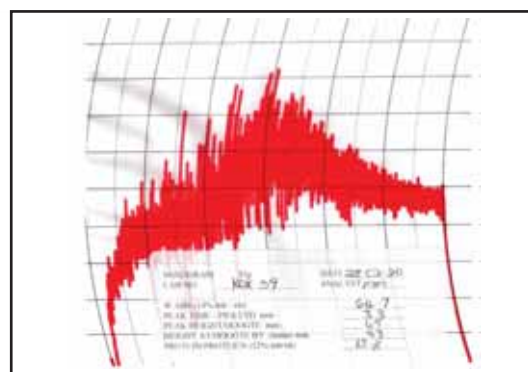
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

22

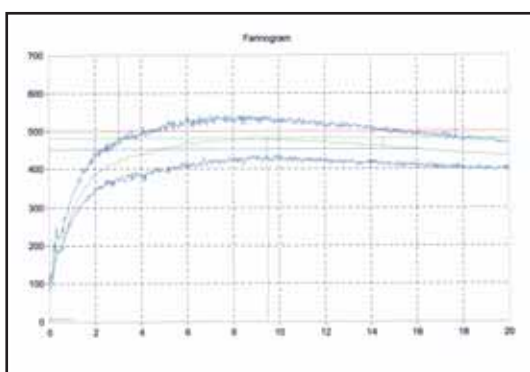


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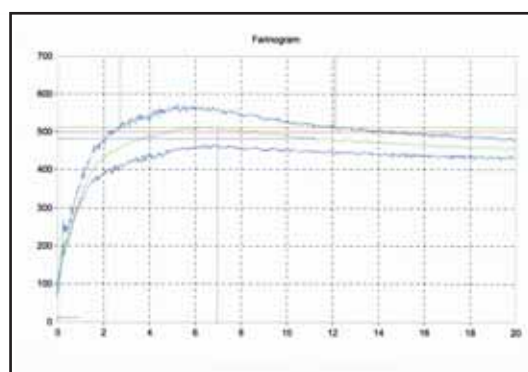


FARINOGRAM

22

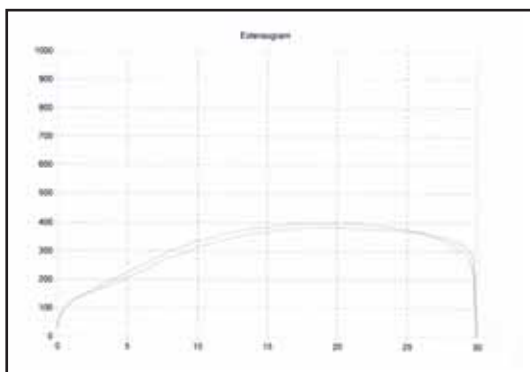


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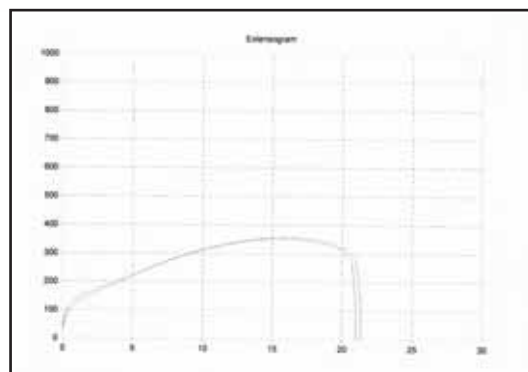


EXTENSOGRAM

22

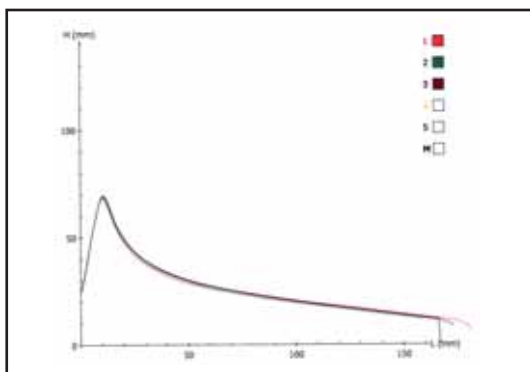


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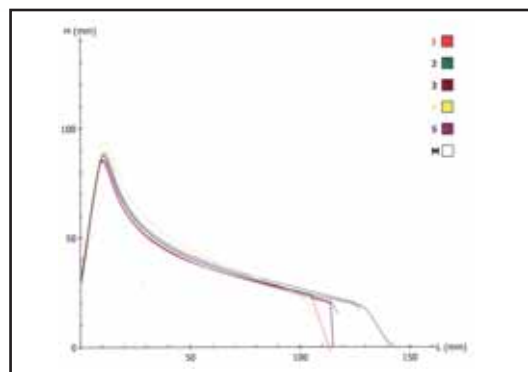


ALVEOGRAM

22



23



South African Quality data per production region

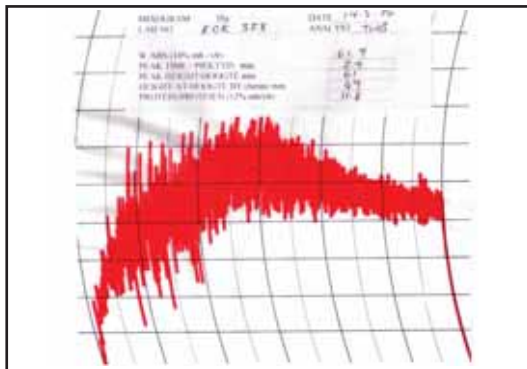
SUMMER RAINFALL AND IRRIGATION WHEAT

PRODUCTION REGION	(24) Free State Central Region				(25) Free State South-Western Region					
WHEAT	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	12.6	11.1	13.7	1.07	15.0	13.7	15.9	0.93		
Falling number, sec	349	236	416	52.62	293	236	343	50.85		
Moisture, %	9.9	9.0	10.7	0.45	10.5	9.9	11.0	0.45		
1000 Kernel mass (13% mb), g	29.1	26.2	37.9	3.16	36.6	32.2	44.6	5.53		
Hectolitre mass (dirty), kg/hl	74.5	60.7	81.1	7.30	79.6	76.2	83.9	3.25		
Screenings (<1.8 mm sieve), %	4.69	0.83	11.87	3.79	2.09	0.64	4.81	1.86		
Total damaged kernels, %	0.50	0.18	1.00	0.25	1.43	0.06	2.76	1.41		
Combined deviations, %	6.97	1.41	16.11	5.11	3.87	0.70	8.13	3.20		
Number of samples	11				4					
CULTIVARS										
	PAN 3368 24.6				PAN 3161 33.8					
cultivars	PAN 3111 15.4				PAN 3368 14.8					
with highest %	PAN 3161 15.1				SST 8135 13.5					
occurrence	SST 398 11.2				SST 398 13.5					
	SST 8156 10.5				SST 8156 11.5					
Number of samples	11				4					
MIXOGRAM (Quadromat Junior)	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	3.1	2.1	4.3	0.59	3.1	2.3	4.3	0.84		
Tail height (6 min), mm	48	32	56	6.35	51	46	56	4.12		
Number of samples	11				4					
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	72.9	-	-	-	70.8	77.1	-	-	-	74.6
FLOUR										
Protein (12% mb), %	12.7	-	-	-	11.6	13.7	-	-	-	14.4
Moisture, %	13.6	-	-	-	13.6	13.8	-	-	-	13.7
Ash (db), %	0.56	-	-	-	0.64	0.68	-	-	-	0.71
Colour, KJ (wet)	-4.6	-	-	-	-4.4	-4.3	-	-	-	-2.6
Colour, Konica Minolta CM5 (dry)										
L*	92.89	-	-	-	93.12	93.07	-	-	-	92.14
a*	0.58	-	-	-	0.43	0.50	-	-	-	0.55
b*	12.22	-	-	-	11.14	10.10	-	-	-	10.33
RVA										
Peak Viscosity, cP	678	-	-	-	1544	1639	-	-	-	1344
Minimum viscosity (Trough), cP	436	-	-	-	1368	1424	-	-	-	1152
Final Viscosity, cP	729	-	-	-	1759	1743	-	-	-	1491
Peak Time, min	5.20	-	-	-	6.60	6.87	-	-	-	6.47
GLUTEN										
Wet gluten (14% mb), %	31.7	-	-	-	31.0	39.1	-	-	-	37.7
Dry gluten (14% mb), %	11.5	-	-	-	10.6	13.4	-	-	-	12.9
Gluten Index	97	-	-	-	96	92	-	-	-	94
FARINOGRAM										
Water absorption (14% mb), %	62.0	-	-	-	60.7	63.5	-	-	-	62.9
Development time, min	6.4	-	-	-	3.7	4.3	-	-	-	9.0
Stability, min	8.0	-	-	-	7.0	5.3	-	-	-	12.1
Mixing tolerance index, BU	43	-	-	-	28	55	-	-	-	27
EXTENSOGRAM (45 min pull)										
Area, cm²	130	-	-	-	97	101	-	-	-	135
Maximum height, BU	438	-	-	-	381	324	-	-	-	460
Extensibility, mm	219	-	-	-	186	222	-	-	-	218
ALVEOGRAM										
Strength (S), cm²	53.2	-	-	-	41.0	43.7	-	-	-	59.6
Stability (P), mm	92	-	-	-	91	79	-	-	-	105
Distensibility (L), mm	132	-	-	-	105	145	-	-	-	119
Configuration ratio (P/L)	0.70	-	-	-	0.87	0.54	-	-	-	0.88
MIXOGRAM										
Peak time, min	2.7	-	-	-	2.7	2.0	-	-	-	3.0
100 g BAKING TEST										
Loaf volume, cm³	1144	-	-	-	1016	1251	-	-	-	1215
Evaluation (see page 79)	0	-	-	-	0	0	-	-	-	0

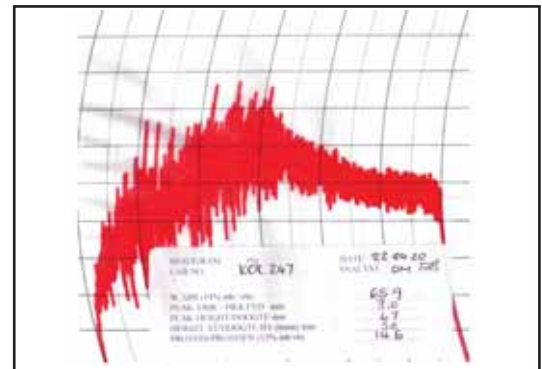
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

24

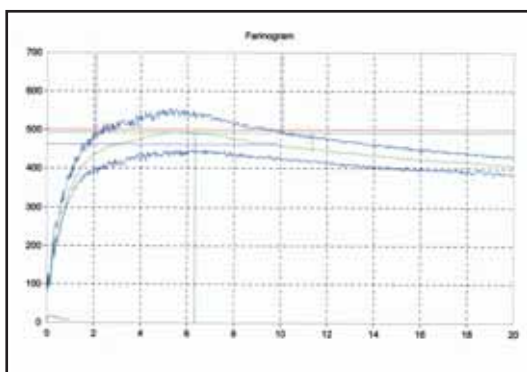


25

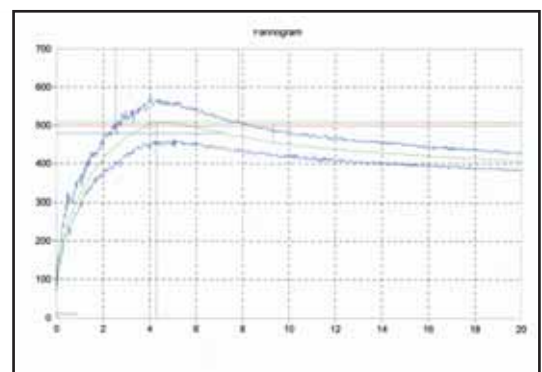


FARINOGRAM

24

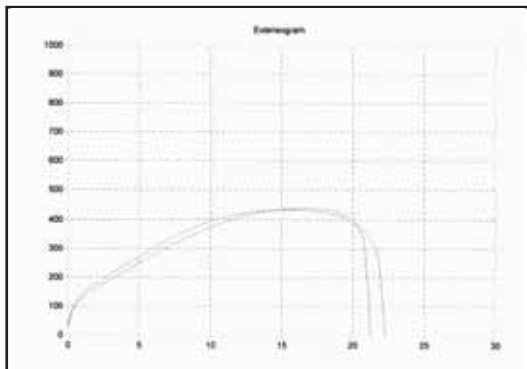


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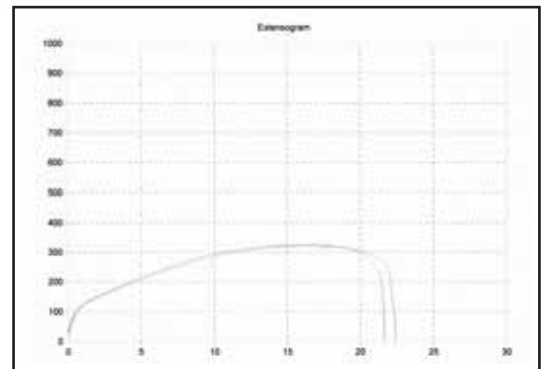


EXTENSOGRAM

24

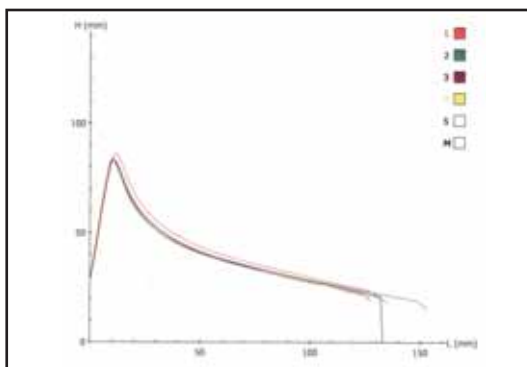


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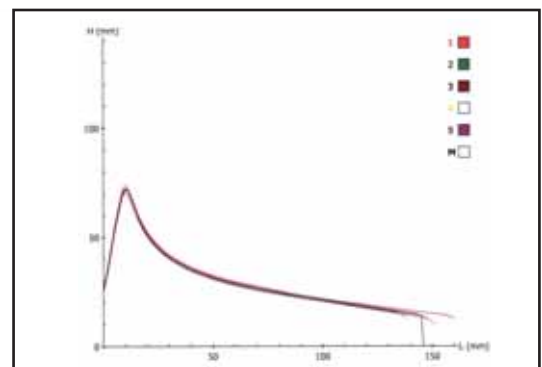


ALVEOGRAM

24



25



South African Quality data per production region

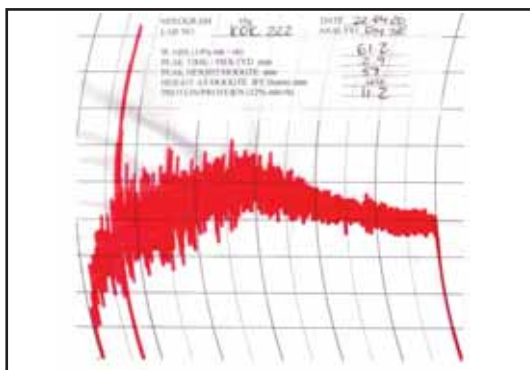
SUMMER RAINFALL AND IRRIGATION WHEAT

PRODUCTION REGION	(26) Free State South-Eastern Region				(28) Free State Eastern Region					
WHEAT	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	13.6	10.9	15.4	1.40	13.6	11.2	16.0	1.32		
Falling number, sec	255	48	475	163.44	266	47	531	148.34		
Moisture, %	10.6	9.8	11.5	0.51	10.5	9.7	11.2	0.47		
1000 Kernel mass (13% mb), g	33.6	28.9	38.3	3.65	35.3	27.1	44.2	4.15		
Hectolitre mass (dirty), kg/hl	77.6	72.4	79.9	2.60	78.7	73.6	83.2	2.64		
Screenings (<1.8 mm sieve), %	2.08	0.72	5.30	1.42	1.55	0.10	3.77	1.03		
Total damaged kernels, %	2.89	0.24	13.02	4.38	3.91	0.06	19.76	6.25		
Combined deviations, %	5.48	1.04	14.04	4.07	5.81	0.22	21.61	6.27		
Number of samples	8				21					
CULTIVARS										
	SST 398		22.0		PAN 3161		18.8			
cultivars	PAN 3368		21.6		SST 8135		17.3			
with highest %	PAN 3111		15.1		SST 317		12.6			
occurrence	SST 347		8.5		PAN 3368		10.2			
	PAN 3161		8.0		SST 8156		9.1			
Number of samples	8				21					
MIXOGRAM (Quadromat Junior)	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	3.1	2.6	3.9	0.46	3.1	2.3	4.8	0.55		
Tail height (6 min), mm	48	42	57	4.93	49	35	58	5.07		
Number of samples	8				21					
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	73.5	-	-	-	76.0	75.4	76.8	-	-	74.7
FLOUR										
Protein (12% mb), %	13.2	-	-	-	12.8	12.9	11.0	-	-	13.1
Moisture, %	13.6	-	-	-	13.5	13.2	13.3	-	-	14.1
Ash (db), %	0.76	-	-	-	0.60	0.70	0.68	-	-	0.68
Colour, KJ (wet)	-3.6	-	-	-	-3.9	-4.2	-4.6	-	-	-3.3
Colour, Konica Minolta CM5 (dry)										
L*	92.57	-	-	-	93.02	92.97	93.57	-	-	92.71
a*	0.63	-	-	-	0.41	0.55	0.45	-	-	0.48
b*	11.03	-	-	-	10.33	10.24	9.73	-	-	10.13
RVA										
Peak Viscosity, cP	2134	-	-	-	333	1825	2087	-	-	308
Minimum viscosity (Trough), cP	1636	-	-	-	106	1576	1690	-	-	87
Final Viscosity, cP	2414	-	-	-	188	1969	2246	-	-	154
Peak Time, min	7.00	-	-	-	4.20	6.67	7.00	-	-	4.07
GLUTEN										
Wet gluten (14% mb), %	35.7	-	-	-	34.2	34.0	29.2	-	-	35.0
Dry gluten (14% mb), %	12.3	-	-	-	11.5	11.6	10.1	-	-	11.5
Gluten Index	95	-	-	-	94	98	97	-	-	94
FARINOGRAM										
Water absorption (14% mb), %	62.5	-	-	-	59.8	61.5	60.2	-	-	60.9
Development time, min	6.9	-	-	-	4.7	6.0	6.0	-	-	5.0
Stability, min	8.9	-	-	-	6.1	7.9	7.3	-	-	6.4
Mixing tolerance index, BU	33	-	-	-	62	37	49	-	-	54
EXTENSOGRAM (45 min pull)										
Area, cm²	101	-	-	-	122	125	112	-	-	119
Maximum height, BU	353	-	-	-	411	429	409	-	-	363
Extensibility, mm	205	-	-	-	216	212	200	-	-	237
ALVEOGRAM										
Strength (S), cm²	51.9	-	-	-	41.0	53.9	38.2	-	-	44.6
Stability (P), mm	90	-	-	-	64	92	83	-	-	77
Distensibility (L), mm	139	-	-	-	167	143	113	-	-	143
Configuration ratio (P/L)	0.65	-	-	-	0.38	0.64	0.73	-	-	0.54
MIXOGRAM										
Peak time, min	2.4	-	-	-	2.5	2.6	2.8	-	-	2.4
100 g BAKING TEST										
Loaf volume, cm³	1196	-	-	-	1175	1115	1006	-	-	1235
Evaluation (see page 79)	0	-	-	-	0	0	0	-	-	0

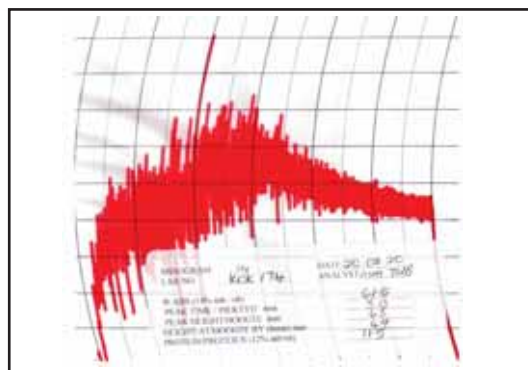
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

26

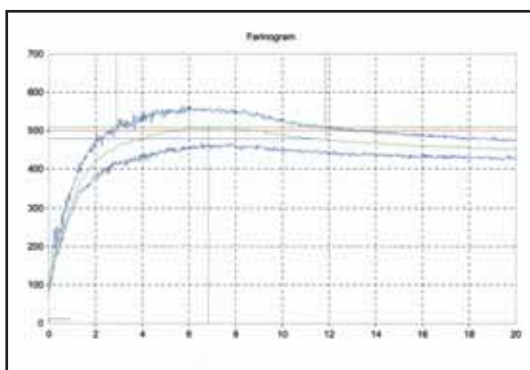


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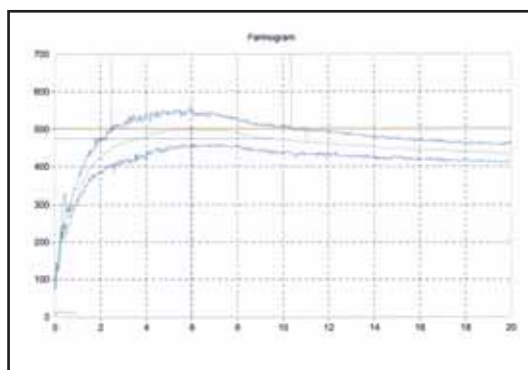


FARINOGRAM

26

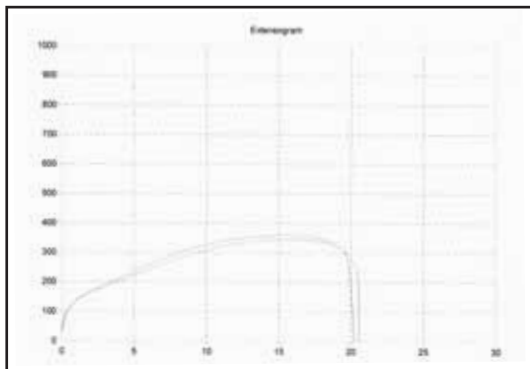


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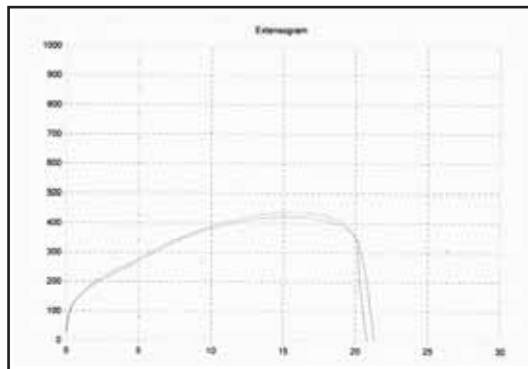


EXTENSOGRAM

26

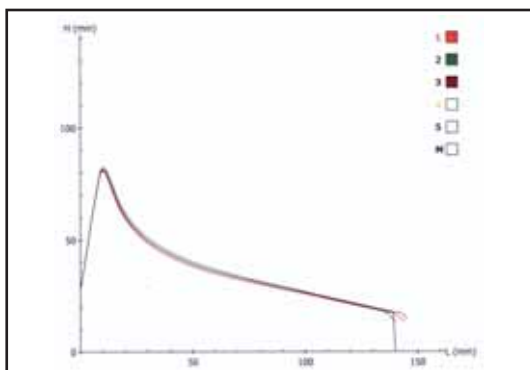


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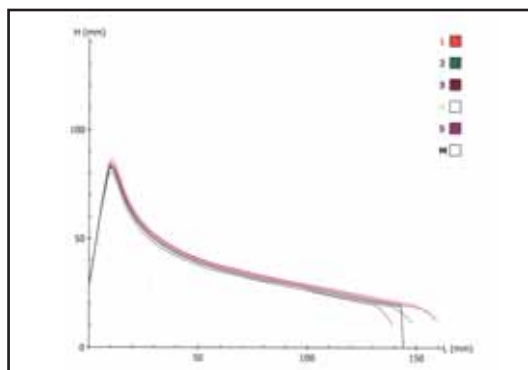


ALVEOGRAM

26



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South African Quality data per production region

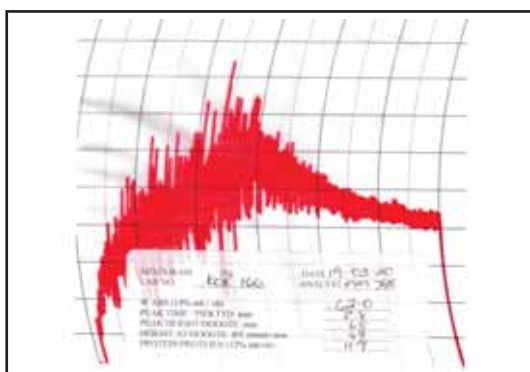
IRRIGATION WHEAT

PRODUCTION REGION	(29) Mpumalanga Southern Region				(33) Mpumalanga Northern Region					
WHEAT	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	13.2	-	-	-	11.7	9.7	13.2	1.33		
Falling number, sec	372	-	-	-	404	369	443	30.67		
Moisture, %	11.0	-	-	-	10.4	10.0	10.8	0.29		
1000 Kernel mass (13% mb), g	39.8	-	-	-	37.5	35.5	41.4	2.03		
Hectolitre mass (dirty), kg/hl	82.9	-	-	-	82.9	81.2	84.2	0.96		
Screenings (<1.8 mm sieve), %	1.25	-	-	-	1.04	0.45	1.96	0.57		
Total damaged kernels, %	0.32	-	-	-	0.21	0.08	0.54	0.15		
Combined deviations, %	2.09	-	-	-	1.42	0.67	2.16	0.58		
Number of samples	1				7					
CULTIVARS										
		SST 884	48.0			SST 8135	47.3			
cultivars		SST 8156	21.0			SST 895	22.0			
with highest %		PAN 3400	18.0			SST 884	10.6			
occurrence		SST 895	13.0			SST 8154	9.6			
						SST 8156	7.9			
Number of samples	1				7					
MIXOGRAM (Quadromat Junior)	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	2.8	-	-	-	3.3	3.0	3.7	0.21		
Tail height (6 min), mm	49	-	-	-	49	43	54	3.37		
Number of samples	1				7					
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	76.5	-	-	-	-	75.0	75.1	-	76.0	-
FLOUR										
Protein (12% mb), %	12.1	-	-	-	-	12.1	11.2	-	9.1	-
Moisture, %	13.8	-	-	-	-	14.3	14.0	-	13.6	-
Ash (db), %	0.75	-	-	-	-	0.64	0.64	-	0.58	-
Colour, KJ (wet)	-4.8	-	-	-	-	-4.8	-4.8	-	-5.0	-
Colour, Konica Minolta CM5 (dry)										
L*	93.53	-	-	-	-	93.46	93.52	-	93.79	-
a*	0.49	-	-	-	-	0.62	0.53	-	0.51	-
b*	9.44	-	-	-	-	10.65	10.35	-	10.09	-
RVA										
Peak Viscosity, cP	2350	-	-	-		2137	2147	-	2187	-
Minimum viscosity (Trough), cP	1726	-	-	-		1528	1561	-	1607	-
Final Viscosity, cP	2565	-	-	-		2384	2423	-	2488	-
Peak Time, min	7.00	-	-	-		7.00	7.00	-	7.00	-
GLUTEN										
Wet gluten (14% mb), %	32.7	-	-	-	-	32.8	30.4	-	24.1	-
Dry gluten (14% mb), %	10.7	-	-	-	-	10.9	10.1	-	7.9	-
Gluten Index	94	-	-	-	-	95	93	-	98	-
FARINOGRAM										
Water absorption (14% mb), %	59.9	-	-	-	-	60.8	60.9	-	58.3	-
Development time, min	5.8	-	-	-	-	6.0	5.2	-	5.0	-
Stability, min	6.6	-	-	-	-	10.9	9.1	-	8.9	-
Mixing tolerance index, BU	53	-	-	-	-	23	30	-	34	-
EXTENSOGRAM (45 min pull)										
Area, cm²	110	-	-	-	-	123	113	-	82	-
Maximum height, BU	373	-	-	-	-	423	434	-	395	-
Extensibility, mm	214	-	-	-	-	216	191	-	150	-
ALVEOGRAM										
Strength (S), cm²	40.8	-	-	-	-	48.9	43.9	-	33.6	-
Stability (P), mm	72	-	-	-	-	88	95	-	88	-
Distensibility (L), mm	148	-	-	-	-	128	107	-	89	-
Configuration ratio (P/L)	0.49	-	-	-	-	0.69	0.89	-	0.99	-
MIXOGRAM										
Peak time, min	2.4	-	-	-	-	2.8	2.9	-	3.3	-
100 g BAKING TEST										
Loaf volume, cm³	1114	-	-	-	-	1094	1080	-	902	-
Evaluation (see page 79)	0	-	-	-	-	0	0	-	0	-

