Evaluering 2023/Evaluation 2023

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NUWE KULTIVARS PRESTEER GOED IN 2023-proewe onder besproeiing

LIENTJIE VISSER, DAWIE DU PLESSIS, THOBEKA KHUMALO, TEBOGO OLIPHANT, ERNEST DUBE en **TOI TSILO,** LNR-Kleingraan, Bethlehem

In die dinamiese koringverbouingsomgewing, waar die klimaat en ander produksietoestande voortdurend verander, is daar altyd 'n meedoënlose soeke na 'n goed aangepaste kultivar met hoë opbrengs. Die nasionale kultivarevalueringsprogram wat deur LNR-Kleingraan uitgevoer word, het ten doel om ons toegewyde produsente met die kennis en gereedskap toe te rus wat nodig is om die beste koringkultivars te kies. Sodoende kan 'n voorspoedige en volhoubare toekoms vir ons koringbedryf verseker word.

Die program ontleed graanopbrengs, kwaliteitmetings (hektolitermassa, proteïeninhoud en valgetal) asook die interaksie tussen genotipe en omgewing noukeurig. Hierdie volledige benadering beklemtoon nie net die prestasie van elke kultivar in spesifieke streke nie, maar gee ook 'n vergelykende ontleding oor jare, wat 'n omvattende siening van kultivaraanpasbaarheid bied.

Die koringlandskap is besig om 'n beduidende transformasie te ondergaan, met besproeiingskoring wat al hoe belangriker raak in die lig van verminderde droëlandkoringgebiede in die somerreënvalstreek. Hierdie verskuiwing onderstreep die behoefte aan 'n gefokusde evaluering van koringkultivars onder besproeiing. Die nasionale kultivarevalueringsprogram voer besproeiingskoringproewe uit in die vier hoofproduksiestreke: die koeler sentrale besproeiingsarea in die Noord-Kaap; die warmer noordelike besproeiingsareas in Noordwes, Limpopo en Gauteng; die Hoëveld van Mpumalanga en die Vrystaat; asook in KwaZulu-Natal.

In sommige van hierdie streke moet proewe op twee verskillende tye geplant word, hetsy vroeër of later, met die presiese datums wat tussen die streke varieer. Produsente kan hierdie inligting gebruik om die beste kultivars volgens hulle verlangde plantdatums te kies.

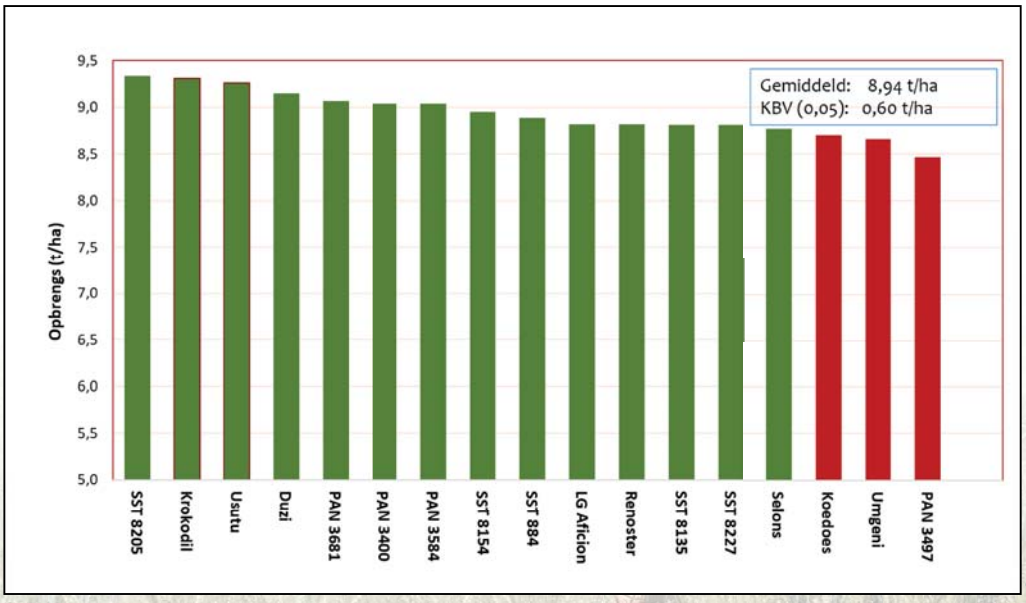
Vier nuwe besproeiingskultivars is in 2023 se kultivarevalueringsprogram ingesluit: PAN 3584, PAN 3681, LG Aficion en SST 8227. Daar was altesaam 17 inskrywings wat deur drie instellings gelewer is: LNR-Kleingraan, Syngenta Seeds en Corteva. Sewe proewe is in die koeler sentrale besproeiingsareas geplant, vier in die Hoëveld, vier in die warmer noordelike besproeiingsareas en twee in KwaZulu-Natal.