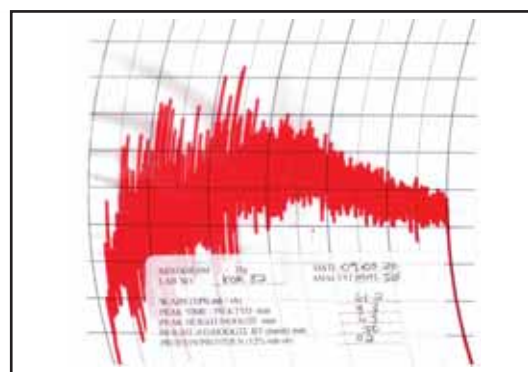
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

29

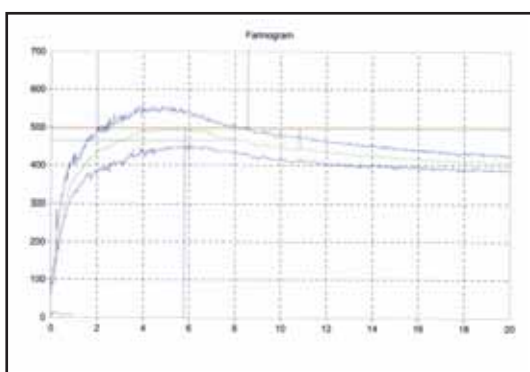


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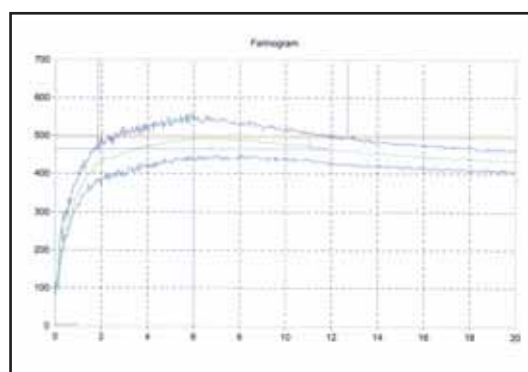


FARINOGRAM

29

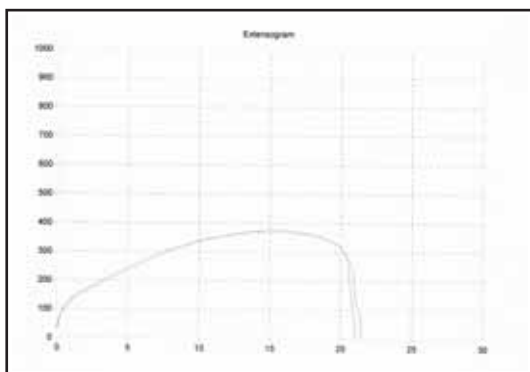


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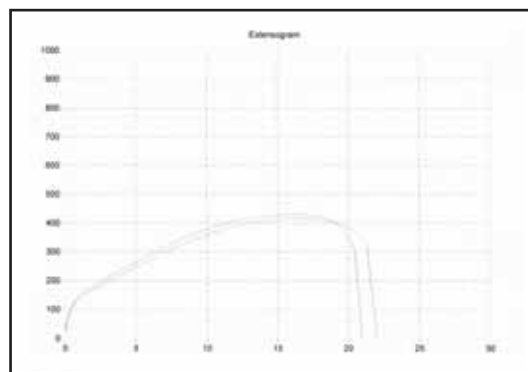


EXTENSOGRAM

29

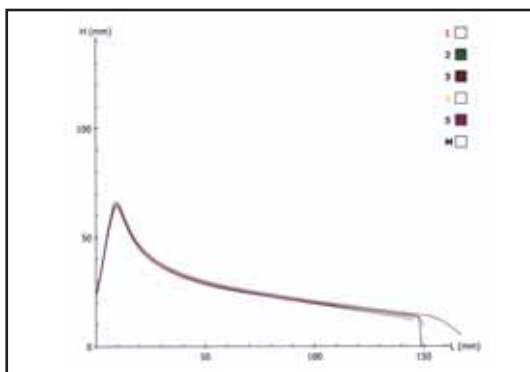


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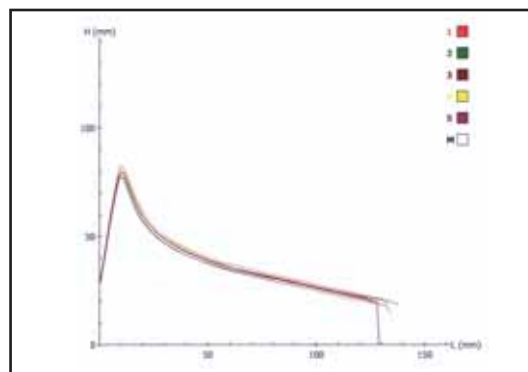


ALVEOGRAM

29



33



South African Quality data per production region

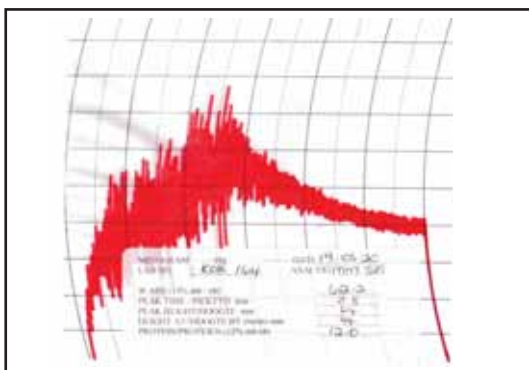
IRRIGATION WHEAT

PRODUCTION REGION	(34) Gauteng Region					(35) Limpopo Region				
WHEAT	ave	min	max	stdev		ave	min	max	stdev	
Protein (12% mb), %	12.6	10.7	14.4	1.35		12.1	9.3	14.9	1.42	
Falling number, sec	283	46	410	142.75		431	301	561	60.76	
Moisture, %	10.2	7.9	11.4	1.19		9.7	8.4	11.1	0.77	
1000 Kernel mass (13% mb), g	35.4	27.9	39.8	4.61		40.5	33.4	51.8	4.81	
Hectolitre mass (dirty), kg/hl	79.7	66.1	84.2	6.82		83.1	79.4	85.8	1.91	
Screenings (<1.8 mm sieve), %	1.44	0.11	3.38	1.08		0.76	0.06	2.82	0.95	
Total damaged kernels, %	5.85	0.32	32.72	13.16		0.93	0.12	6.60	1.62	
Combined deviations, %	7.55	0.45	36.10	14.00		1.88	0.32	6.74	1.67	
Number of samples	6					15				
CULTIVARS										
	SST 884 38.7					SST 8135 33.4				
cultivars	SST 8156 18.2					SST 8154 15.8				
with highest %	SST 843 13.0					SST 884 13.4				
occurrence	SST 8135 11.7					SST 895 11.6				
	SST 875 9.7					SST 8156 7.5				
Number of samples	6					15				
MIXOGRAM (Quadromat Junior)	ave	min	max	stdev		ave	min	max	stdev	
Peak time, min	3.0	2.2	3.8	0.63		2.8	2.0	3.8	0.48	
Tail height (6 min), mm	44	23	56	10.98		46	42	51	2.83	
Number of samples	6					15				
	COMPOSITE SAMPLES									
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	75.4	-	-	-	71.7	76.5	76.4	76.4	-	77.1
FLOUR										
Protein (12% mb), %	12.8	-	-	-	11.3	12.8	11.1	10.1	-	9.7
Moisture, %	14.2	-	-	-	13.7	13.7	13.5	13.5	-	12.9
Ash (db), %	0.66	-	-	-	0.63	0.60	0.65	0.61	-	0.68
Colour, KJ (wet)	-4.8	-	-	-	-3.5	-4.9	-5.0	-5.0	-	-4.9
Colour, Konica Minolta CM5 (dry)										
L*	93.59	-	-	-	92.90	93.58	93.76	93.86	-	93.65
a*	0.47	-	-	-	0.41	0.53	0.55	0.52	-	0.56
b*	9.35	-	-	-	9.50	10.84	10.51	10.31	-	9.98
RVA										
Peak Viscosity, cP	1308	-	-	-	140	1643	2206	2328	-	2133
Minimum viscosity (Trough), cP	1024	-	-	-	10	1468	1645	1782	-	1571
Final Viscosity, cP	1395	-	-	-	13	1798	2499	2711	-	2422
Peak Time, min	6.00	-	-	-	3.07	6.73	7.00	7.00	-	7.00
GLUTEN										
Wet gluten (14% mb), %	33.1	-	-	-	30.3	34.9	29.0	25.7	-	24.3
Dry gluten (14% mb), %	11.9	-	-	-	9.9	11.5	9.3	8.6	-	8.1
Gluten Index	98	-	-	-	91	94	96	98	-	98
FARINOGRAM										
Water absorption (14% mb), %	60.6	-	-	-	55.9	62.0	62.7	59.1	-	59.9
Development time, min	6.9	-	-	-	2.2	5.3	6.0	5.8	-	5.4
Stability, min	9.9	-	-	-	3.3	6.9	7.6	7.5	-	7.7
Mixing tolerance index, BU	34	-	-	-	110	40	43	43	-	40
EXTENSOGRAM (45 min pull)										
Area, cm²	160	-	-	-	90	100	92	88	-	98
Maximum height, BU	449	-	-	-	273	324	359	362	-	441
Extensibility, mm	263	-	-	-	228	219	185	175	-	164
ALVEOGRAM										
Strength (S), cm²	51.0	-	-	-	21.2	43.3	40.5	37.7	-	36.4
Stability (P), mm	70	-	-	-	39	76	98	77	-	91
Distensibility (L), mm	188	-	-	-	273	154	94	109	-	92
Configuration ratio (P/L)	0.37	-	-	-	0.14	0.49	1.04	0.71	-	0.99
MIXOGRAM										
Peak time, min	2.9	-	-	-	2.0	2.3	2.8	3.1	-	3.4
100 g BAKING TEST										
Loaf volume, cm³	1244	-	-	-	1088	1257	1031	958	-	880
Evaluation (see page 79)	0	-	-	-	0	0	0	0	-	0

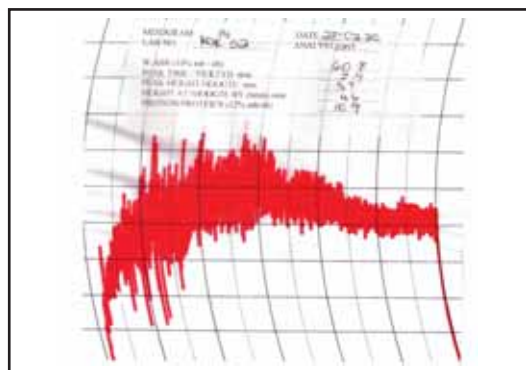
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

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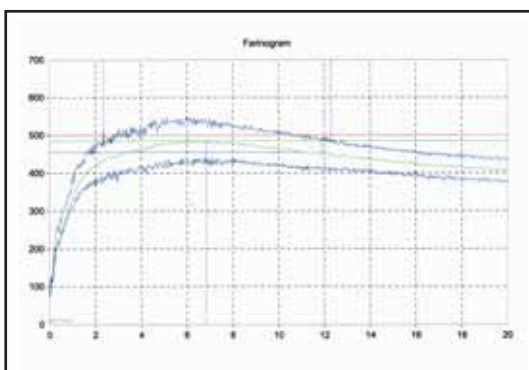


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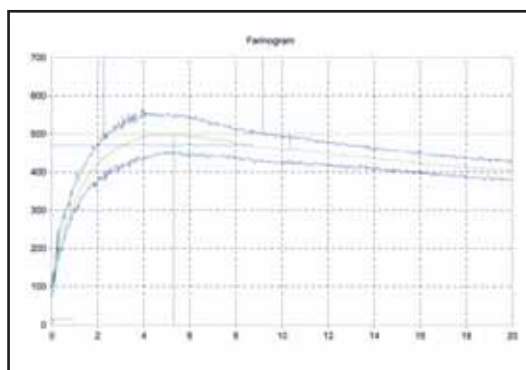


FARINOGRAM

34

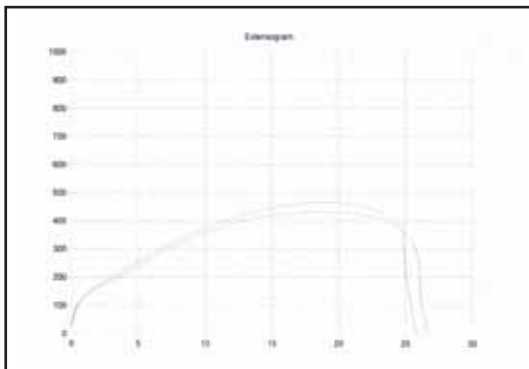


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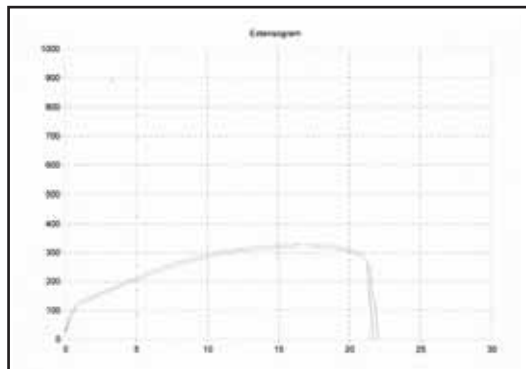


EXTENSOGRAM

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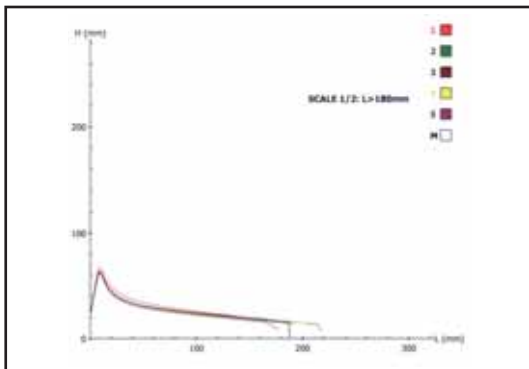


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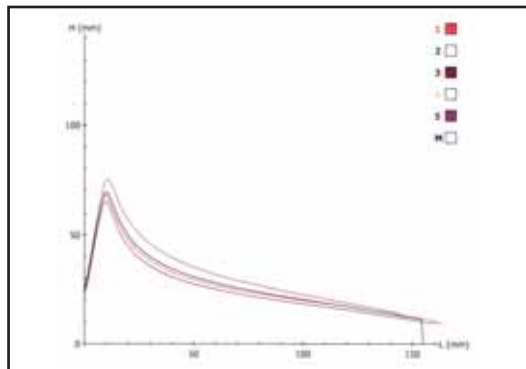


ALVEOGRAM

34



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South African Quality data per production region

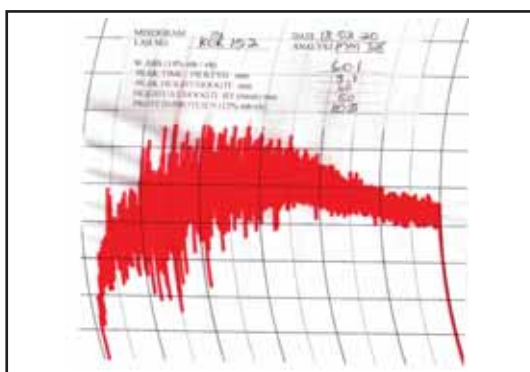
IRRIGATION WHEAT

PRODUCTION REGION	(36) KwaZulu-Natal				
WHEAT					
	ave	min	max	stdev	
Protein (12% mb), %	12.8	11.3	14.5	1.14	
Falling number, sec	393	282	450	51.77	
Moisture, %	11.1	10.2	11.9	0.47	
1000 Kernel mass (13% mb), g	39.6	36.5	42.0	2.16	
Hectolitre mass (dirty), kg/hl	81.8	79.1	83.6	1.36	
Screenings (<1.8 mm sieve), %	0.94	0.24	1.62	0.39	
Total damaged kernels, %	0.42	0.12	0.78	0.22	
Combined deviations, %	1.61	0.88	2.94	0.64	
Number of samples	10				
CULTIVARS					
		SST 8135	53.1		
cultivars		SST 8156	16.1		
with highest %		SST 884	11.9		
occurrence		SST 8154	6.3		
		PAN 3497	5.0		
Number of samples	10				
MIXOGRAM (Quadromat Junior)					
	ave	min	max	stdev	
Peak time, min	3.1	2.3	4.7	0.72	
Tail height (6 min), mm	50	48	52	1.14	
Number of samples	10				
	COMPOSITE SAMPLES				
CLASS AND GRADE	Super	B1	B2	B3	Cow
Bühler Extraction, %	76.0	76.4	-	-	-
FLOUR					
Protein (12% mb), %	12.3	11.0	-	-	-
Moisture, %	13.6	13.6	-	-	-
Ash (db), %	0.63	0.74	-	-	-
Colour, KJ (wet)	-4.9	-4.9	-	-	-
Colour, Konica Minolta CM5 (dry)					
L*	93.92	93.83	-	-	-
a*	0.44	0.43	-	-	-
b*	9.60	9.89	-	-	-
RVA					
Peak Viscosity, cP	2210	2340	-	-	-
Minimum viscosity (Trough), cP	1693	1730	-	-	-
Final Viscosity, cP	2431	2615	-	-	-
Peak Time, min	7.00	7.00	-	-	-
GLUTEN					
Wet gluten (14% mb), %	33.9	29.4	-	-	-
Dry gluten (14% mb), %	11.2	9.7	-	-	-
Gluten Index	89	89	-	-	-
FARINOGRAM					
Water absorption (14% mb), %	61.5	60.1	-	-	-
Development time, min	5.9	6.5	-	-	-
Stability, min	8.0	7.5	-	-	-
Mixing tolerance index, BU	39	48	-	-	-
EXTENSOGRAM (45 min pull)					
Area, cm ²	103	102	-	-	-
Maximum height, BU	354	373	-	-	-
Extensibility, mm	203	198	-	-	-
ALVEOGRAM					
Strength (S), cm ²	46.2	39.1	-	-	-
Stability (P), mm	85	76	-	-	-
Distensibility (L), mm	140	131	-	-	-
Configuration ratio (P/L)	0.61	0.58	-	-	-
MIXOGRAM					
Peak time, min	2.6	2.8	-	-	-
100 g BAKING TEST					
Loaf volume, cm ³	1198	1156	-	-	-
Evaluation (see page 79)	0	0	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

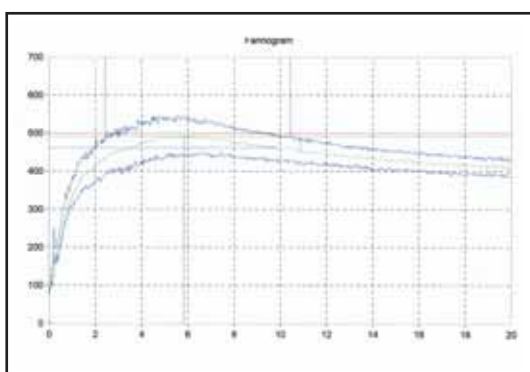
MIXOGRAM

36



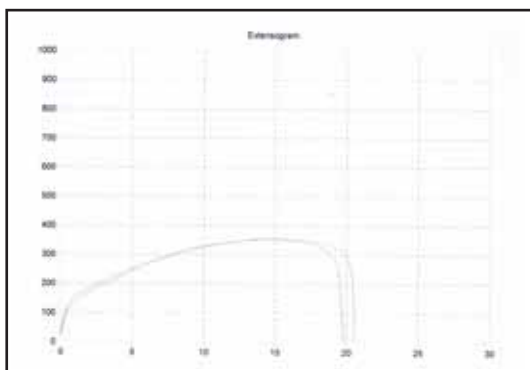
FARINOGRAM

36



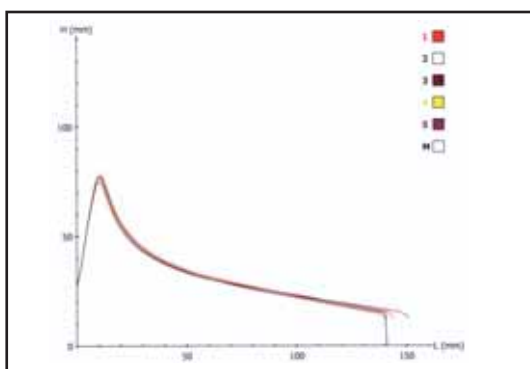
EXTENSOGRAM

36



ALVEOGRAM

36



Mycotoxins

Mycotoxins, toxic chemical compounds produced by moulds, can contaminate commodities either in the field or during storage and are invisible, odourless and tasteless. According to the Food and Agriculture Organization, food losses due to mycotoxin contamination are estimated at 25% on a global scale and pose a real threat to food security, especially in Africa where the magnitude of losses is difficult to estimate because of a lack of information.

Effective management to prevent food losses or adverse health effects as a result of long-term exposure to contaminated food is only possible when adequate reliable testing data is available. Well-timed interventions in the food and feed value chain can then be based on these testing results.

Mycotoxin production is foremost a food safety issue, although the occurrence of moulds can also lead to damage ranging from rancidity, odour, flavour changes, loss of nutrients and germ layer destruction resulting in a reduction in quality. The only proven way to determine whether grain, cereals, feed or food are contaminated, is by analytical testing. Most mycotoxins are toxic at very low concentrations, sensitive and reliable methods for their detection are therefore required.

The accredited multi-mycotoxin assessments included in the annual wheat crop quality survey for the past nine seasons, provide the most comprehensive overview of the multi-mycotoxin risk in commercial wheat produced and delivered to commercial grain storage companies in South Africa. Approximately 10 - 20% of the wheat crop samples were selected every season to proportionally represent all the production regions.

The absence of Aflatoxin B₁, B₂, G₁, G₂, Fumonisin B₁, B₂, B₃, Ochratoxin A, T2-toxin and HT-2 toxin in the wheat samples over the past ten seasons were confirmed in the 2019/20 season. One sample from North West reported a Zearalenone value of 29 µg/kg. This is the first season that Zearalenone residues were detected on a wheat crop sample. The Deoxynivalenol residue levels measured, were all below the national maximum allowable level.

Constant monitoring and continued research on the prevention and mitigation of mycotoxin contamination are necessary. Application of good agricultural practices and storage conditions as well as effective mycotoxin risk management programs are essential elements in preventing the negative effects of mycotoxins.

National Mycotoxin Regulations

According to the Foodstuffs, Cosmetics and Disinfectants Act (Act 54 of 1972) and regulations published under Government Notice No. R. 1145, dated 8 October 2004, all foodstuffs, ready for human consumption, may not contain more than 10 µg/kg of aflatoxin, of which aflatoxin B₁ may not exceed 5 µg/kg.

Amendments to Government Notice No. R. 1145, dated 8 October 2004, published in Government Notice No. 987 of 05 September 2016, specify that:

- Cereal grains (wheat, maize and barley) intended for further processing, may not contain more than 2 000 µg/kg of Deoxynivalenol.
- Flour, meal, semolina and flakes derived from wheat, maize or barley, ready for human consumption, may not contain more than 1 000 µg/kg of Deoxynivalenol.

Further processing means any other treatment or processing method that has been proven to reduce levels of fungus produced toxins in foodstuffs intended for human consumption.

Table 7: Mycotoxin results for the 2019/20 season

Region	Class and Grade	Aflatoxin (µg/kg)						Fumonisin (µg/kg)			Deoxynivalenol (µg/kg)	15-ADON (µg/kg)	Ochratoxin A (µg/kg)	Zearalenone (µg/kg)	HT-2 Toxin (µg/kg)	T-2 Toxin (µg/kg)
		B ₁	B ₂	G ₁	G ₂	B ₁	B ₂	B ₃								
		LOQ														
		5 µg/kg	5 µg/kg	5 µg/kg	20 µg/kg	20 µg/kg	20 µg/kg	100 µg/kg	5 µg/kg	20 µg/kg						
1	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
2	B3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
3	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
3	Super	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
3	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
3	B3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
4	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
4	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
5	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
5	Super	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
6	Super	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
6	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
6	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
10	Super	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
10	B1	ND	ND	ND	ND	ND	ND	ND	ND	191	ND	ND	ND	ND	ND	
10	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
11	Super	ND	ND	ND	ND	ND	ND	ND	ND	160	ND	ND	ND	ND	ND	
11	B1	ND	ND	ND	ND	ND	ND	ND	ND	133	ND	ND	ND	ND	ND	
12	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
14	Super	ND	ND	ND	ND	ND	ND	ND	ND	<100	ND	ND	ND	ND	ND	
15	Super	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
16	COW	ND	ND	ND	ND	ND	ND	ND	ND	1 017	ND	ND	29	ND	ND	
17	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
19	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
20	B1	ND	ND	ND	ND	ND	ND	ND	ND	102	ND	ND	ND	ND	ND	
20	Super	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
20	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
23	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
23	Super	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
24	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

Table 7: Mycotoxin results for the 2019/20 season (continue)

Region	Class and Grade	Aflatoxin (µg/kg)						Fumonisin (µg/kg)			Deoxynivalenol (µg/kg)	15-ADON (µg/kg)	Ochratoxin A (µg/kg)	Zearalenone (µg/kg)	HT-2 Toxin (µg/kg)	T-2 Toxin (µg/kg)
		B ₁	B ₂	G ₁	G ₂	B ₁	B ₂	B ₃								
		LOQ														
		5 µg/kg	5 µg/kg	5 µg/kg	5 µg/kg	20 µg/kg	20 µg/kg	20 µg/kg	100 µg/kg	100 µg/kg						
25	Super	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
28	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
28	Super	ND	ND	ND	ND	ND	ND	ND	195	ND	ND	ND	ND	ND	ND	ND
29	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
33	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
34	Super	ND	ND	ND	ND	ND	ND	ND	<100	ND	ND	ND	ND	ND	ND	ND
35	Super	ND	ND	ND	ND	ND	ND	ND	<100	ND	ND	ND	ND	ND	ND	ND
35	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
36	Super	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total number of samples		40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Average of total number of samples		0	0	0	0	0	0	0	45	0	0	0	1	0	0	0
Number of positive results		0	0	0	0	0	0	0	6	0	0	0	1	0	0	0
Average of positive results		-	-	-	-	-	-	-	300	-	-	-	29	-	-	-
Maximum of positive results		-	-	-	-	-	-	-	1 017	-	-	-	-	-	-	-

Note:

- Limit of quantitation (LOQ) means the lowest concentration level that can be quantified with acceptable precision and accuracy by the UPLC-MS/MS. A concentration measured below the LOQ is reported as <LOQ.
- Limit of detection (LOD) is the lowest concentration level that can be detected but not quantified and is 50% of the LOQ of each mycotoxin. A concentration measured below the LOD is reported as not detected (ND).
- Mycotoxin levels lower than the LOQ were seen as tested negative for calculation purposes.
- µg/kg = ppb (parts per billion)

Amino Acid Profile

Amino acid profile or composition is an important feature in determining the nutritional value of wheat for human and animal diets and are considered crucial to good health. Amino acids are the building blocks of proteins and approximately 22 amino acids are commonly distributed among the proteins of all biological materials. Of these, 18 can be found in cereal grain proteins. Amino acids are organic compounds containing basic amine ($-NH_2$) and acidic carboxyl ($-COOH$) functional groups, in addition to a side chain (R group) specific to each amino acid.

The classification of amino acids is based on different features, one being whether the amino acid can be acquired through the diet. According to this, three types are identified: essential, conditionally essential and non-essential amino acids. Classification as essential or non-essential, does however not reflect their actual importance, since all of them are necessary for human health. Essential amino acids are considered “essential” as they cannot be synthesised by the body and must be obtained from the diet. The nine essential amino acids are phenylalanine, valine, threonine, tryptophan, methionine, leucine, isoleucine, lysine and histidine. Arginine, cysteine, glycine, glutamine, proline and tyrosine, are considered conditionally essential in the human diet, meaning their synthesis can be limited under special pathophysiological conditions. Alanine, aspartic acid, asparagine, glutamic acid and serine are non-essential amino acids, meaning they can be synthesized by the body.^(1,2)

The results of the 35 samples analysed by SAGL and reported as g amino acid/100 g sample, are provided in Table 8 on pages 70 and 71. The values obtained for all amino acids on these samples, were within the normal range reported for wheat in literature, deficient in certain essential amino acids, such as tryptophan, lysine, threonine, methionine and histidine, but high in glutamic acid and proline, which is not essential. The range per season per individual amino acid compared well over the four seasons for which data is available.

Due to the fact that protein and amino acid composition of wheat vary with crop varieties, application of fertilisers, irrigation practices, soil composition and climatic conditions, the amino acid content showed a wide variation between samples. The only exception being tryptophan, ranging from 0.13 to 0.18 g/100 g this season. Similar small differences were observed in the previous three seasons. The World Health Organisation's (WHO) recommended daily dose for tryptophan is 4 mg/kg/day.⁽³⁾

Lysine values varied between 0.31 and 0.40 g/100 g, comprising $\pm 2.3 - 3.1$ % of the total amino acid content. The WHO recommended daily dose for lysine is 30 mg/kg/day. Threonine's WHO recommended daily dose is 15 mg/kg/day⁽⁴⁾ and ranged from 0.32 to 0.45 g/100 g this season. Methionine values were lower this season than during the previous two seasons, ranging from 0.14 to 0.26 g/100 g. The WHO daily recommendation is 15 mg/kg/day for the sulphur containing amino acids in total.⁽³⁾

The values for histidine varied between 0.24 and 0.36 g/100 g. The results also showed that the samples were high in the essential amino acid leucine, with values ranging from 0.71 to 1.07 g/100 g. Phenylalanine values varied between 0.47 and 0.77 g/100 g. According to the results, the samples were rich in glutamic acid and proline, together contributing ± 40 % of the total amino acid content.

References:

1. Richard D. Semba, Michelle Shardell, Fayrouz A. Sakr Ashour, Ruin Moaddel, Indi Trehan, Kenneth M. Maleta, M. Isabel Ordiz, Klaus Kraemer, Mohammed A. Khadeer, Luigi Ferrucci, Mark J. Manary. (2016). Child Stunting is Associated with Low Circulating Essential Amino Acids. *EbioMedicine* (6), page 246-252.
2. Williams, P. 2011. *A Practical Introduction to Cereal Chemistry*. First Choice Books, page 4-19.
3. World Health Organization. Protein and amino acids requirements in human nutrition: report of a joint FAO/WHO/UNU expert consultation, Teck. Rep. Series no 935, World Health Organization, Geneva, Switzerland 2007.

Table 8: Amino acid content of wheat samples originating from different production regions

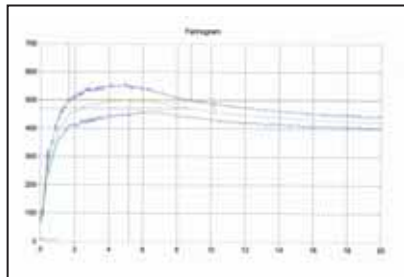
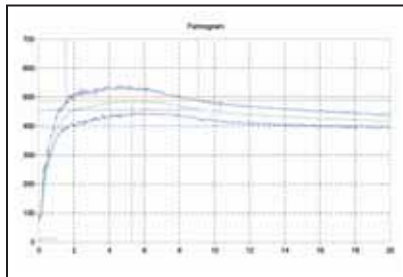
Region	Grade	Amino Acid																	
		Tryptophan	Methionine	Cystine	Histidine	Serine	Arginine	Glycine	Aspartic acid	Glutamic acid	Threonine	Alanine	Proline	Lysine	Tyrosine	Valine	Isoleucine	Leucine	Phenyl- alanine
		g/100g (as is)																	
1	COW	0.16	0.19	0.41	0.26	0.59	0.55	0.52	0.64	3.74	0.37	0.43	1.19	0.34	0.33	0.53	0.40	0.81	0.55
3	B1	0.14	0.22	0.44	0.28	0.65	0.58	0.54	0.66	3.87	0.39	0.44	1.26	0.35	0.34	0.56	0.41	0.85	0.58
3	Super	0.15	0.24	0.47	0.31	0.70	0.61	0.58	0.71	4.36	0.41	0.47	1.43	0.37	0.37	0.61	0.46	0.97	0.65
3	COW	0.16	0.21	0.41	0.30	0.68	0.61	0.58	0.70	4.21	0.40	0.46	1.37	0.36	0.36	0.60	0.45	0.90	0.62
3	B3	0.16	0.26	0.48	0.33	0.76	0.67	0.65	0.75	4.87	0.44	0.51	1.58	0.40	0.41	0.66	0.51	1.02	0.72
4	B2	0.15	0.20	0.39	0.27	0.63	0.56	0.55	0.69	3.74	0.37	0.44	1.22	0.35	0.32	0.55	0.40	0.83	0.56
4	B1	0.16	0.23	0.41	0.28	0.63	0.57	0.54	0.66	3.82	0.38	0.43	1.24	0.34	0.34	0.56	0.42	0.84	0.57
5	Super	0.13	0.17	0.34	0.24	0.51	0.48	0.46	0.58	3.08	0.32	0.38	1.03	0.31	0.29	0.47	0.34	0.71	0.47
6	Super	0.16	0.23	0.49	0.32	0.74	0.62	0.62	0.74	4.78	0.44	0.49	1.60	0.39	0.33	0.64	0.50	1.01	0.71
6	B1	0.15	0.20	0.43	0.28	0.63	0.54	0.52	0.66	3.95	0.38	0.43	1.31	0.34	0.27	0.55	0.42	0.86	0.59
10	Super	0.15	0.21	0.42	0.31	0.69	0.61	0.60	0.71	4.36	0.39	0.46	1.42	0.36	0.38	0.58	0.44	0.90	0.62
10	B1	0.14	0.20	0.38	0.28	0.63	0.56	0.55	0.65	3.93	0.36	0.43	1.26	0.34	0.33	0.54	0.40	0.82	0.56
10	B2	0.16	0.15	0.34	0.26	0.56	0.52	0.53	0.59	3.61	0.35	0.41	1.19	0.32	0.32	0.51	0.37	0.78	0.53
11	Super	0.16	0.20	0.44	0.31	0.70	0.63	0.59	0.74	4.36	0.40	0.47	1.41	0.36	0.39	0.58	0.44	0.91	0.63
11	B1	0.16	0.18	0.37	0.28	0.63	0.57	0.55	0.64	3.81	0.37	0.43	1.24	0.34	0.36	0.53	0.40	0.82	0.56
12	COW	0.16	0.21	0.44	0.27	0.59	0.53	0.52	0.62	3.82	0.36	0.42	1.24	0.33	0.32	0.54	0.40	0.82	0.56
14	Super	0.16	0.20	0.41	0.32	0.72	0.66	0.63	0.79	4.76	0.42	0.51	1.52	0.39	0.41	0.64	0.48	0.98	0.68
15	Super	0.16	0.20	0.40	0.29	0.63	0.58	0.55	0.69	4.24	0.38	0.45	1.36	0.36	0.37	0.58	0.44	0.88	0.62
16	COW	0.16	0.20	0.41	0.30	0.66	0.61	0.57	0.72	4.26	0.39	0.46	1.40	0.37	0.38	0.59	0.44	0.91	0.62
19	COW	0.15	0.14	0.32	0.27	0.58	0.55	0.52	0.61	3.80	0.35	0.42	1.25	0.32	0.34	0.52	0.39	0.80	0.57
20	B1	0.16	0.20	0.42	0.29	0.62	0.57	0.53	0.64	3.76	0.37	0.43	1.24	0.34	0.32	0.56	0.41	0.84	0.57
20	Super	0.16	0.18	0.42	0.30	0.64	0.57	0.55	0.65	4.01	0.38	0.44	1.32	0.35	0.36	0.56	0.42	0.87	0.60
20	B2	0.13	0.16	0.31	0.25	0.56	0.51	0.50	0.60	3.32	0.33	0.40	1.09	0.31	0.31	0.48	0.36	0.73	0.49

Table 8: Amino acid content of wheat samples originating from different production regions (continue)

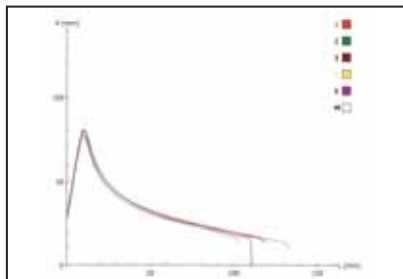
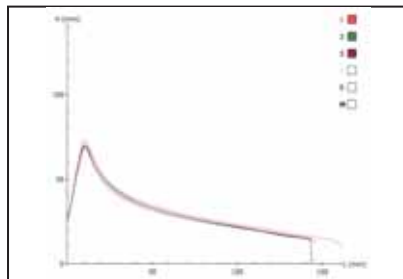
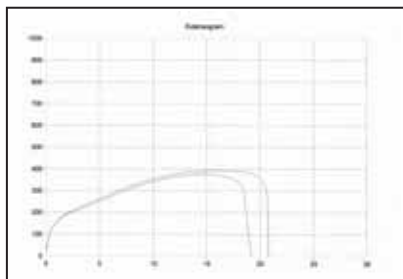
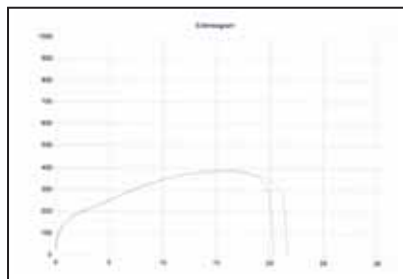
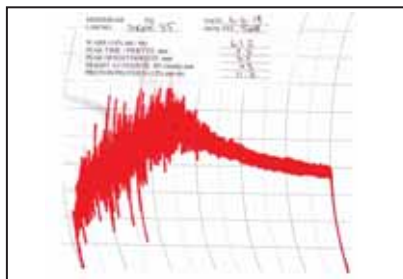
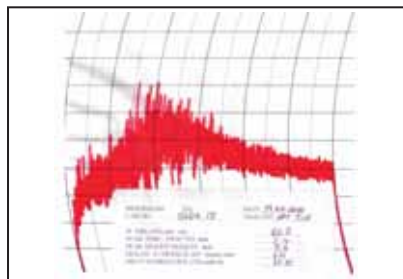
Region	Grade	Amino Acid																		
		Tryptophan	Methionine	Cysteine	Histidine	Serine	Arginine	Glycine	Aspartic acid	Glutamic acid	Threonine	Alanine	Proline	Lysine	Tyrosine	Valine	Isoleucine	Leucine	Phenyl- alanine	
		g/100g (as is)																		
23	COW	0.16	0.20	0.49	0.35	0.75	0.67	0.62	0.78	4.83	0.44	0.51	1.59	0.39	0.41	0.64	0.50	1.01	0.72	
24	COW	0.16	0.16	0.37	0.28	0.60	0.54	0.52	0.62	3.61	0.36	0.42	1.23	0.34	0.32	0.53	0.39	0.81	0.57	
25	Super	0.16	0.24	0.48	0.36	0.79	0.69	0.66	0.75	4.90	0.45	0.50	1.72	0.37	0.43	0.68	0.53	1.07	0.77	
26	COW	0.15	0.18	0.40	0.33	0.69	0.61	0.58	0.69	4.57	0.41	0.47	1.52	0.37	0.38	0.61	0.48	0.96	0.70	
28	COW	0.16	0.20	0.42	0.32	0.70	0.64	0.60	0.68	4.42	0.41	0.47	1.45	0.37	0.38	0.61	0.47	0.93	0.68	
28	Super	0.17	0.18	0.37	0.29	0.66	0.58	0.56	0.66	4.06	0.38	0.45	1.33	0.35	0.37	0.56	0.42	0.87	0.60	
29	COW	0.16	0.20	0.42	0.29	0.64	0.56	0.54	0.70	4.14	0.39	0.46	1.34	0.36	0.32	0.58	0.44	0.89	0.61	
33	B1	0.16	0.19	0.41	0.28	0.62	0.53	0.54	0.67	3.91	0.38	0.44	1.29	0.35	0.25	0.55	0.41	0.85	0.57	
34	Super	0.18	0.19	0.43	0.35	0.79	0.68	0.67	0.74	4.91	0.45	0.51	1.61	0.39	0.43	0.65	0.50	1.02	0.71	
35	Super	0.16	0.19	0.45	0.31	0.68	0.59	0.58	0.66	4.27	0.40	0.46	1.42	0.35	0.34	0.62	0.46	0.94	0.64	
35	B1	0.17	0.21	0.41	0.28	0.62	0.56	0.56	0.63	3.93	0.37	0.44	1.32	0.34	0.33	0.56	0.42	0.86	0.59	
36	Super	0.17	0.22	0.48	0.32	0.71	0.68	0.63	0.77	4.75	0.43	0.51	1.60	0.40	0.43	0.66	0.50	0.99	0.69	
2019/20 Minimum		0.13	0.14	0.31	0.24	0.51	0.48	0.46	0.58	3.08	0.32	0.38	1.03	0.31	0.25	0.47	0.34	0.71	0.47	
2019/20 Maximum		0.18	0.26	0.49	0.36	0.79	0.69	0.67	0.79	4.91	0.45	0.51	1.72	0.40	0.43	0.68	0.53	1.07	0.77	
2018/19 Minimum		0.12	0.17	0.35	0.23	0.55	0.50	0.48	0.59	3.35	0.33	0.40	1.11	0.31	0.29	0.43	0.32	0.72	0.50	
2018/19 Maximum		0.19	0.30	0.62	0.40	0.86	0.79	0.73	0.87	5.76	0.50	0.58	2.02	0.45	0.49	0.76	0.63	1.21	0.86	
2017/18 Minimum		0.14	0.22	0.29	0.26	0.57	0.50	0.39	0.60	3.64	0.35	0.42	1.17	0.33	0.22	0.51	0.39	0.43	0.53	
2017/18 Maximum		0.17	0.37	0.48	0.39	0.89	0.73	0.75	0.86	5.88	0.52	0.58	2.03	0.44	0.43	0.76	0.60	1.20	0.88	
2016/17 Minimum		0.13	0.18	0.31	0.23	0.51	0.45	0.45	0.54	3.02	0.32	0.37	0.99	0.31	0.23	0.46	0.34	0.70	0.46	
2016/17 Maximum		0.19	0.26	0.55	0.44	0.93	0.83	0.77	0.88	6.39	0.54	0.61	2.18	0.49	0.49	0.82	0.66	1.32	1.01	

RSA WHEAT CROP QUALITY SUMMARY

RSA Crop Quality 2017/18 and 2019/20 Seasons

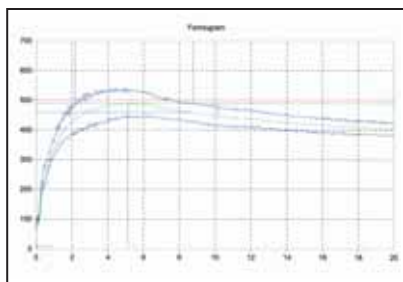
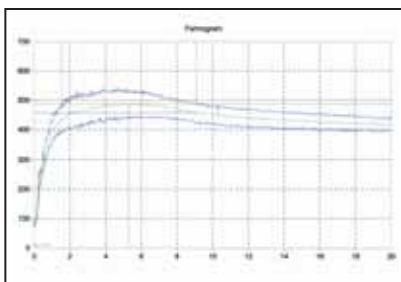
Country of origin	RSA Crop Average 2017/2018							RSA Crop Average 2019/20						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	Super	B1	B2	B3	COW	Average	
No. of samples	142	77	22	15	42	6	304	132	56	25	15	105	333	
WHEAT GRADING														
Protein (12% mb), %	13.1	12.0	11.0	11.9	13.0	13.3	12.6	13.5	12.0	11.1	12.4	13.2	12.9	
Moisture, %	10.0	10.1	10.0	9.5	10.3	10.2	10.0	10.3	10.1	10.1	10.2	10.3	10.2	
Falling number, sec	379	368	367	380	360	301	371	382	387	355	370	295	353	
1000 Kernel mass (13% mb), g	36.9	39.4	40.9	37.0	36.4	34.2	37.7	36.1	38.7	37.8	33.3	33.2	35.6	
Hlm (dirty), kg/hl	80.9	81.7	81.6	81.3	78.4	75.8	80.7	80.0	81.3	80.6	77.1	75.9	78.9	
Screenings (<1.8 mm sieve), %	1.31	1.21	0.98	1.98	2.61	3.24	1.51	1.31	1.27	1.21	1.56	3.26	1.92	
Gravel, stones, turf and glass, %	0.01	0.01	0.02	0.00	0.01	0.07	0.01	0.01	0.01	0.00	0.00	0.01	0.01	
Foreign matter, %	0.11	0.13	0.10	0.10	0.29	0.39	0.14	0.10	0.09	0.08	0.06	0.25	0.14	
Other grain & unthreshed ears, %	0.35	0.38	0.28	0.42	0.94	0.86	0.45	0.29	0.28	0.32	0.32	0.65	0.41	
Heat damaged kernels, %	0.00	0.00	0.00	0.00	0.01	0.05	0.00	0.00	0.00	0.01	0.01	0.08	0.03	
Immature kernels, %	0.05	0.04	0.02	0.01	0.11	0.30	0.06	0.07	0.05	0.05	0.01	0.09	0.07	
Insect damaged kernels, %	0.59	0.54	0.60	0.55	1.20	3.44	0.72	0.27	0.27	0.18	0.14	0.44	0.31	
Sprouted kernels, %	0.02	0.02	0.02	0.00	0.05	1.93	0.06	0.04	0.03	0.09	0.11	3.17	1.03	
Total damaged kernels, %	0.66	0.61	0.65	0.56	1.36	5.73	0.84	0.38	0.34	0.34	0.28	3.77	1.44	
Combined deviations, %	2.43	2.32	2.01	3.06	5.20	10.22	2.94	2.08	1.98	1.95	2.22	7.93	3.91	
Heavily frost damaged kernels, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.01	0.02	
Field fungi, %	0.10	0.08	0.07	0.11	0.13	1.23	0.12	0.11	0.15	0.14	0.07	0.60	0.27	
Storage fungi, %	0.00	0.00	0.00	0.00	0.01	0.08	0.00	0.00	0.00	0.00	0.00	0.01	0.00	
Ergot, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Poisonous seeds (<i>Crotalaria spp., etc.</i>)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Poisonous seeds (<i>Argemone mexicana, etc.</i>)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Live insects	No	No	No	No	No	No	No	No	No	No	No	No	No	
Undesirable odour	No	No	No	No	No	No	No	No	No	No	No	No	No	
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	COW	Average	
No. of samples	25	19	9	7	8	2	70	25	13	9	4	18	69	
Bühler Extraction, %	73.2	73.6	73.6	72.8	71.6	71.2	73.1	74.9	75.7	75.8	74.1	73.7	74.8	
FLOUR														
Colour, KJ (wet)	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7	
Colour, Konica Minolta CM5 (dry)														
L*	93.68	93.83	93.85	93.95	93.77	93.59	93.78	93.54	93.81	93.83	93.99	93.48	93.64	
a*	0.44	0.44	0.45	0.38	0.41	0.31	0.43	0.50	0.46	0.46	0.40	0.44	0.47	
b*	9.69	9.79	9.99	9.84	10.25	9.78	9.84	10.35	10.22	10.53	10.32	10.26	10.32	
Ash (db), %	0.60	0.61	0.61	0.58	0.60	0.65	0.60	0.65	0.65	0.63	0.61	0.63	0.64	
Protein (12% mb), %	12.0	11.1	10.2	10.0	11.7	11.9	11.3	12.7	11.2	10.3	11.2	12.1	11.9	
Wet Gluten (14% mb), %	32.7	30.6	27.5	26.7	31.7	31.6	30.7	33.6	29.5	26.6	29.2	31.7	31.1	
Dry Gluten (14% mb), %	11.1	10.3	9.2	9.0	10.8	10.9	10.4	11.5	9.9	8.8	9.9	10.7	10.6	
Gluten Index	93	93	94	94	92	90	93	95	95	96	96	96	95	
100 g BAKING TEST														
Baking water absorption, %	62.2	61.1	60.2	60.2	61.9	62.3	61.4	63.2	61.1	60.1	61.3	62.3	62.1	
Loaf volume, cm³	1145	1104	1013	997	1109	1083	1096	1185	1083	1036	1106	1140	1130	
Evaluation (see page 79)	0	0	0	0	0	0	0	0	0	0	0	0	0	
FARINOGRAM														
Water absorption (14% mb), %	60.9	60.1	59.5	58.8	60.9	60.4	60.3	61.5	60.2	59	58.6	59.4	60.2	
Development time, min	6.3	5.2	4.3	4.7	5.4	5.2	5.5	6.0	5.3	5.4	4.9	4.9	5.4	
Stability, mm	9.0	7.1	7.2	7.8	8.8	7.2	8.0	8.7	7.5	7.8	8.7	7.7	8.1	
Mixing tolerance index, BU	37	45	43	43	35	42	40	38	41	41	33	48	41	
														

RSA Crop Quality of 2017/18 and 2019/20 Seasons

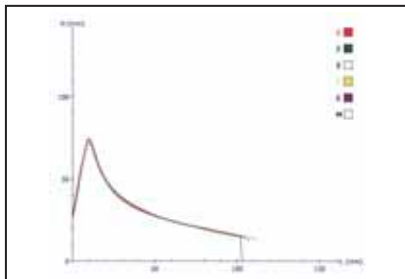
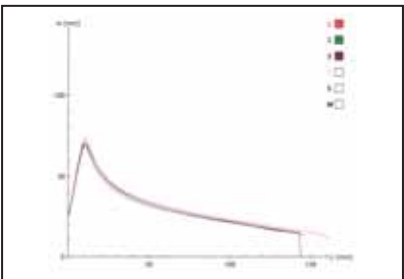
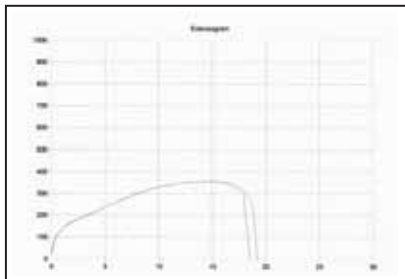
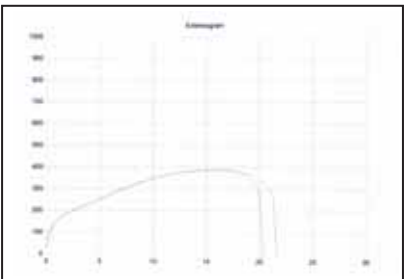
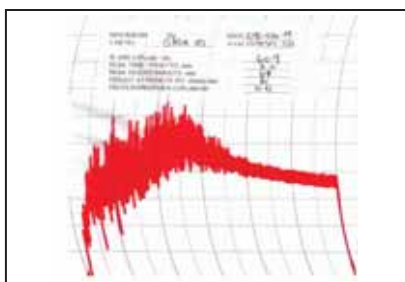
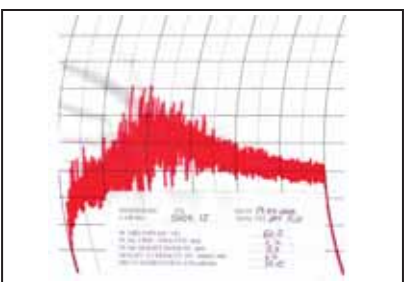
Country of origin	RSA Crop Average 2017/2018							RSA Crop Average 2019/20					
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	25	19	9	7	8	2	70	25	13	9	4	18	69
ALVEOGRAM													
Strength (S), cm²	44.6	36.1	34.0	34.6	40.6	36.1	39.2	47.3	39.8	36.8	40.2	41.3	42.6
Stability (P), mm	85	79	86	78	86	79	83	83	82	80	74	72	79
Distensibility (L), mm	122	113	102	106	119	123	115	146	127	117	148	163	143
P/L	0.72	0.75	1.22	0.81	0.80	0.69	0.81	0.59	0.68	0.73	0.56	0.50	0.60
													
EXTENSOGRAM													
Strength, cm²	121	100	89	89	109	95	106	121	106	98	105	114	112
Max. height, BU	421	365	352	347	373	328	382	387	382	375	381	383	383
Extensibility, mm	209	197	180	178	206	200	198	223	201	190	197	216	211
													
MIXOGRAM													
Peak time, min	2.8	2.6	2.7	2.7	2.4	2.5	2.6	2.5	2.7	2.8	2.7	2.7	2.6
Water absorption (14% mb), %	62.2	61.1	60.2	60.2	61.9	62.3	61.4	63.2	61.1	60.1	61.3	62.4	62.1
													
MYCOTOXINS													
Aflatoxin B ₁ (µg/kg)	ND							0 [0]					
Aflatoxin B ₂ (µg/kg)	ND							0 [0]					
Aflatoxin G ₁ (µg/kg)	ND							0 [0]					
Aflatoxin G ₂ (µg/kg)	ND							0 [0]					
Fumonisin B ₁ (µg/kg)	ND							0 [0]					
Fumonisin B ₂ (µg/kg)	ND							0 [0]					
Fumonisin B ₃ (µg/kg)	ND							0 [0]					
Deoxynivalenol (µg/kg) [max. value]	<100 [570]							<100 [1 017]					
Ochratoxin A (µg/kg)	ND							0 [0]					
Zearalenone (µg/kg)	ND							<20 [29]					
T-2 Toxin (µg/kg)	ND							0 [0]					
No. of samples	40							40					