Die proewe is op die plaas uitgevoer om die werklike toestande van kommersiële koringproduksie te weerspieël – dit bied sodoende insigte wat direk van toepassing is op ons produsente. Groot dele van die 2023-seisoen is deur warm, droë weer gekenmerk, wat die verdampingsvraag verhoog het en gelei het tot lae opbrengste, veral by die laat aanplantings.

> Die koringlandskap is besig om 'n beduidende transformasie te ondergaan, met besproeiingskoring wat al hoe belangriker raak.

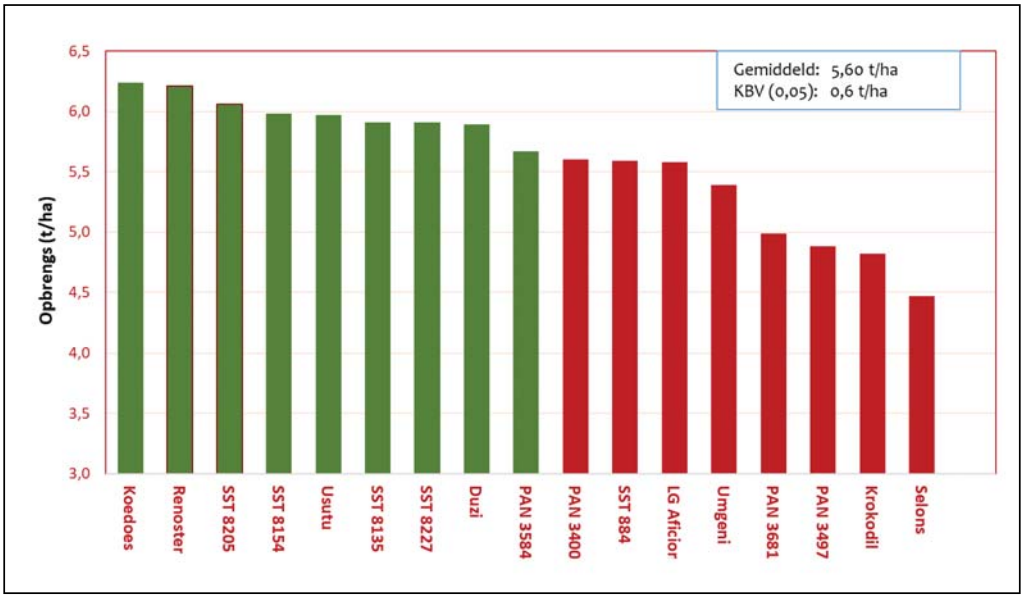
Die graanopbrengsresultate vir die 2023-seisoen vir elke streek en plantdatum word deur **Grafieke 1** tot **5** (op bladsye 3 - 5) weergegee. Die groen stawe op hierdie grafieke verteenwoordig kultivars waarvan die gemiddelde opbrengs statisties nie van mekaar verskil nie. Meer gedetailleerde inligting oor die prestasie van besproeiingskoringkultivars kan gevind word in die produksieriglyne wat jaarliks deur LNR-Kleingraan gepubliseer word. Hierdie riglyne bevat inligting rakende eenjaarprestasie asook langtermyngraanopbrengs- en kwaliteitdata vir alle produksiestreke en planttye. Dit sal vanaf die einde Februarie 2024 op die LNR-webtuiste (*www.arc.agric.za*) beskikbaar wees.

Produsente kan vir Toi Tsilo by 058 307 3400 of *tsilot@arc.agric.za* kontak vir addisionele inligting of om harde kopieë van die produksieriglyne aan te vra.