RSA WHEAT CROP QUALITY SUMMARY

RSA Crop Quality 2018/19 and 2019/20 Seasons

Country of origin	RSA Crop Average 2018/19							RSA Crop Average 2019/20						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	Super	B1	B2	B3	COW	Average	
No. of samples	153	88	29	14	48	5	337	132	56	25	15	105	333	
WHEAT GRADING														
Protein (12% mb), %	12.8	11.6	10.5	10.7	12.0	11.5	12.1	13.5	12.0	11.1	12.4	13.2	12.9	
Moisture, %	9.3	9.3	9.2	9.6	9.0	9.7	9.3	10.3	10.1	10.1	10.2	10.3	10.2	
Falling number, sec	402	401	378	354	400	359	397	382	387	355	370	295	353	
1000 Kernel mass (13% mb), g	38.9	39.7	39.9	37.0	39.0	42.9	39.2	36.1	38.7	37.8	33.3	33.2	35.6	
Hlm (dirty), kg/hl	81.7	81.7	82.0	79.9	79.5	82.3	81.3	80.0	81.3	80.6	77.1	75.9	78.9	
Screenings (<1.8 mm sieve), %	1.30	1.23	1.18	2.44	2.58	0.69	1.49	1.31	1.27	1.21	1.56	3.26	1.92	
Gravel, stones, turf and glass, %	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	
Foreign matter, %	0.14	0.13	0.11	0.14	0.27	0.12	0.15	0.10	0.09	0.08	0.06	0.25	0.14	
Other grain & unthreshed ears, %	0.31	0.36	0.31	0.42	1.03	0.09	0.43	0.29	0.28	0.32	0.32	0.65	0.41	
Heat damaged kernels, %	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.01	0.01	0.08	0.03	
Immature kernels, %	0.09	0.07	0.06	0.09	0.04	0.18	0.08	0.07	0.05	0.05	0.01	0.09	0.07	
Insect damaged kernels, %	0.49	0.47	0.53	0.49	0.81	1.50	0.55	0.27	0.27	0.18	0.14	0.44	0.31	
Sprouted kernels, %	0.02	0.02	0.01	0.00	0.10	0.16	0.03	0.04	0.03	0.09	0.11	3.17	1.03	
Total damaged kernels, %	0.60	0.56	0.60	0.58	0.95	1.94	0.66	0.38	0.34	0.34	0.28	3.77	1.44	
Combined deviations, %	2.35	2.29	2.20	3.58	4.83	2.85	2.73	2.08	1.98	1.95	2.22	7.93	3.91	
Heavily frost damaged kernels, %	0.01	0.06	0.00	0.00	0.50	8.68	0.22	0.03	0.01	0.00	0.00	0.01	0.02	
Field fungi, %	0.12	0.14	0.10	0.12	0.12	0.08	0.12	0.11	0.15	0.14	0.07	0.60	0.27	
Storage fungi, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	
Ergot, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Live insects	No	No	No	No	No	No	No	No	No	No	No	No	No	
Undesirable odour	No	No	No	No	No	No	No	No	No	No	No	No	No	
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	COW	Average	
No. of samples	28	21	11	7	3	-	70	25	13	9	4	18	69	
Bühler Extraction, %	71.5	71.7	71.5	69.2	70.7	-	71.3	74.9	75.7	75.8	74.1	73.7	74.8	
FLOUR														
Colour, KJ (wet)	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7	
Colour, Konica Minolta CM5 (dry)														
L*	93.74	93.80	93.89	93.61	93.99	-	93.78	93.54	93.81	93.83	93.99	93.48	93.64	
a*	0.45	0.45	0.44	0.48	0.41	-	0.45	0.50	0.46	0.46	0.40	0.44	0.47	
b*	10.04	10.05	10.23	10.65	9.82	-	10.12	10.35	10.22	10.53	10.32	10.26	10.32	
Ash (db), %	0.60	0.60	0.61	0.61	0.57	-	0.60	0.65	0.65	0.63	0.61	0.63	0.64	
Protein (12% mb), %	11.8	10.6	9.6	10.4	11.3	-	10.9	12.7	11.2	10.3	11.2	12.1	11.9	
Wet Gluten (14% mb), %	32.7	28.9	25.6	30.1	31.3	-	30.1	33.6	29.5	26.6	29.2	31.7	31.1	
Dry Gluten (14% mb), %	11.0	9.7	8.5	10.1	10.6	-	10.1	11.5	9.9	8.8	9.9	10.7	10.6	
Gluten Index	92	95	96	96	93	-	94	95	95	96	96	96	95	
100 g BAKING TEST														
Baking water absorption, %	61.9	60.5	59.4	60.5	61.3	-	60.9	63.2	61.1	60.1	61.3	62.3	62.1	
Loaf volume, cm³	1088	1014	936	994	1085	-	1033	1185	1083	1036	1106	1140	1130	
Evaluation (see page 79)	0	0	0	0	0	-	0	0	0	0	0	0	0	
FARINOGRAM														
Water absorption (14% mb), %	61.6	60.4	58.9	58.6	61.1	-	60.5	61.5	60.2	59	58.6	59.4	60.2	
Development time, min	5.4	4.9	4.5	4.5	4.5	-	5.0	6.0	5.3	5.4	4.9	4.9	5.4	
Stability, mm	7.4	6.8	6.4	7.1	6.8	-	7.0	8.7	7.5	7.8	8.7	7.7	8.1	
Mixing tolerance index, BU	40	41	43	38	40	-	41	38	41	41	33	48	41	
														

RSA Crop Quality of 2018/19 and 2019/20 Seasons

Country of origin	RSA Crop Average 2018/2019							RSA Crop Average 2019/20					
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	28	21	11	7	3	-	70	25	13	9	4	15	69
ALVEOGRAM													
Strength (S), cm²	38.5	33.2	29.0	31.2	36.5	-	34.6	47.3	39.8	36.8	40.2	41.3	42.6
Stability (P), mm	84	82	76	81	80	-	82	83	82	80	74	72	79
Distensibility (L), mm	114	100	95	87	118	-	104	146	127	117	148	163	143
P/L	0.75	0.85	0.83	0.96	0.68	-	0.81	0.59	0.68	0.73	0.56	0.50	0.60
													
EXTENSOGRAM													
Strength, cm²	101	90	76	85	96	-	92	121	106	98	105	114	112
Max. height, BU	364	351	323	344	348	-	350	387	382	375	381	383	383
Extensibility, mm	204	187	172	177	201	-	191	223	201	190	197	216	211
													
MIXOGRAM													
Peak time, min	2.5	2.6	2.7	3.0	2.3	-	2.6	2.5	2.7	2.8	2.7	2.7	2.6
Water absorption (14% mb), %	61.9	60.5	59.4	60.5	61.3	-	60.9	63.2	61.1	60.1	61.3	62.4	62.1
													
MYCOTOXINS													
Aflatoxin B ₁ (µg/kg)	ND							0 [0]					
Aflatoxin B ₂ (µg/kg)	ND							0 [0]					
Aflatoxin G ₁ (µg/kg)	ND							0 [0]					
Aflatoxin G ₂ (µg/kg)	ND							0 [0]					
Fumonisin B ₁ (µg/kg)	ND							0 [0]					
Fumonisin B ₂ (µg/kg)	ND							0 [0]					
Fumonisin B ₃ (µg/kg)	ND							0 [0]					
Deoxynivalenol (µg/kg) [max. value]	<100 [361]							<100 [1 017]					
Ochratoxin A (µg/kg)	ND							0 [0]					
Zearalenone (µg/kg)	ND							<20 [29]					
T-2 Toxin (µg/kg)	ND							0 [0]					
No. of samples	40							40					

GRADING:

Full grading was conducted in accordance with the Regulations relating to the grading, packing and marking of bread wheat intended for sale in the Republic of South Africa (No. R. 1547 of 29 November 2019). Please see pages 112 to 123.

Hectolitre mass, screenings, protein and falling number were determined. The determination of deviations relating to wheat kernels comprised foreign matter including gravel, stones, turf and glass; other grain and unthreshed ears; damaged kernels including heat-damaged kernels, immature kernels, insect-damaged kernels and sprouted kernels; heavily frost-damaged kernels; field fungi; storage fungi; ergot; noxious seeds; possible presence of undesirable odours and live insects.

Hectolitre mass means the mass in kilogram per hectolitre and was determined according to ISO 7971-3 by means of the Kern 222 instrument.

Hectolitre mass provides a measure of the bulk density of grain and is also useful as a guide to grain soundness and potential milling extraction (flour yield).

Screenings means all material that passes through a standard sieve. For the definition of a standard sieve please refer to the definitions of Regulation No. R. 1547 on page 114 of this report.

Damaged wheat means wheat -

- (a) which have been damaged by insects;
- (b) which have been distinctly discoloured (orange-brown, dark brown or black) by external heat or as a result of heating caused by internal fermentation in wheat with an excessive moisture content, excluding wheat kernels in respect of which the discolouration is confined to the germ end;
- (c) which are immature and have a distinctly green colour; and
- (d) in which germination has proceeded to such an extent that the skin covering the embryo has been broken or the developing sprouts and/or rootlets are clearly visible.

Combined deviations means the sum of the percentages screenings, other grain and unthreshed ears, foreign matter and damaged kernels.

THOUSAND KERNEL MASS:

This is the weight in grams of one thousand kernels of grain and provides a measure of grain size and density. This determination does not include kernels

that are broken or chipped and is done according to Industry Accepted Method 008. Thousand kernel mass is reported on a 13% moisture basis.

FALLING NUMBER MILLING:

At least 300 g of wheat is cleaned by using the standard 1.8 mm sieve and by removing coarser impurities by hand. The sample is then milled on a falling number hammer mill fitted with a 0.8 mm screen.

NEAR INFRARED SPECTROSCOPY (NIRS):

NIRS is a measurement technique based on the fact that the constituents to be measured, absorb electromagnetic radiation in the near infrared region of the electromagnetic spectrum. The moisture and protein content of the whole wheat flour and Quadromat milled flour samples are measured with a SpectraStar 2400 NIR Analyser RTW.

The calibration on the NIR was developed by the SAGL and is verified by analysing every fifth sample by means of the primary methods, described on the next page under Moisture and Protein.

FALLING NUMBER:

This method is based upon the rapid gelatinization of an aqueous suspension of meal or flour in a boiling water bath and subsequent measurement of the liquefaction of the starch paste by the alpha-amylase in the sample. The method measures the enzyme activity, mainly the α -amylase activity.

ICC Standard No. 107/1, latest edition is used to determine the falling number. The altitude-corrected value is reported on a 14% moisture basis.

QUADROMAT JUNIOR MILLING:

Cleaned wheat samples are conditioned by adding 3 ml water per 100 g wheat, 18 hours prior to milling. The samples are then milled on the Quadromat Junior laboratory mill.

BÜHLER MILLING:

Cleaned wheat samples are conditioned to between 15.0% and 16.0% moisture according to the wheat moisture and kernel hardness and allowed to stand

for a minimum of 18 hours (18 - 24 hours). Samples are then milled on a Bühler MLU 202 mill and passed through a bran finisher.

BÜHLER EXTRACTION:

The extraction represents the flour yield after milling plus flour obtained from bran that passed through a bran finisher. Flour extraction is calculated from the mass of the total products. The Bühler MLU 202 mill is set for South African wheat, mill settings and sieve sizes deviate from AACCI method 26-21.02, latest edition.

MOISTURE:

ICC Standard No. 110/1, latest edition is used to determine the moisture content of wheat flour. This method determines moisture content as a loss in weight of a sample when dried in an oven at 130 °C for 90 minutes for flour or 2 hours for whole wheat flour.

PROTEIN:

The Dumas combustion analysis technique is used, according to AACCI method 46-30.01, latest edition.

This method prescribes a generic combustion method for the determination of crude protein. Combustion of the sample at high temperature (1 100 °C) in pure oxygen sets nitrogen free, which is measured by thermal conductivity detection. The total nitrogen content of the whole wheat flour and flour samples are determined and converted to equivalent protein by multiplication with a factor of 5.7 to obtain the protein content.

COLOUR:

Colour is one of the important properties of milled grains and the colour of wheat flour often affects the colour of the finished product. Generally speaking, a bright white colour flour is more desirable for most products.

The Kent Jones colour (so called wet colour) is determined by following FTP Method No. 0007/3, 7/1991. This method determines the influence of bran and/or extraneous material present in flour by measuring the reflectance of a flour-water slurry at a wavelength of 540 nm. The lower the Kent Jones colour, the lighter/brighter the flour and vice versa.

The dry colour of wheat flour can be measured accurately and precisely with the Konica Minolta CM-5

spectrophotometer. CIE $L^*a^*b^*$ (CIELAB) is a colour model using lightness (L^*) and two colour values (a^* and b^*). The colour coordinates define where a specific colour lies in a Cartesian graph. L^* represents lightness (100 being white and 0 being black), a^* represents green to red variation and b^* represents variation from blue to yellow. The results reported are for the 10° observer and D65 illuminant.

ASH:

Ash is defined as the quantity of mineral matter that remains as incombustible residue, after incineration of a sample in a muffle furnace by application of the described working method. The ash constituents of wheat are taken from the minerals of the soil. The total mineral content as well as the relative proportions of individual elements depend largely upon the soil, rainfall and other climatic conditions during growth.

Since the level of minerals present in flour is related to the rate of extraction, the ash content also indicates milling performance by indirectly revealing the amount of bran contamination. In-house method No. 011, based on the AACCI method 08-02.01 Rapid (Magnesium Acetate) method, is used for the determination.

RAPID VISCO ANALYSER:

AACCI method 76-21.02, latest edition, is followed to prepare a complete pasting curve by means of the Rapid Visco Analyser (RVA). The RVA is a rotational viscometer, able to continuously record the viscosity of a sample (under controlled temperature conditions) as the starch granules hydrate, swell and disintegrate (gelatinisation and pasting), followed by possible realignment of the starch molecules during cooling (retrogradation).

Maximum viscosity before the onset of cooling (**peak viscosity**), **time to peak** viscosity, **minimum viscosity** after peak (trough) and **final viscosity** are measured and provide indications of the pasting properties of the samples and therefore its processing value for baking and other applications.

The results are reported in centipoise (cP) on a 14% moisture basis. Results can also be converted to RVU (rapid visco unit), 1 RVU = 12 cP.

GLUTEN:

Wheat gluten is the water-insoluble complex protein fraction present in wheat flours. The ability of wheat flour to produce dough with good gas retaining properties is attributed to gluten. Gluten is a plastic

elastic substance composed principally of two functional protein components. Glutenin, the high molecular weight fraction, contributes elasticity (is less extensible) and Gliadin, the low molecular weight fraction, provides the viscous component (is highly extensible and less elastic).

The gluten content of wheat flour is determined by means of AACCI Method 38-12.02, latest edition. Wet gluten is washed from meal or flour by an automatic washing apparatus (Glutomatic).

The wet gluten is dried under standardised conditions in a Glutork to obtain the dry gluten. The total wet and total dry gluten contents are expressed as percentages of the sample on a 14% moisture basis.

Wet gluten content correlates to loaf volume and dry gluten content to the crude protein content. The difference between the wet and dry gluten contents is an indication of the water-holding capacity of the gluten proteins, which is in turn, related to flour water absorption.

The gluten index is the ratio of the wet gluten remaining on the sieve (after centrifugation) to the total wet gluten. The gluten index provides an indication of the gluten strength and is not influenced by the protein content.

FARINOGRAPH:

AACCI method 54-21.02, latest edition constant flour weight procedure is followed, using 300 g of flour on a 14% moisture basis.

The farinograph measures and records the resistance of a dough to mixing, as it is formed from flour and water, developed and broken down. This resistance is called consistency. The dough is subjected to a prolonged, relatively gentle mixing action.

The **water absorption** is the amount of water required for a dough to reach a definite consistency (500 Brabender units). The amount of water added to the flour is expressed as a percentage of the flour mass and reported on a 14% moisture basis.

The **development time**, measured in minutes, is the time from the beginning of water addition until the dough reaches its optimum consistency and the point immediately before the first indication of weakening. A long mixing time can be associated with flours with a high percentage of gluten-forming proteins.

The **stability**, measured in minutes, is the time during which the top of the curve intercepts a horizontal

line through the centre of the curve. This gives an indication of the dough's tolerance to mixing: the longer the stability, the longer the mixing time that the dough can withstand. A dough with a longer stability can also withstand a longer fermentation period.

The **mixing tolerance index** (MTI) value is the difference, in Brabender units (BU), between the top of the curve at the peak and the top of the curve measured 5 minutes after the peak is reached. The value gives an indication of the extent to which breakdown of the dough occurs. The higher the value, the more and the quicker the breakdown of the dough occurs. This value is similar to the mixogram tail height.

EXTENSOGRAPH:

The extensograph measures the resistance and extensibility of a fully mixed, relaxed flour-water dough, by measuring the force required to stretch the dough with a hook until it breaks. ICC Standard No. 114/1, latest edition is followed.

The **strength**, measured in cm^2 , gives an indication of the total force (work) needed to stretch the dough and is represented by the area under the curve.

The **maximum height/resistance**, measure in BU, gives an indication of the dough's resistance to stretching and is measured as the mean of the maximum heights of the curves of the two test pieces.

The **extensibility**, measured in millimeters, is the mean length at the base of the two curves and indicates the stretch ability of the dough.

ALVEOGRAPH:

The alveograph measures the resistance of the dough to stretching and also how extensible the dough is. The alveograph stretches the dough in more than one direction (as is happening during proofing), whereas the extensograph stretches the dough in only one direction. ICC Standard No. 121, latest edition is followed.

Strength (S): The area under the curve gives an indication of the dough strength and is measured in cm^2 .

Stability (P): Obtained by multiplying the maximum height of the curve with a constant factor of 1.1. This value is an indication of the resistance of the dough to extension (force required to blow the bubble of dough) and is measured in millimetres.

Distensibility (L): The length of the curve, measured

along the base line in millimetres, corresponds to the maximum volume of air that the bubble can withhold. Provides an indication of the extensibility of the dough. P/L-value: This ratio is obtained by dividing the P-value by the L-value, thus providing an approximate indication of the shape of the curve that combines stability and extensibility (viscoelastic properties).

MIXOGRAPH:

A 35 g mixograph is used. The amount of flour weighed is adjusted according to the flour moisture content and the amount of water added to the flour is adjusted according to the flour protein content. Industry Accepted Method 020 based on AACCI method 54-40.02, latest edition is followed.

Mixogram peak time is the time measured in minutes that dough takes to reach its maximum consistency or first indication of dough weakening. The peak time is a measure of optimum dough development and thus a measure of protein quality.

Mixogram tail height at 6 minutes is the distance in millimetres measured from the base line of the paper at 6 minutes to the graph centre point at 6 minutes. This figure is an indication of the weakening effect of the dough. Higher values indicate flours that are more tolerant to mixing.

100 g BAKING TEST:

This procedure, according to Industry Accepted Method 022 based on AACCI Method 10-10.03, latest edition, provides an optimised bread-making method for evaluating bread wheat flour quality and a variety of dough ingredients by a straight-dough method in which all ingredients are incorporated in the initial mixing step.

Keys for the evaluation of the 100 g Baking test:

- 0 - Excellent
- 1 - Very Good
- 2 - Good
- 3 - Questionable
- 4 - Poor
- 5 - Very Poor
- 6 - Extremely Poor

Please note: This 100 g Baking test evaluation does not give an indication of the baking quality of the flour, but refers to the relationship between the protein content and the bread volume.

AMINO ACID PROFILE:

The protein bound amino acids (Aspartic acid (Asp), Glutamic acid (Glu), Serine (Ser), Glycine (Gly),

Histidine (His), Arginine (Arg), Threonine (Thr), Alanine (Ala), Proline (Pro), Tyrosine (Tyr), Valine (Val), Isoleucine (Ileu), Leucine (Leu), Phenylalanine (Phe) and Lysine (Lys)) were determined by using In-house method No. 028, (AccQ-Tag method).

Samples (200 mg) are hydrolysed with 6 N hydrochloric acid (HCl) for 24 hours and then derivatised with 6-aminoquinolyl-N-hydroxysuccinimidyl carbamate (AQC) to produce stable derivatives. These amino acids are then analysed by a reverse phase UPLC method, using a Waters Acquity H-Class UPLC with Empower software (Waters, Millipore Corp., Milford, MA).

In-house method No. 15, where the sample is first oxidised and dried, was followed for the determination of Cysteine (as Cysteic acid) and Methionine (as Methionine sulfone). The samples were then analysed with liquid chromatography using a modified Pico-Tag method.

For the determination of Tryptophan according to In-house method No. 007, the samples are hydrolysed under alkaline conditions with a saturated barium hydroxide solution heated to 110 °C for 20 hours. The hydrolysate is analysed by reverse phase liquid chromatography with UV detection at 285 nm.

MYCOTOXIN ANALYSES:

Mycotoxins are secondary metabolites produced by fungi on agricultural commodities intended for human and animal consumption. These mycotoxins are potentially dangerous to humans and animals since they are, amongst other also carcinogens. Aside from health risks, mycotoxin contamination can also reduce the value of the crops. Environmental factors such as temperature, humidity, soil and storage conditions influence toxin production.

SAGL implements a validated SAGL In-house multi-mycotoxin method using UPLC - MS/MS. 40 of the 333 wheat crop samples were tested for Aflatoxin B₁, B₂, G₁, G₂, Fumonisin B₁, B₂, B₃, Deoxynivalenol, 15-ADON, HT2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A.

Wheat Exports and Imports



WHEAT EXPORTS/IMPORTS PER COUNTRY
2018/19 Season (29 Sep 2018 - 27 Sep 2019)

RSA EXPORTS		IMPORTS FOR RSA		IMPORTS FOR OTHER COUNTRIES		EXPORTS OF IMPORTED WHEAT		IMPORTS PER HARBOUR*	
To Country	Tons	From Country	Tons	From Country	Tons	To Country	Tons	Harbour	Tons
Botswana	30 058	Argentina	35 519	Argentina	6 988	Botswana	78 553	Cape Town	98 625
Eswatini (Swaziland)	4 422	Canada	85 428	Canada	6 060	Eswatini (Swaziland)	39 660	Durban	1 363 696
Lesotho	13 662	Czech Republic	110 636	Czech Republic	2 995	Lesotho	64 980	East London	49 342
Mozambique	1 594	Germany	358 343	Germany	32 001	Zimbabwe	27 336	Port Elizabeth	42 628
Namibia	9 865	Latvia	39 290	Latvia	13 480			Richards Bay	18 550
Zambia	21 244	Lithuania	124 161	Lithuania	26 002				
Zimbabwe	27 412	Poland	24 998	Russian Federation	88 448				
		Russian Federation	401 385	Ukraine	16 756				
		Ukraine	48 210	United States	12 014				
		United States	140 127						
Total	108 257	Total	1 368 097	Total	204 744	Total	210 529	Total	1 572 841

*Includes: Imports for RSA and Other Countries

WHEAT EXPORTS/IMPORTS PER COUNTRY 2019/20 Season (28 Sep 2019 - 17 Jul 2020)

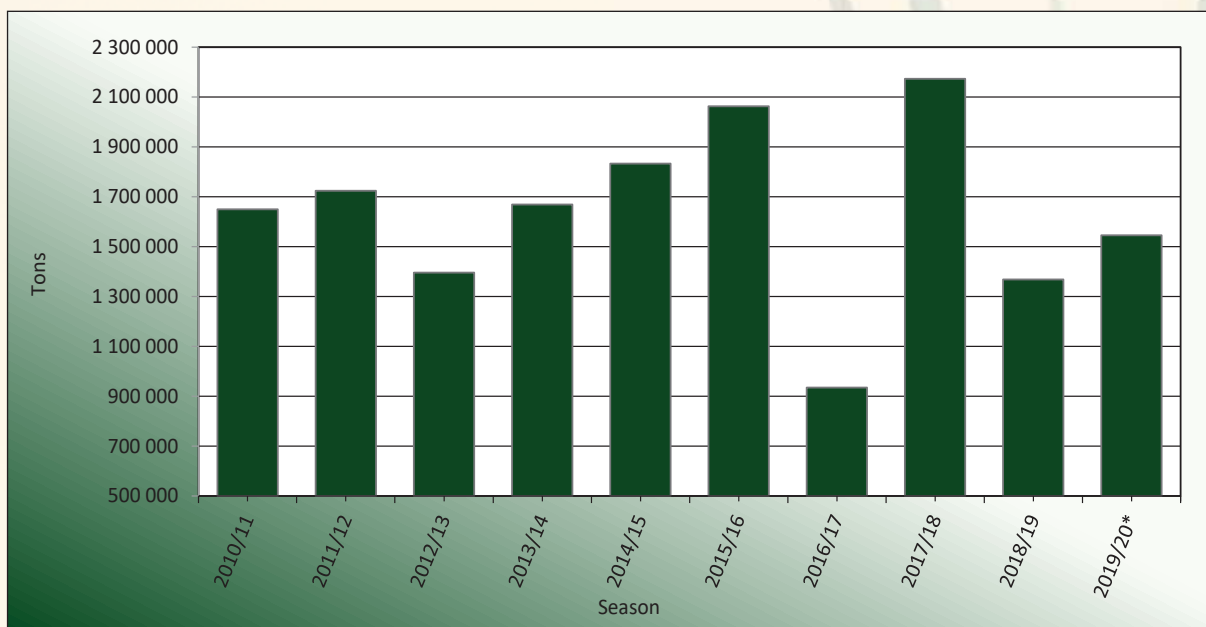
RSA EXPORTS		IMPORTS FOR RSA		IMPORTS FOR OTHER COUNTRIES		EXPORTS OF IMPORTED WHEAT		IMPORTS PER HARBOUR*	
To Country	Tons	From Country	Tons	From Country	Tons	To country	Tons	Harbour	Tons
Botswana	4 820	Canada	51 618	Canada	7 007	Botswana	97 156	Cape Town	128 368
Eswatini (Swaziland)	7 314	Czech Republic	52 365	Germany	61 266	Eswatini (Swaziland)	34 823	Durban	1 481 102
Lesotho	2 000	Finland	21 878	Latvia	12 135	Lesotho	70 082	East London	45 339
Namibia	11 938	Germany	271 501	Lithuania	23 753	Mozambique	1 154	Port Elizabeth	46 736
Zambia	39 839	Latvia	54 803	Poland	86 298	Zimbabwe	8 606	Richards Bay	74 016
Zimbabwe	5 583	Lithuania	202 603	Russian Federation	38 122				
		Poland	492 911	Ukraine	981				
		Russian Federation	291 864						
		Ukraine	53 199						
		United States	53 257						
Total	71 494	Total	1 545 999	Total	229 562	Total	211 821	Total	1 775 561

*Includes: Imports for RSA and Other Countries

Quantity of wheat imported to the RSA

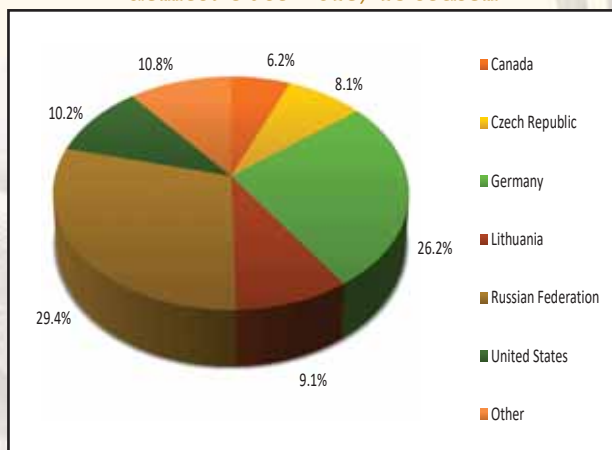
The graphs and table given below and on the next page, are based on progressive import figures per country provided by SAGIS.

Graph 27: Total wheat imports for domestic use from the 2010/11 season

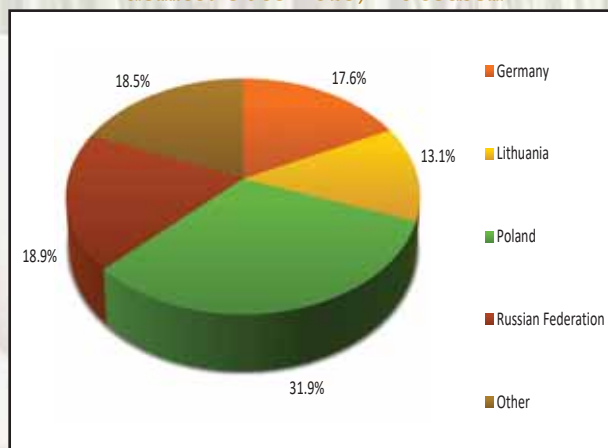


*2019/20 season figure includes imports up to 17 July 2020.

Graph 28: Wheat imports per origin for domestic use 2018/19 season



Graph 29: Wheat imports per origin for domestic use 2019/20 season



*2019/20 season figure includes imports up to 17 July 2020.