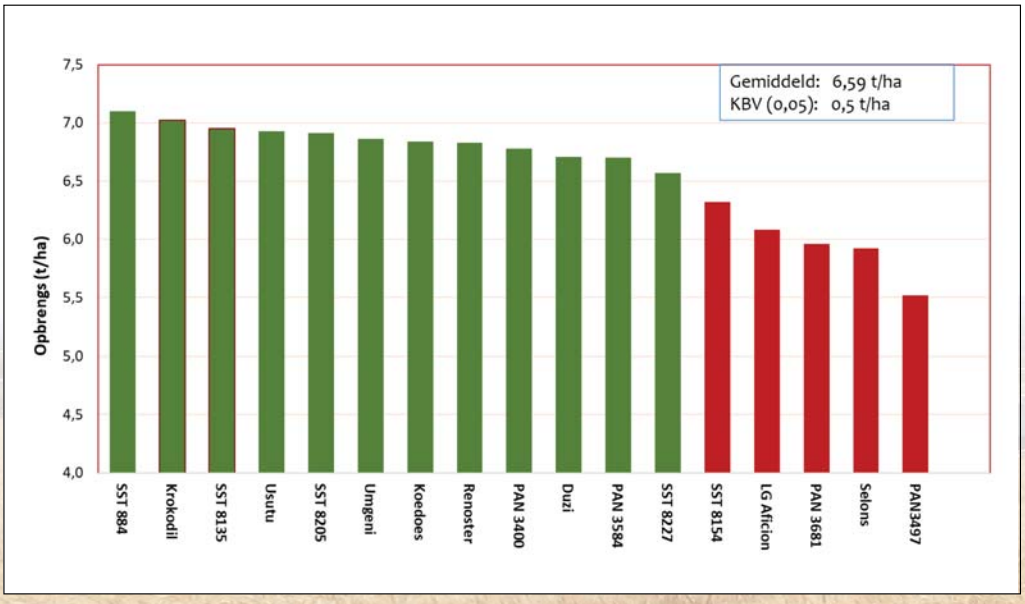


Grafiek 1: Koeler sentrale besproeiingsarea (vroeër plantdatum): gemiddelde opbrengs (t/ha) van inskrywings van die 2023-kultivarevalueringsproewe. Groen stawe dui kultivars met statisties soortgelyke opbrengs aan.

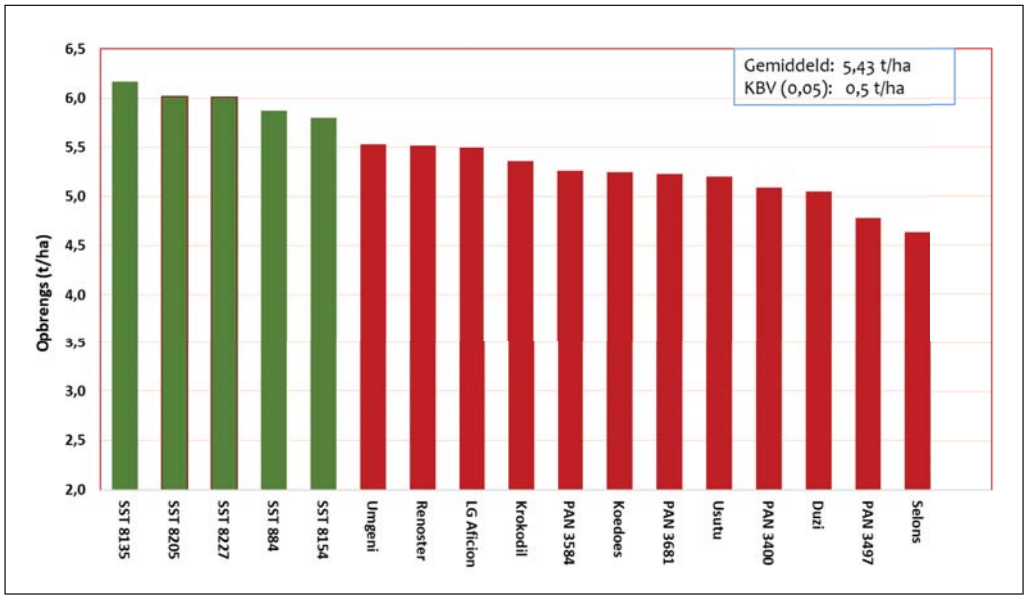
NUWE KULTIVARS PRESTEER...



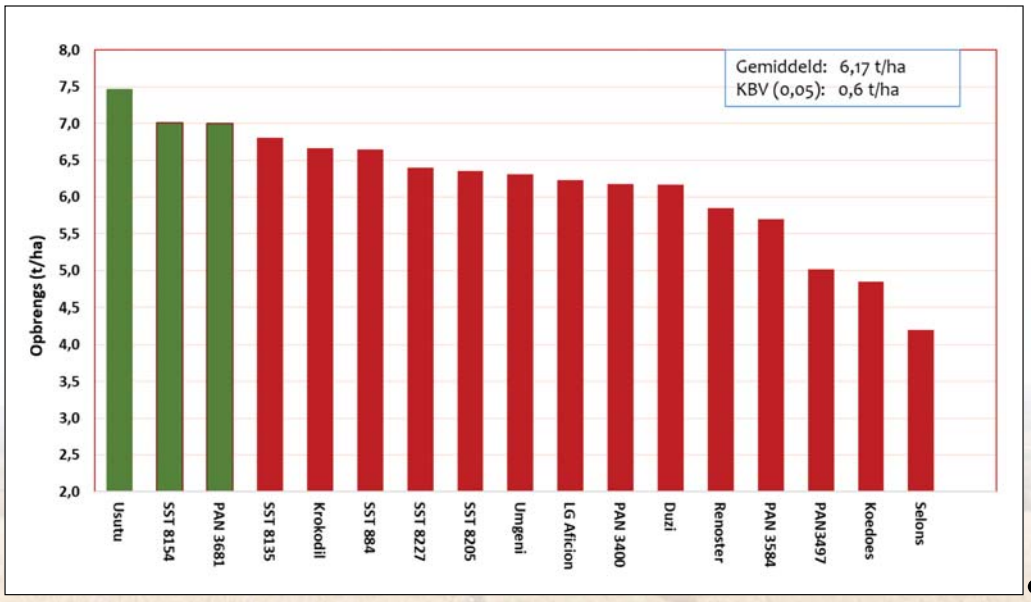
Grafiek 2: Koeler sentrale besproeiingsarea (later plantdatum): gemiddelde opbrengs (t/ha) van inskrywings van die 2023-kultivarevalueringsproewe. Groen stawe dui kultivars met statisties soortgelyke opbrengs aan.



Grafiek 3: Warmer noordelike besproeiingsarea (vroeër plantdatum): gemiddelde opbrengs (t/ha) van inskrywings van die 2023-kultivarevalueringsproewe. Groen stawe dui kultivars met statisties soortgelyke opbrengs aan.



Grafiek 4: Hoëveld-besproeiingsarea (vroeër plantdatum): gemiddelde opbrengs (t/ha) van inskrywings van die 2023-kultivarevalueringsproewe. Groen stawe dui kultivars met statisties soortgelyke opbrengs aan.



Grafiek 5: KwaZulu-Natal-besproeiingsarea: gemiddelde opbrengs (t/ha) van inskrywings van die 2023-kultivar-evalueringsproewe. Groen stawe dui kultivars met statisties soortgelyke opbrengs aan.

Hierdie navorsing is moontlik gemaak deur die finansiële ondersteuning van die Landbounavorsingsraad (LNR), die Suid-Afrikaanse Wintergraanbedryfstrust (SAWCIT) en die Departement van Landbou, Grondhervorming en Landelike Ontwikkeling (DALRRD)

Western Cape producers can choose from a wide range of cultivars

PETRUS DELPORT, ARC-Small Grain, Stellenbosch

The national wheat cultivar trials for the 2023/2024 season in the Western Cape were jointly conducted by ARC-Small Grain, the Western Cape Department of Agriculture and Syngenta Seeds. This collaboration provides a robust platform for generating objective results to help wheat producers in the Western Cape make informed cultivar choices. The trials were scientifically designed and executed to accurately reflect the performance of each cultivar.

Grain yield and quality data collected from the trials were subjected to statistical analysis using two methods: analysis of variance (ANOVA) and additive main effects and multiplicative interaction (AMMI). ANOVA was used to evaluate the performance of each cultivar in a specific locality, while AMMI was used to assess the performance of cultivars across multiple localities. This analysis allowed prediction of the performance of each cultivar with a high degree of certainty, taking into account factors such as climate, soil and production practices.

The trials evaluated 17 commercial cultivars, which included PAN 3471, PAN 3774, PAN 3783, PAN 3855, PAN 3976, Ratel, SST 0187, SST 0208, SST 0117, SST 0127, SST 0147, SST 015, SST 0166, SST 056, SST 087, Steenbok and Tredou. With such a wide selection of cultivars, Western Cape producers have access to a wealth of information to help with their choice of cultivar to propagate. Field trials to assess the performance of these cultivars are conducted across multiple locations, taking into account parameters such as yield, hectolitre mass, and falling number. This information helps producers choose the cultivars that are best suited to their growing conditions, including average rainfall, soil type, and agronomic practices. To minimise risk, it is always recommended to plant at least two different cultivars, for example those that differ in growth periods.