Table 9: Total wheat imports per country per season for use in the RSA

	Season										Total (Tons)
	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20*	
Argentina	629 600	652 279	98 029	-	59 607	49 516	35 613	132 433	35 519	-	1 692 596
Australia	181 637	247 675	189 925	49 780	95 254	38 457	24 816	-	-	-	827 544
Brazil	58 551	276 420	234 733	-	-	-	-	-	-	-	569 704
Canada	79 697	45 252	48 583	111 289	105 457	102 816	27 841	90 944	85 428	51 618	748 925
Czech Republic	-	-	-	-	-	-	144 402	47 904	110 636	52 365	355 307
Eswatini	-	-	288	-	-	-	-	-	-	-	288
Finland	-	-	-	25 430	-	-	-	-	-	21 878	47 308
Germany	88 581	105 964	95 476	179 436	348 385	283 451	237 508	282 312	358 343	271 501	2 250 957
Latvia	-	-	-	22 013	61 005	-	17 098	140 007	39 290	54 803	334 216
Lesotho	-	-	384	-	-	-	-	-	-	-	384
Lithuania	-	8 880	-	40 532	43 791	151 047	-	182 241	124 161	202 603	753 255
Poland	-	-	-	-	91 483	185 036	76 912	17 514	24 998	492 911	888 854
Romania	-	36 071	-	-	-	-	112 334	101 449	-	-	249 854
Russian Federation	-	154 129	245 228	800 964	719 784	956 705	182 993	955 697	401 385	291 864	4 708 749
Ukraine	-	39 016	341 976	372 500	279 364	109 350	13 568	135 669	48 210	53 199	1 392 852
Uruguay	25 249	45 250	99 033	-	-	-	-	-	-	-	169 532
USA	586 200	112 915	42 572	66 468	28 311	186 387	61 680	87 064	140 127	53 257	1 364 981
Total	1 649 515	1 723 851	1 396 227	1 668 412	1 832 441	2 062 765	934 765	2 173 234	1 368 097	1 545 999	16 355 306

*2019/20 season figures include imports up to 17 July 2020.

Quality summary of imported wheat (Wheat imported from 29 September 2018 to 27 September 2019) (Previous season)

The quality of all wheat imported into South Africa is monitored by the SAGL. A subsample of all samples drawn by inspectors of the South African Agricultural Food, Quarantine and Inspection Services (SAAFQIS) of the Department of Agriculture, Land Reform and Rural Development (DALRRD) formerly the Department of Agriculture, Forestry and Fisheries (DAFF) is forwarded to the SAGL for analysis. To assist with quality comparisons between local and imported wheat, the same scope of analysis is used for both sets of samples. The import quality results are published at the end of each production and marketing season. The results of samples of wheat imported during the current season (from 28 September 2019 onward) are updated quarterly and available on the SAGL website.

For grading as well as dough and baking quality results of the imported wheat per country, please refer to pages 88 to 107. This imported wheat quality is compared to a summary of the local crop quality of the corresponding (2018/19) season. To simplify the comparison between the quality of the different countries of import, the average quality per country was summarised in Table 10 on pages 86 and 87. The minimum, maximum and standard deviation per country was also calculated. Please take note of the number of samples analysed when comparing results, the higher the number of samples, the more reliable the average result will be.

A total number of 168 samples of wheat imported from the following ten countries were received (number of samples received in brackets): Argentina (9), Canada (18), Czech Republic (5), Germany (39), Latvia (2), Lithuania (22), Poland (2), Russian Federation (43), Ukraine (8) and USA (20). Wheat imported for purposes other than bread baking (e.g. soft types for biscuit making) is included in this data set.

Most of the wheat imported to South Africa is blended with local wheat to obtain a certain milling and baking quality as per individual company specifications. Milling companies will blend higher and lower quality wheat to obtain the most cost-effective grist formulation that conforms to a specific quality. The main objective is to supply the most consistent quality of flour to their customers (bakers) as possible, as in the end, consistency is one of the most important quality parameters.

Towards the end of the production season, it may however become necessary for milling companies to mill wheat blends consisting only of imported wheat. Transportation cost is also an important factor for consideration. The grist formulation of mills situated at the coast will as a result consist mainly of imported wheat whereas inland mills will mill a combination of local and imported wheat.

Please note that these imported wheat samples as well as the 2018/19 wheat crop samples, were graded according to the previous version of the national wheat grading regulations (Government Notice No. R. 64 of 29 January 2016). Hectolitre mass is an important grading factor that also provides an indication of flour extraction potential. 4% of the samples had hectolitre mass values below 77 kg/hl (minimum requirement for South African grade B1 wheat), compared to the 7% and 18% of the previous two seasons. These samples originated from Lithuania, the Russian Federation and the USA.

Screenings represent all material that passes through a standard sieve (1.8 mm), with 3% the maximum allowed for grades 1 to 3 according to RSA grading regulations. When comparing screening results originating from different countries, it is important to keep in mind that sieve aperture size and shape as well as sample preparation procedures vary between countries. Samples from the Russian Federation, USA and Poland reported the highest levels of screenings, which explains the low hectolitre mass values observed on some these samples at least in part.

None of the samples reported falling number results below 220 seconds. The wheat imported from Latvia had the lowest average falling number (280 seconds) and that of the USA the highest (446 seconds), compared to the 397 seconds of the RSA national average for the same season.

The protein content and rheological characteristics of the wheat imported from the USA varied from low and weak to average and fair. The average values are therefore not a true reflection of the overall imported USA wheat bread baking quality, since most of the wheat imported were most probably not intended for bread baking purposes.

The ability of wheat flour to produce dough with good gas-holding capability is attributable to gluten as gluten imparts the elasticity and extensibility characteristics to the dough. Good quality gluten is capable of producing a loaf of bread with a high volume and good crumb texture. As in the previous seasons, the imported Canadian wheat had the highest protein content resulting in the highest gluten content. When evaluating gluten results, it is important to take the protein content into account. The ratio of wet gluten to total protein content is normally between 2.5 – 2.8 to 1. The wet gluten content of good quality white bread flour normally ranges between 27 – 33% (14% mb). The difference between wet and dry gluten is an indication of the water-holding capacity of the gluten proteins which is in turn related to protein quality. This water-holding capacity is also one of the factors determining flour water absorption.

Flour with higher water absorption is preferred by bakers as this results in increased dough yields. The acceptable range for white bread flour is normally between 60.0 – 64.0%, averaging 61.0 – 62.0%. In general, longer farinogram development times of 3.5 to 6.0 minutes and stabilities of 8.0 to 12.0 minutes will be an indication of good baking quality, which is associated with good protein quality.

Acceptable ranges for the alveogram parameters generally are as follows: Strength 30 – 45 cm², stability (P) 65 – 120 mm, distensibility (L) 80 – 120 mm and P/L 0.70 – 1.50. A good correlation exists between alveogram strength and protein quality. Low/short distensibility values, indicated by high P/L values can result in lower loaf volumes. High/long distensibility values, are indicative of soft doughs with excess stretching properties, which can also result in low loaf volumes due to poor gas retention properties. In general, extensogram strength values ranging between 80 – 150 cm², maximum heights of 300 – 550 BU and extensibility values of 170 – 220 mm, indicate good baking quality.

Most of the imported wheat samples, again showed a tendency towards longer mixogram mixing times. Some of these long mixing times can be explained by low protein levels in the samples. Mixing time provides an indication of the amount of time required to mix a dough to optimum development, 2.8 to 3.5 minutes are considered acceptable in South Africa. The longer the mixing time, the larger the risk that the dough will not be mixed to optimum development, which will negatively influence the bread quality and cause lower loaf volumes. Long mixing times can also result in increased dough temperatures. Warmer doughs will proof faster and generally carry less water.

Composite samples of holds per shipment per country were tested for the presence of mycotoxin residues by means of a multi-mycotoxin analysis. The mycotoxin residue levels detected on the composite samples did not raise any major concerns. Most samples tested negative for all of the mycotoxins analysed (Aflatoxin B₁, B₂, G₁, G₂, Fumonisin B₁, B₂, B₃, Deoxynivalenol, 15-ADON, HT-2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A. On the samples that did test positive for some of the mycotoxins, Deoxynivalenol was the most prevalent. All of these positive results were well below the national maximum allowable level of 2 000 µg/kg for cereals intended for further processing.

Table 10: Summary of the quality results of imported wheat during the 2018/19 season

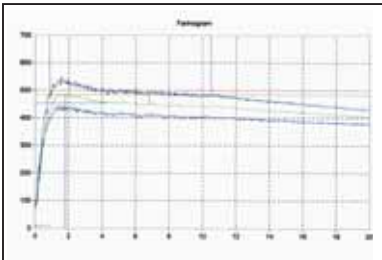
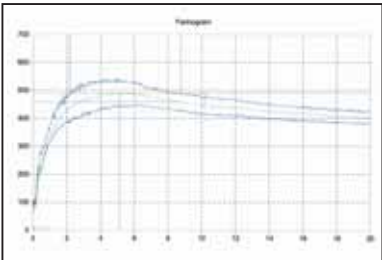
Quality parameter	Argentina				Canada				Czech Republic				Germany				Latvia				Lithuania			
	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev
Hectolitre mass, kg/hl	79.8	78.6	80.7	0.93	81.5	78.2	85.2	2.57	83.1	82.2	84.0	0.88	81.4	78.9	83.7	1.49	80.9	80.8	80.9	0.07	78.8	75.4	81.1	1.88
Screenings (<1.8mm), %	2.13	1.65	2.70	0.42	1.69	1.18	2.79	0.43	2.27	1.70	2.67	0.37	2.30	0.50	5.41	1.06	2.39	2.34	2.43	0.06	1.88	0.80	2.72	0.54
1000 Kernel mass, g (13 % mb)	35.1	34.3	35.8	0.48	38.9	34.5	46.6	4.33	40.7	40.4	40.9	0.23	40.0	29.9	47.6	3.35	38.0	37.7	38.3	0.42	42.6	36.6	47.0	2.64
WWF Protein (12% mb), %	11.2	10.5	12.5	0.70	13.0	11.2	13.9	1.00	12.4	12.4	12.5	0.06	11.5	10.4	12.8	0.77	11.6	11.5	11.6	0.08	11.7	11.2	12.8	0.52
WWF Falling number, sec	292	255	342	26.46	342	273	396	38.64	364	356	374	6.88	367	296	551	52.88	280	254	305	36.06	334	227	427	41.16
Number of samples	9				18				5				39				2				22			
Flour moisture, %	13.0	12.8	13.2	0.13	13.5	13.1	14.0	0.24	13.7	13.5	13.8	0.13	13.5	12.9	14.1	0.30	13.8	13.7	13.9	0.14	13.7	12.8	14.6	0.40
Flour Protein, % (12 % mb)	9.8	9.2	11.1	0.71	11.7	9.8	12.7	1.09	11.0	10.9	11.0	0.05	10.2	7.6	11.3	0.81	10.2	10.2	10.3	0.03	10.3	9.8	11.5	0.58
Ash, % (db)	0.57	0.55	0.61	0.02	0.55	0.52	0.58	0.02	0.49	0.48	0.50	0.01	0.51	0.46	0.65	0.04	0.52	0.51	0.53	0.01	0.56	0.50	0.60	0.03
Colour, KJ (wet)	-3.9	-4.3	-3.6	0.22	-4.1	-4.7	-3.0	0.59	-3.8	-3.9	-3.7	0.08	-3.9	-4.6	-3.4	0.26	-3.9	-3.9	-3.9	0.00	-3.4	-3.8	-3.0	0.30
Konica Minolta CM-5 colour, L*	93.65	93.21	94.00	0.25	93.24	93.02	93.46	0.11	93.28	93.01	93.44	0.17	93.47	93.12	95.03	0.31	93.56	93.49	93.62	0.09	93.09	92.88	93.39	0.13
Konica Minolta CM-5 colour, b*	10.16	9.88	10.45	0.21	10.02	9.49	10.79	0.47	10.01	9.83	10.14	0.11	9.90	0.45	10.88	1.60	9.98	9.92	10.03	0.08	10.19	9.63	11.09	0.50
Wet gluten, % (14 % mb)	24.3	22.1	28.7	2.33	31.5	25.1	35.7	3.78	29.4	27.9	30.1	0.86	27.8	24.0	35.1	2.37	26.6	26.3	26.9	0.42	26.7	24.6	30.6	2.33
Dry gluten, % (14 % mb)	8.5	7.8	9.8	0.80	11.0	8.6	12.7	1.40	10.3	10.0	10.5	0.19	9.4	4.6	13.0	1.23	9.2	8.9	9.5	0.42	9.3	8.5	10.6	0.77
Gluten Index	99	98	100	0.71	97	94	98	1.34	97	95	99	1.48	95	55	99	6.86	99	99	99	0.00	98	95	100	1.34
Farinogram																								
Water absorption, % (14% mb)	54.6	53.7	55.6	0.61	60.8	57.5	62.6	1.71	57.7	57.3	57.9	0.23	57.4	52.6	59.3	1.24	56.7	56.4	57.0	0.42	58.3	57.0	60.1	1.02
Development time, min	1.9	1.5	2.5	0.31	5.8	1.9	8.3	2.46	3.5	2.7	4.0	0.51	2.8	1.7	4.7	0.75	2.3	2.0	2.5	0.35	2.4	1.7	4.2	0.68
Stability, min	9.3	6.4	13.0	2.28	11.8	3.1	15.9	4.29	10.1	9.8	10.4	0.24	9.6	2.6	17.3	3.39	10.1	8.3	11.9	2.55	8.8	2.7	18.5	6.07
Alveogram																								
Strength, cm ²	31.8	28.3	38.5	2.88	46.6	23.5	60.4	12.07	41.5	38.4	43.0	1.81	36.5	11.9	43.9	5.36	41.0	39.6	42.4	1.98	36.8	23.7	51.4	7.76
Stability, mm	66	60	71	3.64	103	89	120	8.87	91	87	96	4.28	90	32	101	10.79	89	84	94	7.07	111	98	129	8.62
Distensibility, mm	96	79	119	13.56	91	30	130	31.90	96	90	108	7.09	85	66	134	12.49	91	91	91	0.00	61	31	100	19.24
P/L	0.70	0.50	0.87	0.12	1.45	0.74	4.00	1.02	0.96	0.81	1.06	0.10	1.09	0.24	1.53	0.22	0.98	0.92	1.03	0.08	2.07	1.08	4.13	0.85
Extensogram																								
Strength, cm ²	102	79	120	12.06	120	86	144	19.60	90	87	94	2.77	93	41	121	14.35	110	106	114	5.66	103	83	122	11.00
Max. height, BU	436	368	499	37.88	448	404	520	30.10	373	364	387	8.58	388	140	556	65.61	438	437	438	0.71	458	371	577	53.17
Extensibility, mm	175	158	183	8.50	199	145	237	31.12	175	170	181	4.66	173	153	194	10.40	187	182	191	6.36	165	140	193	15.15
Mixogram																								
Water absorption, % (14% mb)	59.6	59.0	61.0	0.74	61.9	59.6	63.1	1.34	60.9	60.8	60.9	0.04	60.1	59.0	61.3	0.75	60.1	60.0	60.1	0.07	60.2	59.6	61.5	0.67
Peak time, min	4.9	4.0	5.3	0.40	3.6	3.0	5.0	0.63	3.3	2.9	3.5	0.25	3.4	2.0	4.6	0.51	4.3	4.0	4.5	0.35	5.0	3.6	7.5	1.13
100 g Baking Test																								
Loaf volume, cm ³	962	884	1076	59.48	1032	885	1152	68.05	1002	990	1023	13.70	986	919	1065	40.65	989	986	991	3.54	946	893	1017	39.84
Evaluation	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
Number of samples	9				18				5				39				2				22			

Table 10: Summary of the quality results of imported wheat during the 2018/19 season (continue)

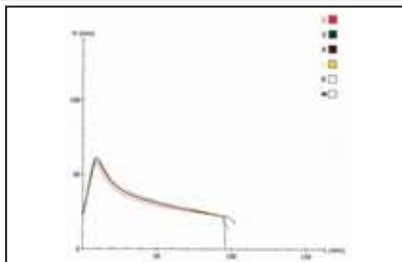
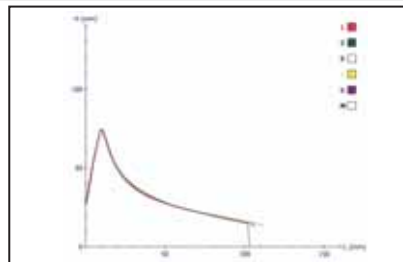
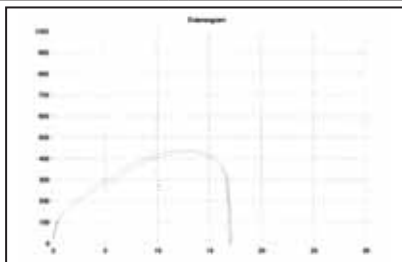
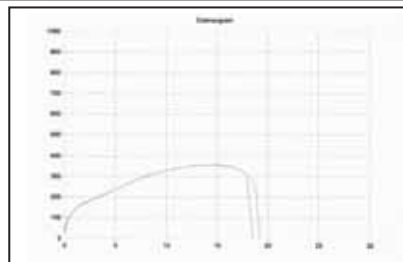
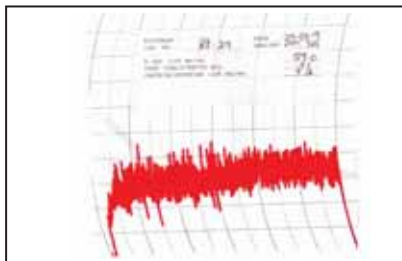
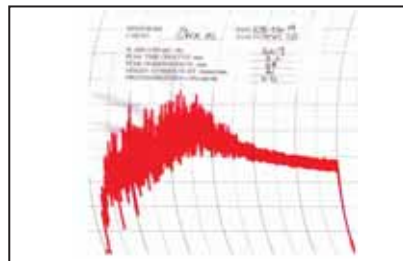
Quality parameter	Poland				Russian Federation				Ukraine				USA				RSA crop average 2018/19			
	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev
Hectolitre mass, kg/hl	78.5	78.4	78.6	0.14	79.7	76.0	81.9	1.42	78.8	78.4	79.3	0.31	80.8	75.9	82.2	1.47	81.3	75.4	86.5	2.34
Screenings (<1.8mm), %	2.82	2.69	2.94	0.18	3.61	2.00	5.73	1.00	1.73	1.15	2.29	0.35	2.89	1.56	5.62	1.02	1.49	0.08	7.81	1.11
1000 Kernel mass, g (13 % mb)	39.9	39.1	40.6	1.06	34.7	30.0	43.2	3.42	43.4	37.2	47.5	4.86	33.2	27.5	41.6	4.41	39.2	27.9	54.3	3.68
WWF Protein (12% mb), %	12.4	12.3	12.6	0.20	11.3	10.7	12.9	0.43	12.0	11.7	12.2	0.19	11.4	9.5	12.8	0.92	12.1	9.0	16.4	1.12
WWF Falling number, sec	345	327	362	24.75	419	262	503	51.49	337	283	382	28.67	446	317	563	97.24	397	203	639	57.58
<i>Number of samples</i>	2				43				8				20				337			
Flour moisture, %	13.5	13.4	13.6	0.14	13.2	12.3	14.1	0.35	13.2	12.8	13.6	0.26	13.4	12.8	13.9	0.25	13.4	12.6	14.4	0.38
Flour Protein, % (12 % mb)	10.9	10.8	11.0	0.13	10.1	9.5	11.3	0.36	10.4	10.1	10.6	0.26	9.9	7.4	11.1	1.10	10.9	7.8	13.8	1.10
Ash, % (db)	0.50	0.47	0.53	0.04	0.57	0.52	0.65	0.03	0.51	0.48	0.59	0.04	0.53	0.45	0.62	0.05	0.60	0.53	0.71	0.03
Colour, KJ (wet)	-3.9	-4.0	-3.8	0.14	-3.9	-4.2	-3.2	0.22	-3.3	-3.8	-2.9	0.40	-3.9	-4.4	-3.4	0.26	-4.5	-5.0	-3.7	0.28
Konica Minolta CM-5 colour, L*	93.49	93.45	93.53	0.06	93.31	92.88	93.72	0.19	93.30	93.00	93.73	0.32	93.60	93.13	94.96	0.50	93.78	92.82	94.43	0.28
Konica Minolta CM-5 colour, b*	9.98	9.88	10.08	0.14	11.99	10.18	12.82	0.55	9.49	9.33	9.83	0.20	10.11	8.20	10.66	0.63	10.12	9.12	11.43	0.57
Wet gluten, % (14 % mb)	29.5	29.3	29.7	0.28	25.5	22.9	30.7	1.48	25.1	24.6	25.5	0.29	24.8	17.6	31.1	3.94	30.1	23.1	38.9	3.29
Dry gluten, % (14 % mb)	10.2	10.0	10.4	0.28	8.6	7.7	10.5	0.52	9.1	8.8	9.4	0.18	8.6	5.8	11.8	1.53	10.1	7.7	13.1	1.16
Gluten Index	99	98	99	0.71	98	92	100	1.62	100	99	100	0.35	97	94	100	2.04	94	71	99	4.37
Farinogram																				
Water absorption, % (14% mb)	57.1	56.0	58.2	1.56	56.5	54.2	60.1	1.65	54.9	53.5	56.0	1.07	55.0	46.2	57.5	3.48	60.5	53.8	64.7	1.83
Development time, min	2.6	2.5	2.7	0.14	3.6	1.5	8.0	2.31	2.1	1.9	2.3	0.13	2.4	1.0	4.3	0.93	5.0	1.4	8.0	1.04
Stability, mm	13.6	11.3	15.8	3.18	11.4	2.3	17.5	3.29	6.6	4.6	9.1	1.40	9.8	1.7	19.0	5.28	7.0	3.0	12.6	1.73
Alveogram																				
Strength, cm ²	39.8	35.3	44.3	6.36	33.0	23.7	48.5	4.55	35.6	33.2	39.8	2.05	33.1	12.2	43.0	9.66	34.6	21.7	50.8	5.92
Stability, mm	90	77	103	18.38	93	62	117	13.23	83	77	90	5.37	85	29	105	23.95	82	62	102	8.88
Distensibility, mm	88	83	92	6.36	67	33	112	18.52	76	70	86	6.12	76	53	101	14.13	104	59	157	17.94
P/L	1.04	0.84	1.24	0.28	1.56	0.55	3.55	0.71	1.10	0.90	1.27	0.15	1.19	0.30	1.87	0.44	0.81	0.43	1.36	0.18
Extensogram																				
Strength, cm ²	99	90	108	12.73	87	70	117	9.85	113	95	142	15.49	95	48	119	17.16	92	58	132	15.72
Max. height, BU	395	368	421	37.48	417	349	474	27.85	472	409	590	55.49	428	244	508	68.92	350	251	491	49.61
Extensibility, mm	181	175	187	8.49	154	120	189	14.62	178	158	191	12.28	162	124	190	15.32	191	132	229	19.05
Mixogram																				
Water absorption, % (14% mb)	60.8	60.7	60.9	0.14	59.9	59.3	61.3	0.39	60.3	59.9	60.5	0.31	59.8	57.7	61.0	1.01	60.9	58.0	64.7	1.26
Peak time, min	4.4	4.1	4.6	0.35	4.7	3.3	5.9	0.52	5.6	5.4	5.8	0.15	4.9	3.0	6.9	1.18	2.6	1.9	4.5	0.37
100 g Baking Test																				
Loaf volume, cm ³	1002	1000	1004	2.83	898	718	1010	71.62	1017	892	1100	64.25	931	845	1032	60.55	1033	815	1237	93.42
Evaluation	0	0	0	0.00	0	0	2	0.37	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
<i>Number of samples</i>	2				43				8				20				70			

2018/19 IMPORTED WHEAT QUALITY - ARGENTINA (29 Sep 2018 to 27 Sep 2019)

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

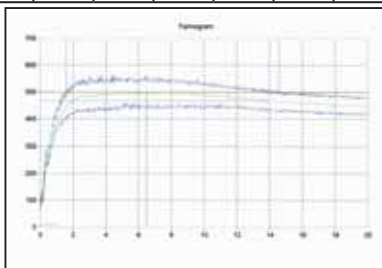
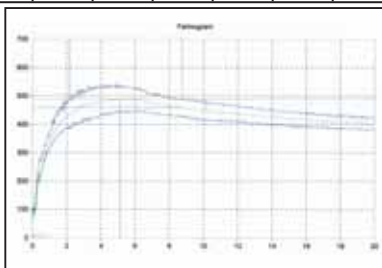
Country of origin	Argentina Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	1	3	5	-	-	-	9	153	88	29	14	48	5	337
WHEAT GRADING														
Protein (12% mb), %	12.5	11.6	10.6	-	-	-	11.2	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	10.9	10.6	10.0	-	-	-	10.3	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	255	285	303	-	-	-	292	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	35.3	35.5	34.9	-	-	-	35.1	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	79.4	78.7	80.6	-	-	-	79.8	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	2.70	2.50	1.79	-	-	-	2.13	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.12	0.21	0.11	-	-	-	0.15	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	0.14	0.15	0.22	-	-	-	0.19	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	0.14	0.09	0.00	-	-	-	0.04	0.09	0.07	0.06	0.09	0.04	0.18	0.08
Insect damaged kernels, %	0.60	0.60	0.43	-	-	-	0.51	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Sprouted kernels, %	0.40	0.28	0.14	-	-	-	0.22	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	1.14	0.97	0.58	-	-	-	0.77	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	4.10	3.83	2.69	-	-	-	3.23	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Heavily frost damaged kernels, %	0.00	0.00	0.00	-	-	-	0.00	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Field fungi, %	0.32	0.21	0.34	-	-	-	0.30	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	0.08	0.03	0.00	-	-	-	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	0	0	0	-	-	-	0	0	0	0	0	0	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	0	0	0	-	-	-	0	0	0	0	0	0	0	0
Live insects	No	No	No	-	-	-	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	-	-	-	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	1	3	5	-	-	-	9	28	21	11	7	3	-	70
Bühler Extraction, %	71.0	70.3	70.8	-	-	-	70.7	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ (wet)	-3.6	-3.8	-4.1	-	-	-	-3.9	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	93.21	93.47	93.84	-	-	-	93.65	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	0.49	0.41	0.41	-	-	-	0.42	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	10.08	9.91	10.32	-	-	-	10.16	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	0.61	0.56	0.57	-	-	-	0.57	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	11.1	10.2	9.2	-	-	-	9.8	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	28.7	25.7	22.6	-	-	-	24.3	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	9.8	9.0	7.9	-	-	-	8.5	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	98	99	99	-	-	-	99	92	95	96	96	93	-	94
100 g BAKING TEST														
Baking water absorption, %	61.0	60.0	59.0	-	-	-	59.6	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm ³	981	1008	930	-	-	-	962	1088	1014	936	994	1085	-	1033
Evaluation	0	0	0	-	-	-	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	55.6	54.8	54.3	-	-	-	54.6	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	2.5	2.0	1.8	-	-	-	1.9	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	10.3	11.7	7.6	-	-	-	9.3	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	9	25	37	-	-	-	30	40	41	43	38	40	-	41
														

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

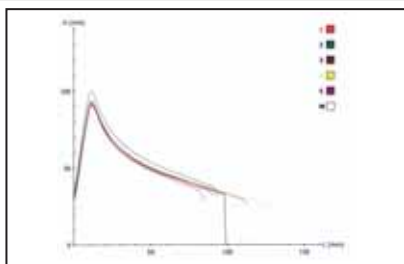
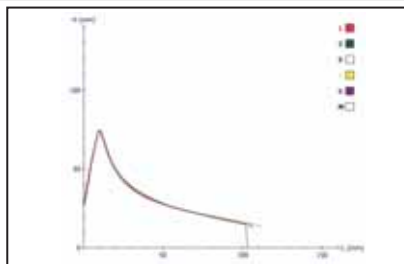
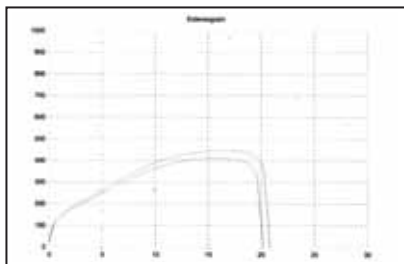
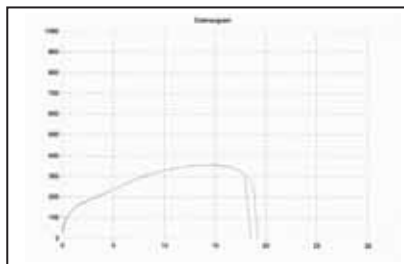
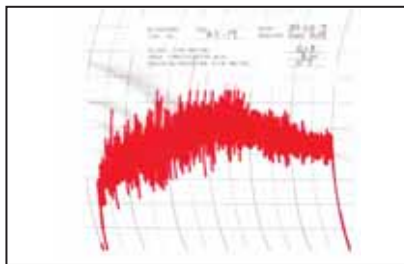
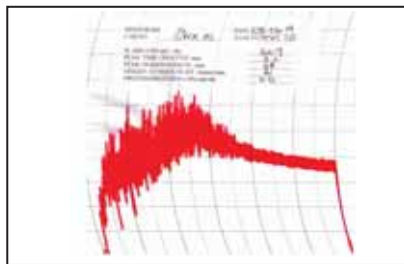
Country of origin	Argentina Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	1	3	5	-	-	-	9	28	21	11	7	3	-	70
ALVEOGRAM														
Strength (S), cm²	32.3	33.6	30.7	-	-	-	31.8	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	60	68	67	-	-	-	66	84	82	76	81	80	-	82
Distensibility (L), mm	119	96	91	-	-	-	96	114	100	95	87	118	-	104
P/L	0.50	0.72	0.74	-	-	-	0.70	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	-	113	95	-	-	-	102	101	90	76	85	96	-	92
Max. height, BU	-	470	415	-	-	-	436	364	351	323	344	348	-	350
Extensibility, mm	-	181	171	-	-	-	175	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	4.0	4.9	5.0	-	-	-	4.9	61.9	60.5	59.4	60.5	61.3	-	60.9
Water absorption (14% mb), %	61.0	60.0	59.0	-	-	-	59.6	2.5	2.6	2.7	3.0	2.3	-	2.6
														
MYCOTOXINS														
Aflatoxin B ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin B ₂ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₁ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₃ (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	503 [545]							<100 [361]						
15-ADON (µg/kg) [max. value]	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg)	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	2							40						

2018/19 IMPORTED WHEAT QUALITY - CANADA (29 Sep 2018 to 27 Sep 2019)

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

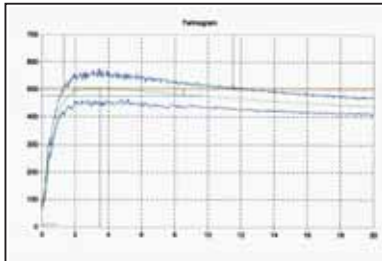
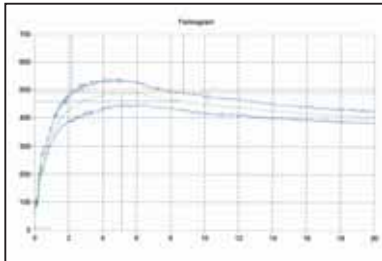
Country of origin	Canada Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	5	4	-	-	4	5	18	153	88	29	14	48	5	337
WHEAT GRADING														
Protein (12% mb), %	12.9	11.3	-	-	13.8	13.7	13.0	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	10.7	12.5	-	-	12.0	12.2	11.8	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	369	376	-	-	319	306	342	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	35.0	46.3	-	-	37.0	38.5	38.9	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	84.7	78.4	-	-	80.8	81.6	81.5	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	2.07	1.35	-	-	1.99	1.35	1.69	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.10	0.10	-	-	0.10	0.08	0.09	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	0.24	0.51	-	-	0.29	0.22	0.30	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	0.02	0.02	-	-	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	0.00	0.02	-	-	0.00	0.04	0.02	0.09	0.07	0.06	0.09	0.04	0.18	0.08
Insect damaged kernels, %	0.05	0.32	-	-	0.12	0.03	0.12	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Sprouted kernels, %	0.11	0.16	-	-	0.20	0.11	0.14	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	0.18	0.52	-	-	0.34	0.19	0.29	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	2.58	2.47	-	-	2.71	1.83	2.37	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Heavily frost damaged kernels, %	0.00	0.00	-	-	8.21	6.35	3.59	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Field fungi, %	0.13	0.14	-	-	0.20	0.15	0.15	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	0.00	0.00	-	-	0.10	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.01	0.00	-	-	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	0	0	-	-	0	0	0	0	0	0	0	0	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	0	0	-	-	0	2	0	0	0	0	0	0	0	0
Live insects	No	No	-	-	No	No	No	No	No	No	No	No	No	No
Undesirable odour	No	No	-	-	No	No	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	5	4	-	-	4	5	18	28	21	11	7	3	-	70
Bühler Extraction, %	71.0	68.9	-	-	69.8	70.5	70.1	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ	-4.6	-3.1	-	-	-4.4	-4.3	-4.1	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	93.29	93.17	-	-	93.25	93.25	93.24	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	0.57	0.49	-	-	0.45	0.52	0.51	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	10.68	9.67	-	-	9.66	9.93	10.02	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	0.57	0.56	-	-	0.55	0.54	0.55	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	11.7	9.9	-	-	12.7	12.4	11.7	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	31.6	25.4	-	-	34.5	34.1	31.5	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	11.0	8.8	-	-	12.1	12.1	11.0	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	96	98	-	-	96	97	97	92	95	96	96	93	-	94
100 g BAKING TEST														
Baking water absorption, %	61.8	59.7	-	-	63.1	62.7	61.9	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm ³	1065	936	-	-	1044	1066	1032	1088	1014	936	994	1085	-	1033
Evaluation	0	0	-	-	0	0	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	61.1	58.0	-	-	62.1	61.8	60.8	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	7.1	2.0	-	-	7.0	6.7	5.8	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	13.1	4.2	-	-	14.4	14.5	11.8	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	21	44	-	-	17	20	25	40	41	43	38	40	-	41
														

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

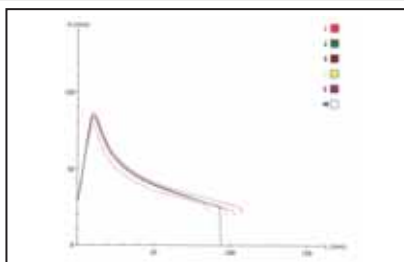
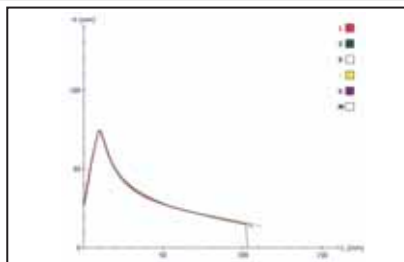
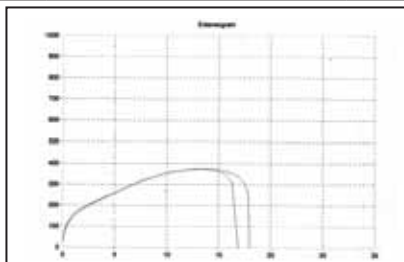
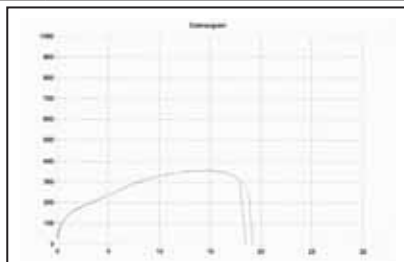
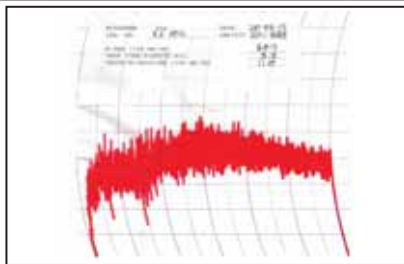
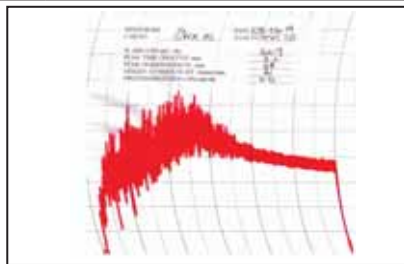
Country of origin	Canada Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	5	4	-	-	4	5	18	28	21	11	7	3	-	70
ALVEOGRAM														
Strength (S), cm²	47.3	26.3	-	-	55.9	54.7	46.6	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	94	115	-	-	101	103	103	84	82	76	81	80	-	82
Distensibility (L), mm	104	36	-	-	112	107	91	114	100	95	87	118	-	104
P/L	0.91	3.25	-	-	0.92	0.97	1.45	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	123	89	-	-	131	135	120	101	90	76	85	96	-	92
Max. height, BU	434	438	-	-	474	451	448	364	351	323	344	348	-	350
Extensibility, mm	213	149	-	-	211	223	199	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	3.3	4.8	-	-	3.4	3.3	3.6	61.9	60.5	59.4	60.5	61.3	-	60.9
Water absorption (14% mb), %	61.8	59.7	-	-	63.1	62.7	61.9	2.5	2.6	2.7	3.0	2.3	-	2.6
														
MYCOTOXINS														
Aflatoxin B ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin B ₂ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₁ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₃ (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	0 [<100]							<100 [361]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg) [max. value]	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	6							40						

2018/19 IMPORTED WHEAT QUALITY - CZECH REPUBLIC (29 Sep 2018 to 27 Sep 2019)

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

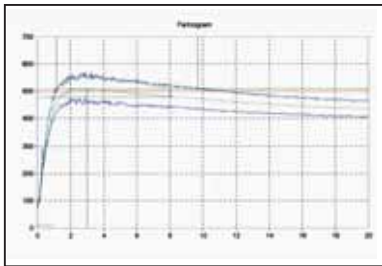
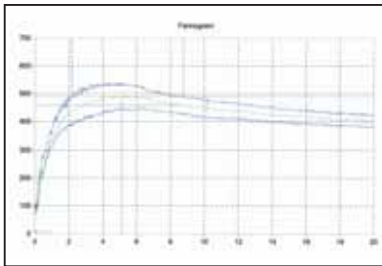
Country of origin	Czech Republic Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	5	-	-	-	-	-	5	153	88	29	14	48	5	337
WHEAT GRADING														
Protein (12% mb), %	12.4	-	-	-	-	-	12.4	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	11.1	-	-	-	-	-	11.1	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	364	-	-	-	-	-	364	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	40.7	-	-	-	-	-	40.7	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	83.1	-	-	-	-	-	83.1	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	2.27	-	-	-	-	-	2.27	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.04	-	-	-	-	-	0.04	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	0.16	-	-	-	-	-	0.16	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	0.00	-	-	-	-	-	0.00	0.09	0.07	0.06	0.09	0.04	0.18	0.08
Insect damaged kernels, %	0.00	-	-	-	-	-	0.00	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Sprouted kernels, %	0.00	-	-	-	-	-	0.00	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	0.00	-	-	-	-	-	0.00	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	2.47	-	-	-	-	-	2.47	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Heavily frost damaged kernels, %	0.10	-	-	-	-	-	0.10	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Field fungi, %	0.00	-	-	-	-	-	0.00	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	0	-	-	-	-	-	0	0	0	0	0	0	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	0	-	-	-	-	-	0	0	0	0	0	0	0	0
Live insects	No	-	-	-	-	-	No	No	No	No	No	No	No	No
Undesirable odour	No	-	-	-	-	-	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	5	-	-	-	-	-	5	28	21	11	7	3	-	70
Bühler Extraction, %	72.3	-	-	-	-	-	72.3	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ	-3.8	-	-	-	-	-	-3.8	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	93.28	-	-	-	-	-	93.28	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	0.54	-	-	-	-	-	0.54	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	10.01	-	-	-	-	-	10.01	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	0.49	-	-	-	-	-	0.49	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	11.0	-	-	-	-	-	11.0	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	29.4	-	-	-	-	-	29.4	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	10.3	-	-	-	-	-	10.3	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	97	-	-	-	-	-	97	92	95	96	96	93	-	94
100 g BAKING TEST														
Baking water absorption, %	60.9	-	-	-	-	-	60.9	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm ³	1002	-	-	-	-	-	1002	1088	1014	936	994	1085	-	1033
Evaluation	0	-	-	-	-	-	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	57.7	-	-	-	-	-	57.7	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	3.5	-	-	-	-	-	3.5	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	10.1	-	-	-	-	-	10.1	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	23	-	-	-	-	-	23	40	41	43	38	40	-	41
														

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

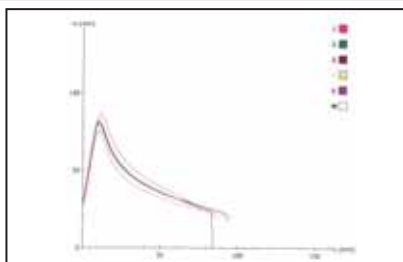
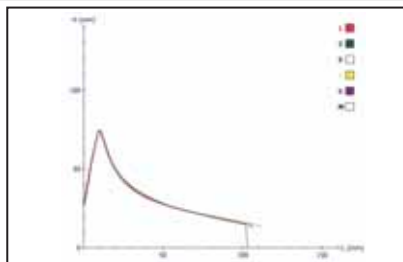
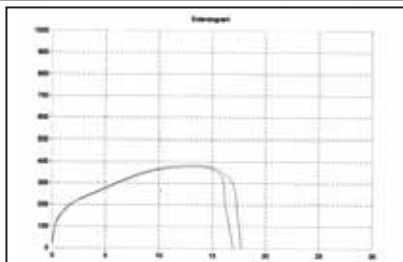
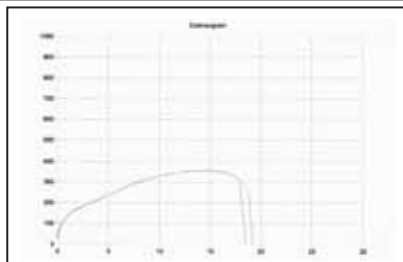
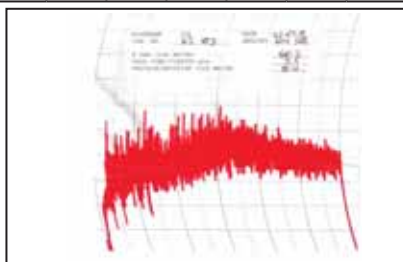
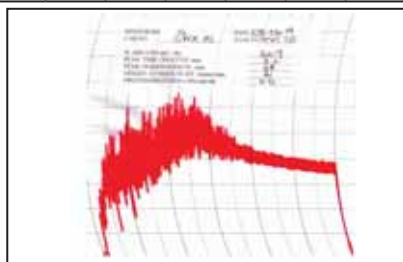
Country of origin	Czech Republic Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	5	-	-	-	-	-	5	28	21	11	7	3	-	70
ALVEOGRAM														
Strength (S), cm²	41.5	-	-	-	-	-	41.5	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	91	-	-	-	-	-	91	84	82	76	81	80	-	82
Distensibility (L), mm	96	-	-	-	-	-	96	114	100	95	87	118	-	104
P/L	0.96	-	-	-	-	-	0.96	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	90	-	-	-	-	-	90	101	90	76	85	96	-	92
Max. height, BU	373	-	-	-	-	-	373	364	351	323	344	348	-	350
Extensibility, mm	175	-	-	-	-	-	175	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	3.3	-	-	-	-	-	3.3	61.9	60.5	59.4	60.5	61.3	-	60.9
Water absorption (14% mb), %	60.9	-	-	-	-	-	60.9	2.5	2.6	2.7	3.0	2.3	-	2.6
														
MYCOTOXINS														
Aflatoxin B ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin B ₂ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₁ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₃ (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	0 [0]							<100 [361]						
15-ADON (µg/kg) [max. value]	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg) [max. value]	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	1							40						

2018/19 IMPORTED WHEAT QUALITY - GERMANY (29 Sep 2018 to 27 Sep 2019)

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

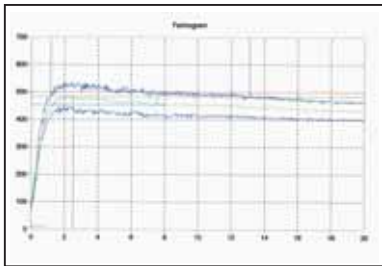
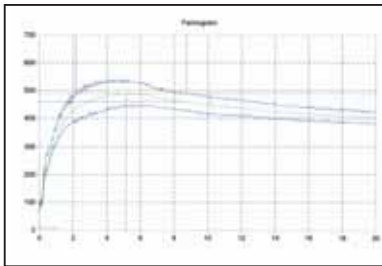
Country of origin	Germany Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	9	11	10	3	6	-	39	153	88	29	14	48	5	337
WHEAT GRADING														
Protein (12% mb), %	12.5	11.3	10.8	11.8	11.7	-	11.5	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	10.8	11.0	11.1	10.2	10.7	-	10.9	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	381	345	343	358	433	-	367	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	39.6	41.5	41.3	41.0	35.4	-	40.0	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	81.5	81.3	81.7	81.4	80.9	-	81.4	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	2.02	1.87	1.89	3.56	3.56	-	2.30	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.10	0.09	0.12	0.11	0.28	-	0.13	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	0.28	0.50	0.71	0.72	1.00	-	0.60	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	0.00	0.00	0.00	0.00	0.04	-	0.01	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	0.03	0.01	0.00	0.07	0.07	-	0.02	0.09	0.07	0.06	0.09	0.04	0.18	0.08
Insect damaged kernels, %	0.06	0.03	0.02	0.12	0.64	-	0.13	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Sprouted kernels, %	0.05	0.09	0.00	0.00	0.06	-	0.05	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	0.14	0.12	0.02	0.19	0.48	-	0.16	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	2.54	2.58	2.74	4.57	5.32	-	3.18	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Heavily frost damaged kernels, %	0.09	0.02	0.00	0.00	0.00	-	0.03	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Field fungi, %	0.12	0.20	0.07	0.17	0.18	-	0.14	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	0.00	0.02	0.02	0.00	0.00	-	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	0	0	0	0	0	-	0	0	0	0	0	0	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	0	0	0	0	0	-	0	0	0	0	0	0	0	0
Live insects	No	No	No	No	No	-	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	No	No	-	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	9	11	10	3	6	-	39	28	21	11	7	3	-	70
Bühler Extraction, %	71.8	71.7	71.8	71.3	70.2	-	71.5	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ	-3.9	-3.8	-4.0	-3.7	-3.8	-	-3.9	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	93.42	93.56	93.44	93.33	93.47	-	93.47	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	0.53	0.50	0.50	0.50	0.52	-	0.51	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	10.12	9.01	10.45	9.98	10.22	-	9.90	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	0.51	0.52	0.49	0.51	0.53	-	0.51	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	11.1	10.0	9.3	10.5	10.3	-	10.2	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	30.3	27.9	25.7	27.9	27.2	-	27.8	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	10.4	9.6	8.3	9.5	9.3	-	9.4	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	96	93	97	98	96	-	95	92	95	96	96	93	-	94
100 g BAKING TEST														
Baking water absorption, %	61.0	59.9	59.3	60.4	60.2	-	60.1	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm ³	1030	960	973	1002	978	-	986	1088	1014	936	994	1085	-	1033
Evaluation	0	0	0	0	0	-	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	58.2	57.2	57.1	58.1	56.7	-	57.4	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	3.5	2.6	2.6	3.0	2.4	-	2.8	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	11.0	8.1	7.9	12.3	11.9	-	9.6	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	23	37	33	16	29	-	30	40	41	43	38	40	-	41
														

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

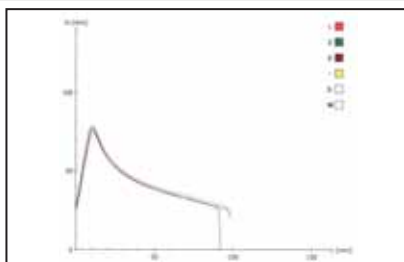
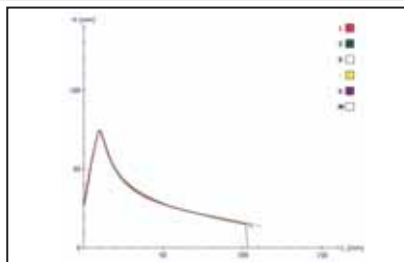
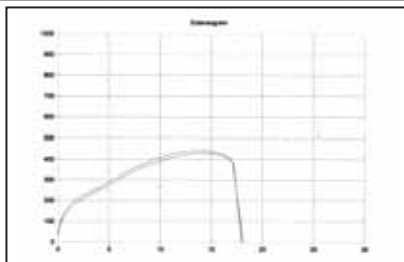
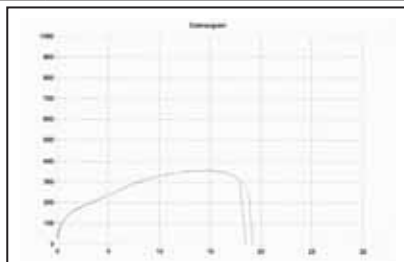
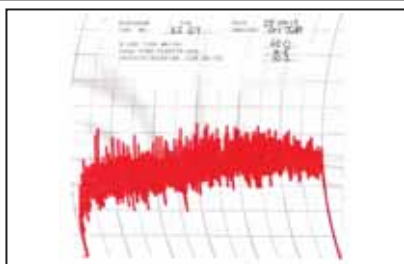
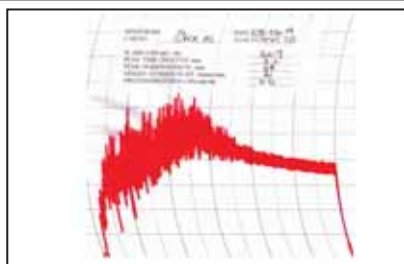
Country of origin	Germany Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	9	11	10	3	6	-	39	28	21	11	7	3	-	70
ALVEOGRAM														
Strength (S), cm²	39.8	35.0	34.5	36.1	38.1	-	36.5	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	90	88	90	97	92	-	90	84	82	76	81	80	-	82
Distensibility (L), mm	91	88	82	72	82	-	85	114	100	95	87	118	-	104
P/L	1.00	1.06	1.10	1.36	1.13	-	1.09	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	100	86	87	95	104	-	93	101	90	76	85	96	-	92
Max. height, BU	400	356	373	402	449	-	388	364	351	323	344	348	-	350
Extensibility, mm	182	175	166	172	170	-	173	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	3.4	3.4	3.1	3.5	3.8	-	3.4	61.9	60.5	59.4	60.5	61.3	-	60.9
Water absorption (14% mb), %	61.0	59.9	59.3	60.4	60.2	-	60.1	2.5	2.6	2.7	3.0	2.3	-	2.6
														
MYCOTOXINS														
Aflatoxin B ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin B ₂ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₁ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₃ (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	0 [<100]							<100 [361]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg)	0 [0]							0 [0]						
HT-2 (µg/kg) [max. value]	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	14							40						

2018/19 IMPORTED WHEAT QUALITY - LATVIA (29 Sep 2018 to 27 Sep 2019)

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

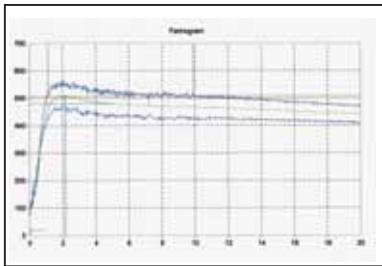
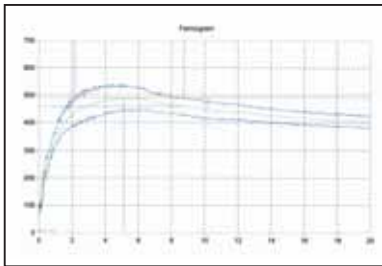
Country of origin	Latvia Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	2	-	-	-	-	2	153	88	29	14	48	5	337
WHEAT GRADING														
Protein (12% mb), %	-	11.6	-	-	-	-	11.6	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	-	11.2	-	-	-	-	11.2	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	-	280	-	-	-	-	280	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	-	38.0	-	-	-	-	38.0	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	-	80.9	-	-	-	-	80.9	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	-	2.39	-	-	-	-	2.39	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	-	0.00	-	-	-	-	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	-	0.07	-	-	-	-	0.07	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	-	0.28	-	-	-	-	0.28	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	-	0.00	-	-	-	-	0.00	0.09	0.07	0.06	0.09	0.04	0.18	0.08
Insect damaged kernels, %	-	0.27	-	-	-	-	0.27	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Sprouted kernels, %	-	0.08	-	-	-	-	0.08	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	-	0.35	-	-	-	-	0.35	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	-	3.09	-	-	-	-	3.09	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Heavily frost damaged kernels, %	-	0.00	-	-	-	-	0.00	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Field fungi, %	-	0.17	-	-	-	-	0.17	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	-	0.08	-	-	-	-	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	-	0	-	-	-	-	0	0	0	0	0	0	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	-	0	-	-	-	-	0	0	0	0	0	0	0	0
Live insects	-	No	-	-	-	-	No	No	No	No	No	No	No	No
Undesirable odour	-	No	-	-	-	-	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	2	-	-	-	-	2	28	21	11	7	3	-	70
Bühler Extraction, %	-	72.0	-	-	-	-	72.0	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ	-	-3.9	-	-	-	-	-3.9	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	-	93.56	-	-	-	-	93.56	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	-	0.50	-	-	-	-	0.50	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	-	9.98	-	-	-	-	9.98	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	-	0.52	-	-	-	-	0.52	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	-	10.2	-	-	-	-	10.2	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	-	26.6	-	-	-	-	26.6	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	-	9.2	-	-	-	-	9.2	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	-	99	-	-	-	-	99	92	95	96	96	93	-	94
100 g BAKING TEST														
Baking water absorption, %	-	60.1	-	-	-	-	60.1	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm ³	-	989	-	-	-	-	989	1088	1014	936	994	1085	-	1033
Evaluation	-	0	-	-	-	-	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	-	56.7	-	-	-	-	56.7	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	-	2.3	-	-	-	-	2.3	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	-	10.1	-	-	-	-	10.1	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	-	31	-	-	-	-	31	40	41	43	38	40	-	41
														

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

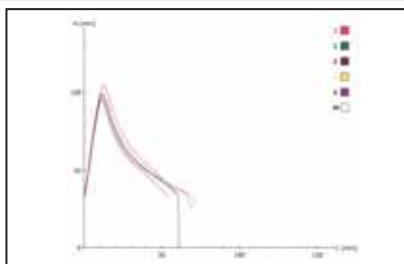
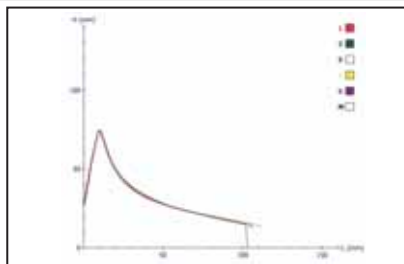
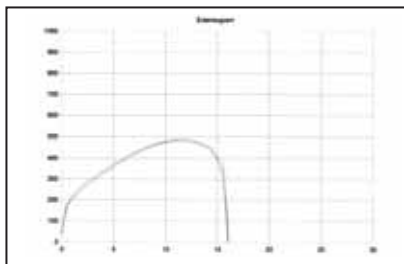
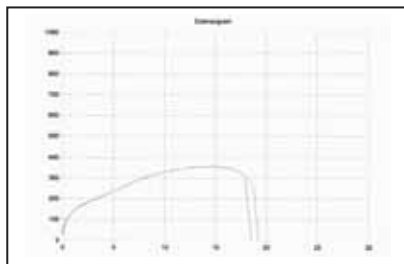
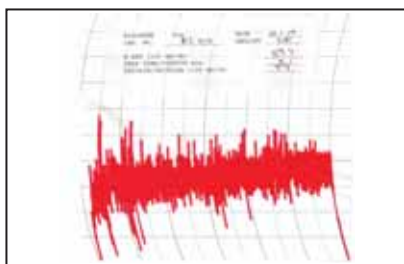
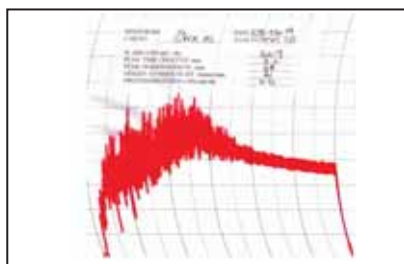
Country of origin	Latvia Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	2	-	-	-	-	2	28	21	11	7	3	-	70
ALVEOGRAM														
Strength (S), cm²	-	41.0	-	-	-	-	41.0	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	-	89	-	-	-	-	89	84	82	76	81	80	-	82
Distensibility (L), mm	-	91	-	-	-	-	91	114	100	95	87	118	-	104
P/L	-	0.98	-	-	-	-	0.98	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	-	110	-	-	-	-	110	101	90	76	85	96	-	92
Max. height, BU	-	438	-	-	-	-	438	364	351	323	344	348	-	350
Extensibility, mm	-	187	-	-	-	-	187	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	-	4.3	-	-	-	-	4.3	61.9	60.5	59.4	60.5	61.3	-	60.9
Water absorption (14% mb), %	-	60.1	-	-	-	-	60.1	2.5	2.6	2.7	3.0	2.3	-	2.6
														
MYCOTOXINS														
Aflatoxin B ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin B ₂ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₁ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₃ (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	0 [0]							<100 [361]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg)	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	1							40						

2018/19 IMPORTED WHEAT QUALITY - LITHUANIA (29 Sep 2018 to 27 Sep 2019)

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

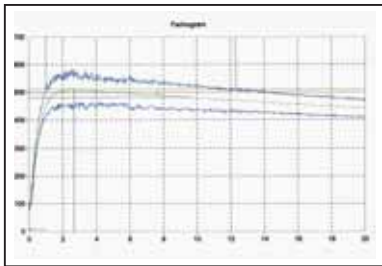
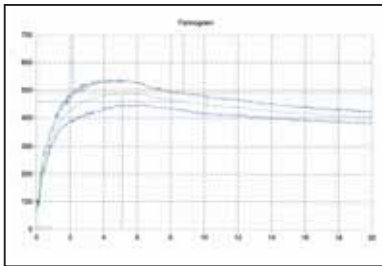
Country of origin	Lithuania Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	6	8	2	-	2	4	22	153	88	29	14	48	5	337
WHEAT GRADING														
Protein (12% mb), %	12.4	11.4	11.8	-	11.4	11.3	11.7	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	11.5	11.9	11.1	-	12.2	12.1	11.8	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	332	358	352	-	283	306	334	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	41.9	44.8	42.3	-	40.4	40.7	42.6	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	80.8	78.6	75.6	-	79.3	77.7	78.8	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	2.00	1.62	0.93	-	2.63	2.29	1.88	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	0.01	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.11	0.17	0.46	-	0.16	0.32	0.20	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	0.26	0.51	0.62	-	1.48	4.49	1.26	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	0.07	0.01	0.00	-	0.08	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	0.13	0.00	0.00	-	0.00	0.03	0.04	0.09	0.07	0.06	0.09	0.04	1.18	0.08
Insect damaged kernels, %	0.05	0.20	0.31	-	0.06	0.19	0.15	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Sprouted kernels, %	0.01	0.02	0.00	-	0.04	0.02	0.02	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	0.27	0.23	0.31	-	0.18	0.30	0.26	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	2.64	2.53	2.32	-	4.45	7.40	3.60	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Heavily frost damaged kernels, %	0.00	0.00	0.00	-	0.53	0.32	0.11	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Field fungi, %	0.11	0.09	0.16	-	0.16	0.06	0.10	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	0.03	0.00	0.00	-	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	0	0	0	-	0	0	0	0	0	0	0	0	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	0	2	0	-	0	2	1	0	0	0	0	0	0	0
Live insects	No	No	No	-	No	No	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	-	No	No	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	6	8	2	-	2	4	22	28	21	11	7	3	-	70
Bühler Extraction, %	70.6	70.1	70.8	-	70.0	69.6	70.2	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ	-3.7	-3.2	-3.1	-	-3.4	-3.3	-3.4	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	92.97	93.08	93.06	-	93.23	93.24	93.09	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	0.61	0.53	0.53	-	0.52	0.46	0.54	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	10.95	9.87	9.85	-	10.25	9.85	10.19	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	0.55	0.55	0.56	-	0.59	0.58	0.56	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	11.2	10.0	10.3	-	10.1	9.8	10.3	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	30.3	25.3	25.1	-	26.7	25.1	26.7	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	10.4	8.8	9.0	-	9.2	8.7	9.3	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	97	99	99	-	99	99	98	92	95	96	96	93	-	94
100 g BAKING TEST														
Baking water absorption, %	61.2	59.8	60.2	-	59.9	59.6	60.2	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm ³	1004	923	924	-	912	934	946	1088	1014	936	994	1085	-	1033
Evaluation	0	0	0	-	0	0	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	59.8	58.0	57.8	-	57.9	57.4	58.3	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	3.4	2.0	2.3	-	2.0	2.0	2.4	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	16.1	7.6	3.9	-	6.3	3.9	8.8	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	12	40	46	-	43	49	35	40	41	43	38	40	-	41
														

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

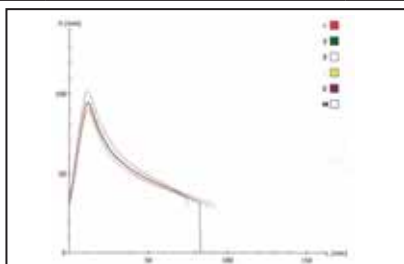
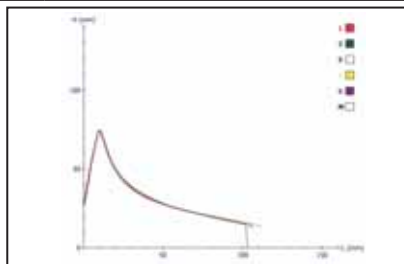
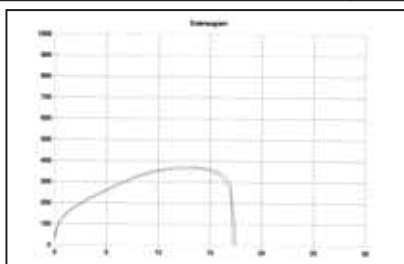
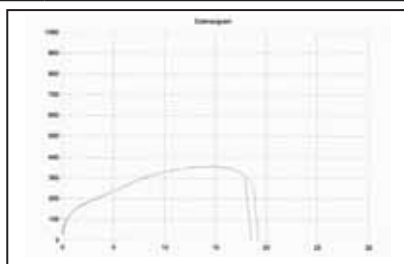
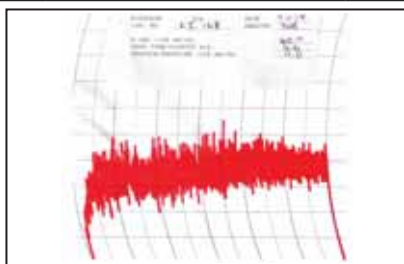
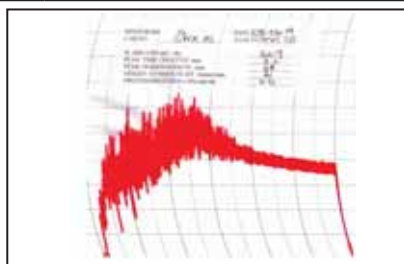
Country of origin	Lithuania Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	6	8	2	-	2	4	22	28	21	11	7	3	-	70
ALVEOGRAM														
Strength (S), cm²	46.8	32.3	32.3	-	37.2	32.8	36.8	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	111	114	123	-	103	104	111	84	82	76	81	80	-	82
Distensibility (L), mm	83	48	42	-	69	56	61	114	100	95	87	118	-	104
P/L	1.36	2.56	2.93	-	1.50	2.03	2.07	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	117	99	105	-	92	95	103	101	90	76	85	96	-	92
Max. height, BU	485	474	507	-	386	397	458	364	351	323	344	348	-	350
Extensibility, mm	180	152	151	-	174	173	165	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	3.8	5.3	6.6	-	4.7	5.5	5.0	61.9	60.5	59.4	60.5	61.3	-	60.9
Water absorption (14% mb), %	61.2	59.8	60.2	-	59.9	59.6	60.2	2.5	2.6	2.7	3.0	2.3	-	2.6
														
MYCOTOXINS														
Aflatoxin B ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin B ₂ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₁ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₃ (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	0 [0]							<100 [361]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg)	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	8							40						

2018/19 IMPORTED WHEAT QUALITY - POLAND (29 Sep 2018 to 27 Sep 2019)

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

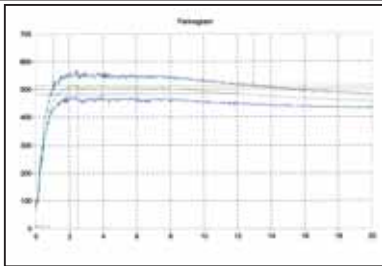
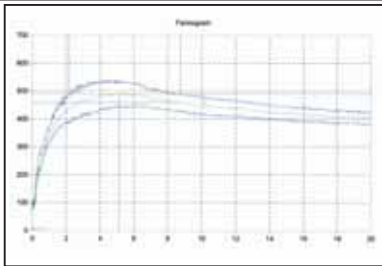
Country of origin	Poland Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	2	-	-	-	-	-	2	153	88	29	14	48	5	337
WHEAT GRADING														
Protein (12% mb), %	12.4	-	-	-	-	-	12.4	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	11.9	-	-	-	-	-	11.9	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	345	-	-	-	-	-	345	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	39.9	-	-	-	-	-	39.9	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	78.5	-	-	-	-	-	78.5	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	2.82	-	-	-	-	-	2.82	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.11	-	-	-	-	-	0.11	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	0.59	-	-	-	-	-	0.59	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	0.04	-	-	-	-	-	0.04	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	0.00	-	-	-	-	-	0.00	0.09	0.07	0.06	0.09	0.04	0.18	0.08
Insect damaged kernels, %	0.00	-	-	-	-	-	0.00	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Sprouted kernels, %	0.12	-	-	-	-	-	0.12	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	0.16	-	-	-	-	-	0.16	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	3.68	-	-	-	-	-	3.68	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Heavily frost damaged kernels, %	0.00	-	-	-	-	-	0.00	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Field fungi, %	0.16	-	-	-	-	-	0.16	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	0	-	-	-	-	-	0	0	0	0	0	0	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	3	-	-	-	-	-	3	0	0	0	0	0	0	0
Live insects	No	-	-	-	-	-	No	No	No	No	No	No	No	No
Undesirable odour	No	-	-	-	-	-	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	2	-	-	-	-	-	2	28	21	11	7	3	-	70
Bühler Extraction, %	71.5	-	-	-	-	-	71.5	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ	-3.9	-	-	-	-	-	-3.9	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	93.49	-	-	-	-	-	93.49	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	0.48	-	-	-	-	-	0.48	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	9.98	-	-	-	-	-	9.98	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	0.50	-	-	-	-	-	0.50	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	10.9	-	-	-	-	-	10.9	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	29.5	-	-	-	-	-	29.5	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	10.2	-	-	-	-	-	10.2	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	99	-	-	-	-	-	99	92	95	96	96	93	-	94
100 g BAKING TEST														
Baking water absorption, %	60.8	-	-	-	-	-	60.8	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm ³	1002	-	-	-	-	-	1002	1088	1014	936	994	1085	-	1033
Evaluation	0	-	-	-	-	-	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	57.1	-	-	-	-	-	57.1	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	2.6	-	-	-	-	-	2.6	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	13.6	-	-	-	-	-	13.6	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	23	-	-	-	-	-	23	40	41	43	38	40	-	41
														

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

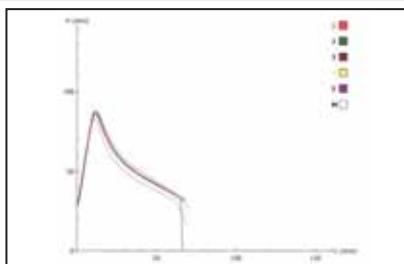
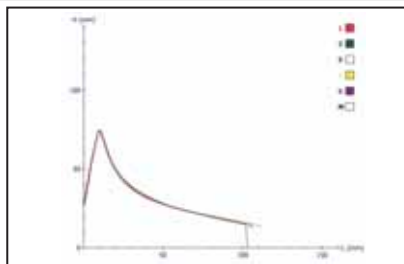
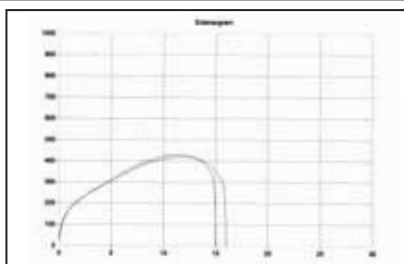
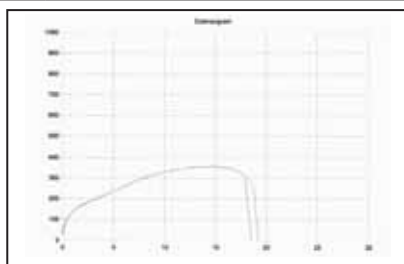
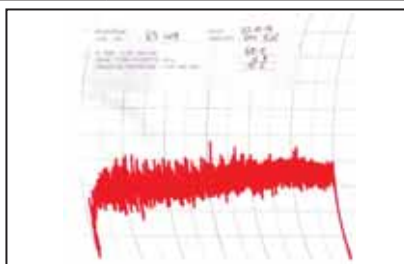
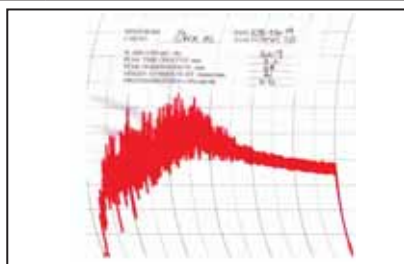
Country of origin	Poland Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	2	-	-	-	-	-	2	28	21	11	7	3	-	70
ALVEOGRAM														
Strength (S), cm²	39.8	-	-	-	-	-	39.8	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	90	-	-	-	-	-	90	84	82	76	81	80	-	82
Distensibility (L), mm	88	-	-	-	-	-	88	114	100	95	87	118	-	104
P/L	1.04	-	-	-	-	-	1.04	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	99	-	-	-	-	-	99	101	90	76	85	96	-	92
Max. height, BU	395	-	-	-	-	-	395	364	351	323	344	348	-	350
Extensibility, mm	181	-	-	-	-	-	181	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	4.4	-	-	-	-	-	4.4	61.9	60.5	59.4	60.5	61.3	-	60.9
Water absorption (14% mb), %	60.8	-	-	-	-	-	60.8	2.5	2.6	2.7	3.0	2.3	-	2.6
														
MYCOTOXINS														
Aflatoxin B ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin B ₂ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₁ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₃ (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	169 [169]							<100 [361]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg)	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	1							40						

2018/19 IMPORTED WHEAT QUALITY - RUSSIAN FEDERATION (29 Sep 2018 to 27 Sep 2019)

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

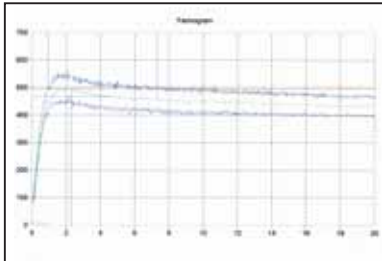
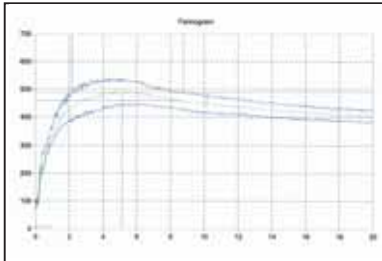
Country of origin	Russian Federation Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	1	4	4	6	5	23	43	153	88	29	14	48	5	337
WHEAT GRADING														
Protein (12% mb), %	12.9	11.2	10.9	11.1	11.1	11.5	11.3	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	12.1	10.1	8.9	9.8	10.3	10.2	10.1	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	311	396	447	421	423	422	419	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	40.6	39.1	38.7	35.1	35.6	32.8	34.7	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	80.7	80.9	81.1	80.7	80.0	78.9	79.7	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	2.18	2.53	2.70	3.29	3.38	4.15	3.61	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.08	0.23	0.27	0.17	0.31	0.21	0.22	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	0.32	0.35	0.21	0.41	3.14	0.54	0.77	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	0.00	0.00	0.00	0.03	0.00	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	0.16	0.05	0.00	0.00	0.02	0.00	0.01	0.09	0.07	0.06	0.09	0.04	0.18	0.08
Insect damaged kernels, %	0.00	0.07	0.15	0.04	0.09	0.14	0.11	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Sprouted kernels, %	0.00	0.06	0.02	0.03	0.10	0.13	0.09	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	0.16	0.18	0.17	0.09	0.20	0.31	0.24	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	2.74	3.28	3.34	3.97	7.03	5.22	4.84	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Heavily frost damaged kernels, %	0.00	0.96	0.12	0.15	0.00	0.03	0.14	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Field fungi, %	0.12	0.15	0.13	0.12	0.16	0.13	0.13	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	0.00	0.04	0.00	0.00	0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	0	3	1	2	2	13	8	0	0	0	0	0	0	0
Live insects	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	1	4	4	6	5	23	43	28	21	11	7	3	-	70
Bühler Extraction, %	70.7	70.1	70.7	70.0	69.7	70.3	70.2	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ	-3.6	-3.7	-3.8	-4.0	-4.1	-4.0	-3.9	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	92.93	93.25	93.10	93.18	93.36	93.39	93.31	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	0.62	0.49	0.48	0.50	0.51	0.50	0.50	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	10.65	11.76	12.47	12.24	12.33	11.87	11.99	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	0.58	0.56	0.55	0.57	0.58	0.58	0.57	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	11.3	9.9	9.7	9.9	9.9	10.3	10.1	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	30.7	24.9	24.4	25.2	25.1	25.7	25.5	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	10.5	8.4	8.2	8.4	8.6	8.7	8.6	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	97	97	96	98	97	98	98	92	95	96	96	93	-	94
100 g BAKING TEST														
Baking water absorption, %	61.3	59.7	59.5	59.8	59.7	60.1	59.9	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm ³	1010	844	766	852	893	941	989	1088	1014	936	994	1085	-	1033
Evaluation	0	0	1	0	0	0	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	60.1	58.1	58.9	57.2	56.4	55.4	56.5	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	3.3	1.8	2.0	3.0	2.0	4.6	3.6	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	16.4	7.9	9.3	10.7	9.2	12.8	11.4	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	5	32	20	21	23	17	20	40	41	43	38	40	-	41
														

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

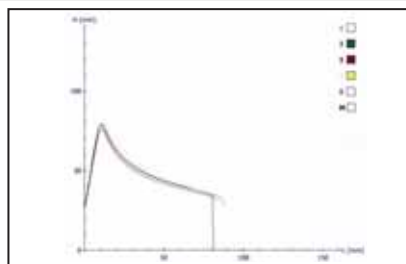
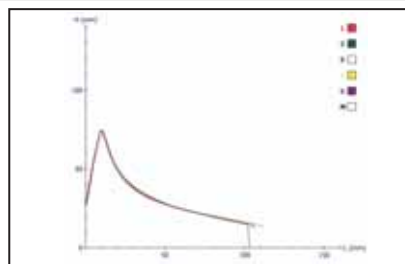
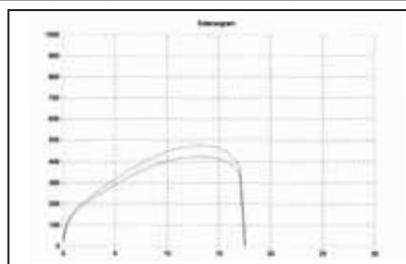
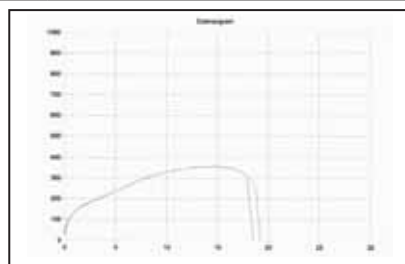
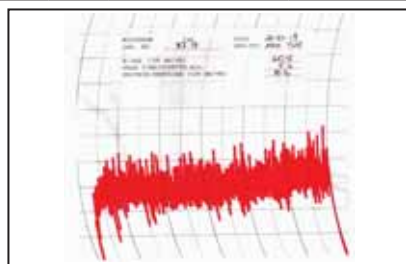
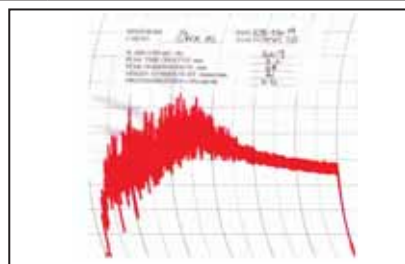
Country of origin	Russian Federation Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	1	4	4	6	5	23	43	28	21	11	7	3	-	70
ALVEOGRAM														
Strength (S), cm²	48.5	32.8	26.8	31.7	31.1	34.1	33.0	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	108	107	111	99	92	85	93	84	82	76	81	80	-	82
Distensibility (L), mm	88	53	39	58	62	77	67	114	100	95	87	118	-	104
P/L	1.23	2.11	2.94	1.82	1.62	1.15	1.56	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	117	86	78	85	82	88	87	101	90	76	85	96	-	92
Max. height, BU	459	425	410	437	417	410	417	364	351	323	344	348	-	350
Extensibility, mm	189	147	138	145	147	161	154	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	3.8	4.5	4.4	4.6	4.4	4.9	4.7	61.9	60.5	59.4	60.5	61.3	-	60.9
Water absorption (14% mb), %	61.3	59.7	59.5	59.8	59.7	60.1	59.9	2.5	2.6	2.7	3.0	2.3	-	2.6
														
MYCOTOXINS														
Aflatoxin B ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin B ₂ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₁ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₃ (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	0 [<100]							<100 [361]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg) [max. value]	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	14							40						

2018/19 IMPORTED WHEAT QUALITY - UKRAINE (29 Sep 2018 to 27 Sep 2019)

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

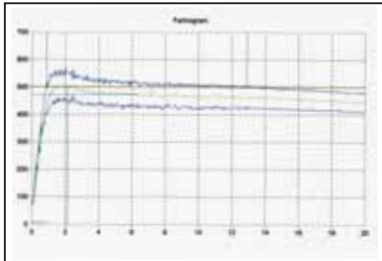
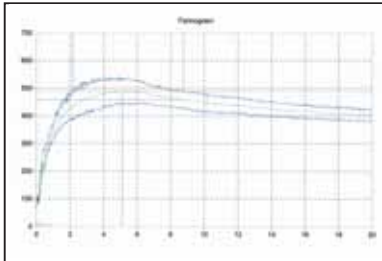
Country of origin	Ukraine Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	1	-	-	-	7	8	153	88	29	14	48	5	337
WHEAT GRADING														
Protein (12% mb), %	-	11.7	-	-	-	12.1	12.0	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	-	11.7	-	-	-	12.0	11.9	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	-	361	-	-	-	333	337	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	-	37.2	-	-	-	44.2	43.4	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	-	78.5	-	-	-	78.9	78.8	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	-	2.14	-	-	-	1.67	1.73	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	-	0.00	-	-	-	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	-	0.06	-	-	-	0.11	0.10	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	-	0.38	-	-	-	0.13	0.17	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	-	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	-	0.00	-	-	-	0.00	0.00	0.09	0.07	0.06	0.09	0.04	0.18	0.08
Insect damaged kernels, %	-	0.00	-	-	-	0.09	0.08	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Sprouted kernels, %	-	0.00	-	-	-	0.00	0.00	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	-	0.00	-	-	-	0.09	0.08	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	-	2.58	-	-	-	2.11	2.17	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Heavily frost damaged kernels, %	-	0.00	-	-	-	0.00	0.00	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Field fungi, %	-	0.16	-	-	-	0.18	0.18	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	-	0.00	-	-	-	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	-	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	-	0	-	-	-	0	0	0	0	0	0	0	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	-	6	-	-	-	14	13	0	0	0	0	0	0	0
Live insects	-	No	-	-	-	No	No	No	No	No	No	No	No	No
Undesirable odour	-	No	-	-	-	No	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	1	-	-	-	7	8	28	21	11	7	3	-	70
Bühler Extraction, %	-	72.4	-	-	-	73.1	73.0	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ	-	-3.7	-	-	-	-3.2	-3.3	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	-	93.68	-	-	-	93.24	93.30	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	-	0.46	-	-	-	0.46	0.43	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	-	9.69	-	-	-	9.46	9.49	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	-	0.51	-	-	-	0.51	0.51	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	-	10.1	-	-	-	10.5	10.4	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	-	25.4	-	-	-	25.0	25.1	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	-	9.2	-	-	-	9.1	9.1	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	-	100	-	-	-	100	100	92	95	96	96	93	-	94
100 g BAKING TEST														
Baking water absorption, %	-	59.9	-	-	-	60.3	60.3	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm³	-	991	-	-	-	1021	1017	1088	1014	936	994	1085	-	1033
Evaluation	-	0	-	-	-	0	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	-	53.6	-	-	-	55.1	54.9	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	-	2.0	-	-	-	2.1	2.1	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	-	5.6	-	-	-	6.7	6.6	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	-	49	-	-	-	41	42	40	41	43	38	40	-	41
														

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

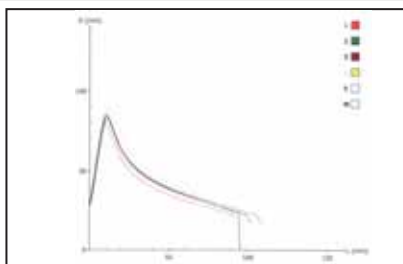
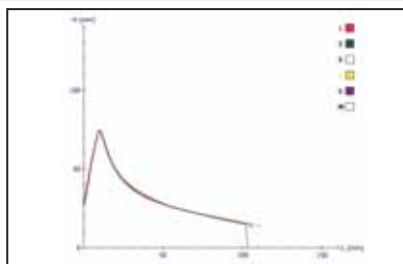
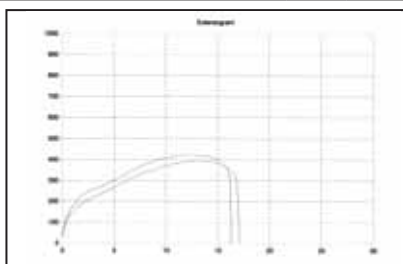
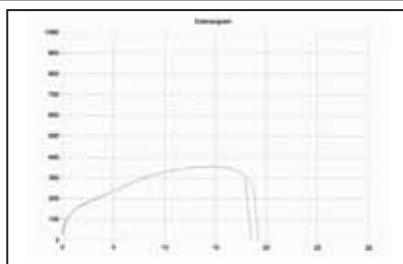
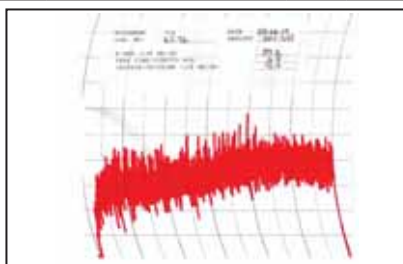
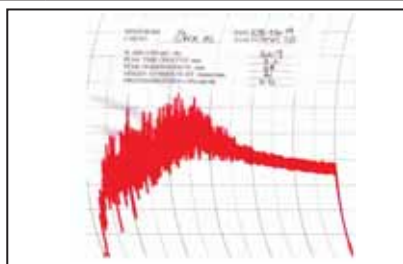
Country of origin	Ukraine Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	1	-	-	-	7	8	28	21	11	7	3	-	70
ALVEOGRAM														
Strength (S), cm²	-	34.4	-	-	-	35.8	35.6	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	-	78	-	-	-	84	83	84	82	76	81	80	-	82
Distensibility (L), mm	-	80	-	-	-	76	76	114	100	95	87	118	-	104
P/L	-	0.98	-	-	-	1.12	1.10	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	-	95	-	-	-	116	113	101	90	76	85	96	-	92
Max. height, BU	-	450	-	-	-	475	472	364	351	323	344	348	-	350
Extensibility, mm	-	158	-	-	-	180	178	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	-	5.7	-	-	-	5.6	5.6	61.9	60.5	59.4	60.5	61.3	-	60.9
Water absorption (14% mb), %	-	59.9	-	-	-	60.3	60.3	2.5	2.6	2.7	3.0	2.3	-	2.6
														
MYCOTOXINS														
Aflatoxin B ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin B ₂ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₁ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₃ (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	59 [118]							<100 [361]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg) [max. value]	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	2							40						

2018/19 IMPORTED WHEAT QUALITY - USA (29 Sep 2018 to 27 Sep 2019)

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

Country of origin	USA Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	2	3	2	4	9	-	20	153	88	29	14	48	5	337
WHEAT GRADING														
Protein (12% mb), %	12.5	11.1	10.9	10.1	11.9	-	11.4	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	10.6	10.5	10.7	11.5	10.6	-	10.8	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	377	519	502	392	448	-	446	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	40.4	30.6	31.5	32.6	33.2	-	33.2	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	82.2	81.4	81.7	78.6	81.1	-	80.8	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	2.12	2.78	2.72	2.66	3.25	-	2.89	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.06	0.30	0.21	0.14	0.18	-	0.18	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	0.24	0.31	0.27	0.36	0.77	-	0.52	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	0.00	0.23	0.16	0.16	0.16	-	0.15	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	0.06	0.00	0.00	0.02	0.04	-	0.03	0.09	0.07	0.06	0.09	0.04	0.18	0.08
Insect damaged kernels, %	0.04	0.35	0.24	0.07	0.33	-	0.24	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Sprouted kernels, %	0.00	0.08	0.08	0.45	0.06	-	0.14	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	0.10	0.66	0.40	0.69	0.59	-	0.55	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	2.52	4.05	3.60	3.84	4.79	-	4.14	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Heavily frost damaged kernels, %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Field fungi, %	0.08	0.35	0.27	0.48	0.13	-	0.24	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	0.00	0.05	0.00	0.04	0.01	-	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	0	0	0	0	0	-	0	0	0	0	0	0	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	0	0	0	0	0	-	0	0	0	0	0	0	0	0
Live insects	No	No	No	No	No	-	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	No	No	-	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	2	3	2	4	9	-	20	28	21	11	7	3	-	70
Bühler Extraction, %	71.8	70.0	69.4	68.7	70.5	-	70.1	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ	-3.9	-3.8	-3.9	-4.1	-3.8	-	-3.9	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	93.41	93.40	93.42	94.32	93.42	-	93.60	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	0.55	0.51	0.47	0.29	0.52	-	0.47	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	10.11	10.52	10.57	9.21	10.27	-	10.11	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	0.51	0.57	0.55	0.49	0.54	-	0.53	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	11.0	9.6	9.6	8.2	10.5	-	9.9	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	30.7	22.8	23.2	19.4	26.8	-	24.8	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	11.2	7.8	8.2	6.5	9.3	-	8.6	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	95	99	99	96	98	-	97	92	95	96	96	93	-	94
100 g BAKING TEST														
Baking water absorption, %	60.9	59.4	59.0	58.1	60.3	-	59.7	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm ³	1017	915	898	874	950	-	931	1088	1014	936	994	1085	-	1033
Evaluation	0	0	0	0	0	-	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	57.5	55.5	55.9	49.3	56.7	-	55.0	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	3.4	1.8	1.8	1.4	2.9	-	2.4	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	10.2	11.0	9.0	4.5	12.0	-	9.8	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	20	31	34	71	26	-	36	40	41	43	38	40	-	41
														

2018/19 Imported Wheat Quality Versus 2018/19 RSA Wheat Quality

Country of origin	USA Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	2	3	2	4	9	-	20	28	21	11	7	3	-	70
ALVEOGRAM														
Strength (S), cm²	41.1	33.3	33.5	18.2	37.9	-	33.1	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	89	93	100	47	96	-	85	84	82	76	81	80	-	82
Distensibility (L), mm	97	65	60	82	76	-	76	114	100	95	87	118	-	104
P/L	0.92	1.43	1.69	0.62	1.30	-	1.19	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	93	101	98	69	102	-	95	101	90	76	85	96	-	92
Max. height, BU	385	491	454	352	436	-	428	364	351	323	344	348	-	350
Extensibility, mm	176	151	158	141	171	-	162	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	3.1	5.1	5.3	5.7	4.8	-	4.9	61.9	60.5	59.4	60.5	61.3	-	60.9
Water absorption (14% mb), %	60.9	59.4	59.4	58.3	60.4	-	59.8	2.5	2.6	2.7	3.0	2.3	-	2.6
														
MYCOTOXINS														
Aflatoxin B ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin B ₂ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₁ (µg/kg)	0 [0]							0 [0]						
Aflatoxin G ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₁ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₂ (µg/kg)	0 [0]							0 [0]						
Fumonisin B ₃ (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	208 [884]							<100 [361]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg) [max. value]	<20 [27]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	8							40						



CERTIFICATE OF ACCREDITATION

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

SOUTHERN AFRICAN GRAIN LABORATORY NPC

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

Facility Accreditation Number: **T0116**

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

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

CHEMICAL AND PHYSICAL ANALYSIS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2017

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

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



Mr R Josias
Chief Executive Officer

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



ANNEXURE A

SCHEDULE OF ACCREDITATION

Facility Number: **T0116**

Permanent Address of Laboratory:

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

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Nominated Representative:

Mrs H Meyer

Issue No.: 29

Date of Issue: 14 October 2019

Expiry Date: 31 October 2024

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

are sugar coated)		(72 hour; 103°C)
Maize Grits	Moisture (Oven Method)	Analytical EBC Method 6.2.2, latest edition (4 hours, 130°C)
Animal feed, Plant tissue and Sunflower (Milled)	Moisture (Oven Method)	AgriLASA 2.1, Latest Edition (5 hours, 105°C)
All flours, cereal grains, oilseeds and animal feeds	Nitrogen and protein (Combustion method - Dumas)	AACCI 46-30.01, Latest Edition
Cereal based food stuff	Dietary fibres (Total)	In-house method 012
Food stuff and feeds	Carbohydrates (by difference) (calculation) Energy value (calculation) Total digestible nutritional value (calculation)	SOP MC 23
Food Stuff and feeds	Determination of Ash	In-house method 011
Wheat Kernels	Moisture (Oven Method)	Government Gazette Wheat Regulation, Latest Edition (72 hour, 103°C)
Flours of grains e.g. barley, oats, triticale, maize, rye, sorghum and wheat; oilseeds like soybeans and sunflower, feeds and mixed feeds and foodstuffs	Crude fat (Ether extraction by Soxhlet)	In-house method 024
Meal and flour of wheat, rye, barley, other grains, starch containing and malted products	Falling number	ICC Std 107/1, Latest Edition
NUTRIENTS AND CONTAMINANTS		
Vitamin fortified food and feed products and fortification mixes grain based	Vitamin A as all trans Retinol (Saponification) (HPLC)	In-house method 001
	Thiamine Mononitrate (HPLC) Riboflavin (HPLC) Nicotinamide (HPLC) Pyridoxine Hydrochloride (HPLC)	In-house method 002
	Folic Acid (HPLC)	In-house method 003
Grain based food and feed products (fortified and unfortified) and fortification mixes	Total Sodium (Na) Total Iron (Fe) Total Zinc (Zn)	In-house method 010
Yeast and Bread	Vitamin D ₂ (HPLC)	In-House method 029

Food and feed	Multi-Mycotoxin: -Aflatoxin G ₁ , B ₁ , G ₂ , B ₂ and total -Deoxynivalenol (DON), 15-ADON -Fumonisin B ₁ , B ₂ , B ₃ -Ochratoxin A -T2, HT-2 - Zearalenone	In-house method 026
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GRADING

Maize	Defective kernels (White maize/ yellow maize)	Government Gazette Maize Regulation, Latest Edition
Cereal as grains (Wheat, barley, rye and oats)	Hectolitre mass (Kern222)	ISO 7971-3, Latest edition
Wheat	Screenings	Government Gazette Wheat Grading Regulation, Latest Edition

RHEOLOGICAL

Wheat flour	Alveograph (Rheological properties)	ICC Std.121, Latest Edition
Flours	Farinograph (Rheological properties)	AACCI 54.02, Latest Edition (Rheological behaviour of flour Farinograph: Constant Flour Weight procedure)
Hard, soft and durum wheat (flour and whole wheat flour)	Mixograph (Rheological properties)	Industry accepted method 020 (Based on AACCI 54-40.02, Latest Edition Mixograph Method)

Original Date of Accreditation: 01 November 1999

ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM



Accreditation Manager

GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS

DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES

NO. R. 1547

29 NOVEMBER 2019

AGRICULTURAL PRODUCT STANDARDS ACT NO. 119 OF 1990

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

The Minister of Agriculture, Forestry and Fisheries, acting under section 15 of the Agricultural Product Standards Act 119 of 1990, has --

- (a) made the regulations in the Schedule;
- (b) determined that the said regulations shall come into operations on the date of publication; and
- (c) read together with section 3(1) of the said Act, repealed the regulations published by Government Notice Nos. R. 905 of 10 July 1998, R. 1421 of 6 November 1998, R.876 of 14 September 2001, R.979 of July 2002, R.1210 of 29 August 2003, R.1186 of December 2010, R.64 of 29 January 2016 and R. 1218 of 7 October 2016.

SCHEDULE

Definitions

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

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

"bag" means a bag manufactured from --

- (a) jute or phormium or a mixture of jute and phormium; or
- (b) polypropylene that complies with SANS specification CKS632 1246:2012;

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

"consignment" means --

- (a) a quantity of wheat 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 bulk container;

"damaged wheat" means wheat --

- (a) which have been damaged by insects;

- (b) which have been distinctly discoloured (orange-brown, dark brown or black) by external heat or as a result of heating caused by internal fermentation in wheat with an excessive moisture content, excluding wheat kernels in respect of which the discolouration is confined to the germ end;
- (c) which are immature and have a distinctly green colour; and
- (d) in which germination has proceeded to such an extent that the skin covering the embryo has been broken or the developing sprouts and/or rootlets are clearly visible.

"ergot sclerotia" means the sclerotia of the fungus *Claviceps purpurea*; and "ergot" has a corresponding meaning;

"falling number" means the time in seconds according to Hagberg-Perten as a measure of the degree of Alpha-Amylase activity in grain and flour;

"field fungi-infected wheat" means wheat of which the kernels are visibly infected with fungi, and that--

- (a) clearly have greyish brush-ends that are discoloured as a whole; or where field fungi growth is present from the brush-ends into the crease; and
- (b) have a dull, lifeless, chalky or pinkish and shrunken appearance as a result of *Fusarium* infection.

"foreign matter" means all matter excluding wheat, other grain and unthreshed ears. Coal, dung, glass and metal shall not be present in the consignment concerned;

"heavily frost-damaged wheat" means --

- (a) wheat which have been damaged by severe frost during the milk to soft dough stage and which is characterised by the kernels being fairly plump, but covered entirely with small blisters extending into the crease, excluding --
 - (i) kernels in which blistering is confined to the back of the kernel; and
 - (ii) immature wrinkled kernels in which wrinkling has been caused by frost while the kernels were still immature; and
- (b) kernels which have a slightly flaked-off bran coat due to frost: Provided that evidence of frost damage is present and that the bran coat had not been rubbed off due to handling.

"hectolitre mass" means the mass in kilogram per hectolitre;

"insect" means any live grain insect that is injurious to stored grain irrespective of the stage of development of that insect;

"other grain" means the kernels or pieces of kernels of barley, oats, triticale, maize, rye and sorghum;

"poisonous seeds" means the seeds or bits of seeds of plant species that may in terms of the Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972 represent a hazard to human or animal health when consumed, including seeds of *Argemone mexicana*, *Convolvulus spp.*, *Crotalaria spp.*, *Datura spp.*, *Ipomoea purpurea*, *Lolium temulentum*, *Ricinus communis* or *Xanthium spp.*;

"protein content" means the percentage protein in wheat on a 12 percent moisture basis;

“screenings” means all material that passes through the standard sieve;

“standard sieve” means a slotted sieve --

- (a) with a flat bottom of metal sheet of 1.0 mm thickness with apertures 12.7mm 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 orientated 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.

“stinking smut infection” means wheat that is infected with *Tilletia spp.* with the exception of wheat infected with *Tilletia indica* (karnal bunt). Wheat is considered to be infected by stinking smut if one or more of the following characteristics are present--

- (a) an unmistakable stinking smut odour; or
- (b) wheat kernels that are smeared with stinking smut; or
- (c) more than four stinking smut balls (or pieces of balls equal to four stinking smut balls) per 100 g of wheat.

“storage fungi infected wheat” means wheat that are visibly infected with fungi, and that show--

- (a) blue, green, blackish or yellow fungal growth anywhere on the kernel; or
- (b) visible mould beneath the bran.

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

“unthreshed ears” means ears and bits of ears of wheat, barley, triticale and rye that still contain seeds that are completely covered with glumes; and

“wheat” means the kernels and pieces of kernels of the species *Triticum aestivum*.

Restrictions on sale of wheat

- 2. (1) No person shall sell a consignment of wheat in the Republic of South Africa --
 - (a) unless the wheat is sold according to the classes set out in regulation 3;
 - (b) unless the wheat complies with the standards for the classes set out in regulation 4;
 - (c) unless the wheat, where applicable, complies with the grades of wheat and the standards for grades set out in regulations 5 and 6 respectively;
 - (d) unless the wheat is packed in accordance with the packing requirements set out in regulation 7;

- (e) unless the containers 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 wheat contains a substance that renders it unfit for human consumption or for processing into or utilisation 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 provisions of sub-regulation (1).

PART I

QUALITY STANDARDS

Classes of wheat

3. The classes of wheat are --

- (a) Bread Wheat; and
- (b) Other Wheat.

Standards for classes

4. (1) Notwithstanding the provisions of sub-regulations (2) and (3), a consignment of wheat shall --

- (a) be free from any toxin, chemical or any other substance that renders it unsuitable for human consumption or for processing into or utilisation thereof as food or feed and may not exceed the permissible deviations regarding aflatoxin in terms of the Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972;
- (b) not contain more poisonous seeds or ergot sclerotia than permitted in terms of the Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972;
- (c) be free from organisms of phytosanitary importance as determined in terms of the Agricultural Pest Act 36 of 1983;
- (d) be free from mould infected, sour and rancid other grain and foreign matter;
- (e) be free from any undesired odour, taste or colour not typical of undamaged and sound wheat;
- (f) be free from animal filth;
- (g) be free from glass, metal, coal or dung;
- (h) with the exception of Class Other Wheat, be free from grain insects;
- (i) with the exception of Class Other Wheat, be free from stinking smut infection; and
- (j) with the exception of Class Other Wheat, have a moisture content not exceeding 13 percent.

(2) A consignment shall be classified as Bread Wheat if --

- (a) the wheat in the consignment consists of at least 95 percent (m/m) of one or more of the bread wheat seeds; and

- (b) it complies with the standards for Super Grade, Grade 1, Grade 2 or Grade 3 set out in regulation 6.

(3) A consignment of wheat shall be classified as Class Other Wheat if it does not comply with the standards for Bread Wheat.

Grades of wheat

5. (1) The grades for Bread Wheat shall be as follows:

- (a) Super Grade;
- (b) Grade 1;
- (c) Grade 2; and
- (d) Grade 3.

(2) No grades are determined for Class Other Wheat.

Standards for grades of wheat

6. (1) Subject to the provisions of subregulations (2), (3) and (4), a consignment of wheat shall be graded as --

- (a) Super Grade if the nature of 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;
- (b) Grade 1 if the nature of deviation, specified in column 1 of Table 1 of the Annexure, in that consignment does not exceed the percentage specified in column 3 of the said table opposite the deviation concerned;
- (c) Grade 2 if the nature of deviation, specified in column 1 of Table 1 of the Annexure, in that consignment does not exceed the percentage specified in column 4 of the said table opposite the deviation concerned; and
- (d) Grade 3 if the nature of deviation, specified in column 1 of Table 1 of the Annexure, in that consignment does not exceed the percentage specified in column 5 of the said table opposite the deviation concerned."

(2) The minimum hectolitre masses for the different grades are as follows:

- (a) Super Grade – 76 kg;
- (b) Grade 1 – 76 kg;
- (c) Grade 2 – 76 kg; and
- (d) Grade 3 – 74 kg.

- (3) (a) Super Grade, Grade 1, Grade 2 and Grade 3 shall have a minimum falling number value of not less than 250 seconds.
- (b) Notwithstanding the provision of paragraph (a), wheat shall be deemed to comply with the requirements of the paragraph concerned if it deviates with not more than 30 seconds lower than the minimum prescribed for Super Grade, Grade 1, Grade 2 and Grade 3.
- (4) The minimum protein content (on a 12 percent moisture basis) for the different grades shall be as follows:
 - (a) Super Grade – 12.5 percent;
 - (b) Grade 1 – 11.5 percent;
 - (c) Grade 2 – 10.5 percent; and
 - (d) Grade 3 – 9.5 percent.

PART II

PACKING AND MARKING REQUIREMENTS

Packing requirements

7. Wheat of different grades shall be packed in different containers, or stored separately.

Marking requirements

8. (1) Every container or the accompanying sale documents of a consignment of wheat shall be marked or endorsed by means of appropriate symbols specified in sub-regulation (2), with --
- (a) the class of the wheat; and
 - (b) the grade.
- (2) The symbols referred to in sub-regulation (1) shall appear in the order of class and grade.
- (3) The symbols used to indicate the different-
- (a) classes shall be --
 - (i) B in the case of Bread Wheat; and
 - (ii) O in the case of Other Wheat.
 - (b) grades shall be --
 - (i) SG in the case of Super Grade
 - (ii) 1 in the case of Grade 1;
 - (iii) 2 in the case of Grade 2; and
 - (iv) 3 in the case of Grade 3.

PART III**SAMPLING*****Obtaining a sample from the consignment***

9. (1) An inspection sample of a consignment of wheat shall --
- (a) in the case of wheat delivered in bags and subject to regulation 10, be obtained by sampling at least ten percent 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 wheat 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 sub-regulation (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 sub-regulation (1) (a) is not representative of that consignment, an additional five percent 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 sub-regulation (1) (b).
- (4) If it is suspected that the sample referred to in sub-regulation (1) (b) is not representative of that consignment, an additional representative sample shall be obtained by using an alternative sampling pattern, apparatus or method.
- (5) A sample taken in terms of these regulations shall be deemed representative of the consignment from which it was taken.

Sampling if contents differ

10. (1) If, after an examination of the wheat taken from different bags in a consignment in terms of regulation 9(1) (a), it appears that the contents of those bags differ substantially --
- (a) the bags concerned shall be placed separately;
 - (b) all the bags in the consignment concerned shall be sampled with a bag probe in order to do such separation; and
 - (c) each group of bags with similar contents in that consignment shall for the purposes of these regulations be deemed to be a separate consignment.
- (2) If, after the discharge of a consignment of wheat in bulk has commenced, it is suspected that the consignment could be of a class or grade other than that determined by means of the initial sampling, the discharge shall immediately be stopped and the part of the consignment remaining in the bulk container as well as the wheat already in the hopper shall be sampled anew with a bulk sampling apparatus or by catching at least 20 samples, by means of a suitable container, at regular intervals throughout the whole offloading period from the stream of wheat flowing in bulk.

Working sample

11. A working sample is obtained by dividing the representative sample of the consignment according to the latest revision of the ICC (International Association for Cereal Science and Technology) 101/1 method.

PART IV**DETERMINATION OF OTHER SUBSTANCES*****Determination of undesirable odours and harmful substances***

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

- (a) it contains a substance that renders the wheat unfit for human consumption or for processing into or for utilisation as food or feed such as poisonous seeds, stones, glass, metal, coal or dung; and
- (b) it has a musty, sour, rancid or other undesirable odour: Provided that a working sample of unscreened wheat that is ground in a grain mill to a fine meal may be used for the determination concerned.

PART V**DETERMINATION OF CLASS, HECTOLITRE MASS,
MOISTURE CONTENT, PROTEIN CONTENT AND FALLING NUMBER*****Determination of class***

13. The class of a consignment of wheat shall be determined as follows:

- (a) Obtain a working sample of at least 500 g and screen the working sample in the manner prescribed in regulation 18.
- (b) Take at least 100 g of the screened wheat and remove all other grain, unthreshed ears and foreign matter by hand.
- (c) Obtain a working sample of at least 25 g each after all other grain, unthreshed ears and foreign matter have been removed and separate the different cultivars.
- (d) Determine the combined mass of all of the cultivars that belong to the same class and express the mass thus determined as a percentage of the mass of the working sample.
- (e) Such percentage represents the percentage of all the cultivars that belong to the same class in the consignment.

Determination of the hectolitre mass

14. The hectolitre mass of a consignment of unscreened wheat may be determined by any suitable instrument: Provided that the instrument complies with and has been calibrated to the specifications detailed in ISO (International Organization for Standardization) 7971-3.

Determination of moisture content

15. The moisture content of a consignment wheat may be determined by any suitable method: Provided that the results thus obtained is in accordance with the maximum permissible deviation for a class 1 moisture meter as detailed in ISO (International Organization for Standardization) 7700/1 based

on the results 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 protein content

16. The percentage of protein of a consignment of wheat may be determined according to any suitable method: Provided that --

- (a) the determination shall be conducted on a sample which had been sifted using a screen with the same apertures as the standard sieve and from which other grain, unthreshed ears and foreign matter had been removed by hand; and
- (b) the results thus obtained are in accordance (± 0.3 percent) with the results obtained by the Dumas Combustion Analysis Method [the latest revision of the AACCI (American Association of Cereal Chemists International) Method 46-30].

Determination of falling number in wheat

17. (1) The falling number of a consignment of wheat may be determined according to any suitable method: Provided that --

- (a) the determination shall be conducted on a sample which had been sifted using a screen with the same apertures as the standard sieve and from which other grain, unthreshed ears and foreign matter had been removed by hand; and
- (b) the results thus obtained are in accordance (± 5 percent) with the results obtained by the latest revision of the ICC (International Association for Cereal Science and Technology) 107/1 method.

(2) If the falling number of a consignment of wheat is determined according to the latest revision of the ICC (International Association for Cereal Science and Technology) 107/1 method --

- (a) the sampling in the mentioned method shall be replaced with the manner prescribed in regulation 9; and
- (b) only the altitude corrected value shall be used.

PART VI

DETERMINATION OF PERCENTAGE DEVIATIONS

Determination of percentage screenings

18. (1) The percentage screenings in a consignment of wheat shall be determined as follows:

- (a) Obtain a working sample of at least 500 g.
- (b) Place the sample on the standard sieve and screen the sample by moving the sieve 50 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 sieve. Move the sieve, which rests on a table or other suitable smooth surface, 250 mm to 460 mm away from and towards the operator with each stroke. The prescribed 50 strokes must be completed within 50 to 60 seconds: Provided that the screening process may also be performed with the standard sieve in some or other container or an automatic sieving apparatus.
- (c) Determine the mass of the material that has passed through the sieve and express it as a percentage of the mass of the working sample.

- (d) Such percentage represents the percentage screenings in the consignment.

Determination of the percentage heavily frost-damaged wheat

19. The percentage heavily frost-damaged wheat in a consignment of wheat shall be determined as follows:

- (a) Obtain a working sample of at least 25 g of a screened sample.
- (b) Remove all heavily frost-damaged kernels by hand and determine the mass thereof.
- (c) Express the mass thus determined as a percentage of the mass of the working sample.
- (d) Such percentage represents the percentage heavily frost-damaged wheat in the consignment concerned.

Determination of the percentages other grain and unthreshed ears

20. The percentage other grain and unthreshed ears in a consignment of wheat shall be determined as follows:

- (a) Obtain a working sample of at least 50 g from a screened sample.
- (b) Remove all other grain and unthreshed ears by hand and determine the mass thereof.
- (c) Express the mass thus determined as a percentage of the mass of the working sample.
- (d) Such percentage represents the percentage other grain and unthreshed ears in the consignment concerned.

Determination of the percentage foreign matter

21. The percentage foreign matter in a consignment of wheat is determined as follows:

- (a) Obtain a working sample of at least 100 g from a screened sample.
- (b) Remove all foreign matter by hand and determine the mass thereof.
- (c) Express the mass thus determined as a percentage of the mass of the working sample.
- (d) Such percentage represents the percentage foreign matter in the consignment concerned.

Determination of the percentage damaged wheat

22. The percentage of damaged wheat in a consignment of wheat shall be determined as follows:

- (a) Obtain a working sample of at least 25 g of a screened sample.
- (b) Remove all damaged kernels by hand and determines the mass thereof.
- (c) Express the mass thus determined as a percentage of the mass of the working sample.
- (d) Such percentage represents the percentage damaged wheat in the consignment concerned.

Determination of the percentage heat-damaged wheat

23. The percentage heat-damaged wheat in a consignment of wheat shall be determined as follows:
- (a) Obtain a working sample of at least 100 g from a screened sample.
 - (b) Remove all heat-damaged kernels by hand and determine the mass thereof. Kernels from an additional working sample may also be sensorially assessed (by smelling and tasting the kernels) to confirm suspicion of heat damage.
 - (c) Express the mass thus determined as a percentage of the mass of the working sample.
 - (d) Such percentage represents the percentage heat-damaged wheat in the consignment concerned.

Determination of percentage field fungi infected wheat

24. The percentage field fungi infected wheat in a consignment of wheat shall be determined as follows:
- (a) Obtain a working sample of at least 25 g from a screened sample.
 - (b) Remove all field fungi infected kernels by hand and determine the mass thereof.
 - (c) Express the mass thus determined as a percentage of the mass of the working sample.
 - (d) Such percentage represents the percentage of field fungi infected wheat in the consignment concerned.

Determination of percentage storage fungi infected wheat

25. The percentage storage fungi infected wheat in a consignment of wheat shall be determined as follows:
- (a) Obtain a working sample of at least 100 g from a screened sample.
 - (b) Remove all storage fungi infected kernels by hand and determine the mass thereof.
 - (c) Express the mass thus obtained as a percentage of the mass of the working sample.
 - (d) Such percentage represents the percentage storage fungi infected wheat in the consignment concerned.

PART VII***Offence and penalties***

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

ANNEXURE

TABLE 1
STANDARDS FOR GRADES OF BREAD WHEAT

Nature of deviation	Maximum percentage permissible deviation (m/m)			
	Super Grade	Grade 1	Grade 2	Grade 3
Column 1	Column 2	Column 3	Column 4	Column 5
(a) Heavily frost-damaged kernel	5	5	5	5
(b) Field fungi infected kernels	2	2	2	2
(c) Storage fungi infected kernels	0.5	0.5	0.5	0.5
(d) Screenings	3	3	3	3
(e) Other grain and unthreshed ears	1	1	1	1
(f) Gravel, stones and turf	0.5	0.5	0.5	0.5
(g) Foreign matter including gravel, stones and turf: Provided that such deviations are individually within the limits specified in item (f)	1	1	1	1
(h) Heat-damaged kernels	0.5	0.5	0.5	0.5
(i) Damaged kernels, including heat-damaged kernels: Provided that such deviations are individually within the limit specified in item (h) and provided further that the minimum falling number value prescribed in regulation 6(3) for the grade concerned is at least complied with	2	2	2	2
(j) Deviations in items (d), (e), (g) and (i) collectively: Provided that such deviations are individually within the limits of the said items	5	5	5	5