Tables 1 and **2** list the top four performers at each locality for the 2023/2024 season's trials. As seen from the Swartland data, several cultivars made the top four list, with SST 0187 appearing in the top four at seven localities, followed by SST 0127, SST 0147 and SST 0208 at five localities. PAN 3774, PAN 3783, SST 0166 and SST 087 made it into the top four at four localities each. In the Rûens, the cultivars were more evenly distributed, with SST 0166 and SST 0187 appearing in the top four at eight localities, followed by SST 0117 and SST 0127 at six localities each. **Tables 3** and **4** (on page 8) list yield results for the 2023 season, as well as the two-, three-, and four-year results for each region and planting date.

Important factors to remember to ensure that an optimum yield is realised:

To achieve optimal yields, it is important to plan well before planting. The following factors should be considered:

- Use certified seed that has a high germination rate.
- Properly apply seed coatings.
- Plant a mix of tried and tested cultivars (75%) and new cultivars (25%) to maximise performance.
- Calculate seeding density using thousand kernel mass rather than kilogram per hectare to achieve optimal planting density per square metre.
- Conduct soil analysis to determine the correct fertilisation rate for each crop field to avoid over- or under-fertilisation.
- When spraying crop protection chemicals such as herbicides and insecticides, ensure that the correct dosages are applied in order to ensure optimum results. Producers must also strictly adhere to application instructions provided on the labels of these products.

With these factors in mind, producers can start the season from a favourable position and realise an optimum yield.

For any additional information, producers are welcome to contact Toi Tsilo at 058 307 3400 or *tsilot@arc.agric.za.*

1 AMMI PREDICTIONS FOR THE BEST PERFORMERS IN THE SWARTLAND FOR THE 2023 SEASON.

SUBREGION	LOCALITY	CULTIVARS			
HIGH RAINFALL	Malmesbury (Papkuilsfontein)	SST 0166	SST 0127	SST 0117	SST 056
	Malmesbury (Koringplaas)	SST 0127	PAN 3774	SST 0208	PAN 3976
	Philadelphia (Altona)	PAN 3774	SST 0187	SST 0127	SST 0208
	Wellington (Boland Landbou)	SST 0166	SST 0117	SST 056	SST 0147
MIDDLE SWARTLAND	Moorreesburg (Klein Swartfontein)	SST 0187	PAN 3774	PAN 3783	SST 0208
	Moorreesburg (Langrug)	SST 0187	PAN 3774	PAN 3783	SST 0208
	Piketberg (Kolsvlei)	PAN 3774	SST 0127	SST 0187	SST 0208
	Eendekuil (The Rest)	SST 0127	SST 0166	PAN 3774	SST 0147
KORINGBERG	Porterville (Latboskloof)	SST 0127	SST 0166	SST 0208	PAN 3774
	Koringberg (Langkloof)	SST 0187	PAN 3774	PAN 3783	SST 0208
	Halfmanshof (Uitkoms)	SST 0127	SST 0166	SST 0147	SST 0208
SANDVELD	Hopefield (Dankbaar)	SST 0127	SST 0166	SST 0208	SST 0147
	Hopefield (Enkelvlei)	SST 0127	PAN 3976	SST 087	SST 0147

2 AMMI PREDICTIONS FOR THE BEST PERFORMERS IN THE RÛENS FOR THE 2023 SEASON.

SUBREGION	LOCALITY	CULTIVARS			
WESTERN RÛENS	Riviersonderend (Tygerhoek)	SST 0166	SST 0127	SST 0117	PAN 3783
	Caledon (Roodebloem)	SST 0208	SST 0187	SST 0166	SST 056
	Caledon (Uitvlug)	SST 0117	SST 0187	SST 087	SST 0147
SOUTHERN RÛENS	Klipdale (Quarie)	SST 0117	SST 0166	SST 0187	SST 0147
	Klipdale (Panorama)	SST 0117	SST 0166	SST 0187	SST 0147
	Bredasdorp (Karsrivier)	SST 0166	SST 0127	SST 0117	SST 0208
	Napier (Tamatiekraal)	SST 087	SST 0117	SST 0187	SST 0147
EASTERN RÛENS	Riversdale (Uitkyk)	SST 0166	SST 0127	SST 0208	SST 0187
	Witsand (Vleitjie)	SST 0166	SST 0208	SST 0127	SST 0187
	Heidelberg (Voorstekop)	SST 0166	SST 0127	SST 0117	SST 0208
	Swellendam (Majuba)	SST 0166	SST 0127	SST 0208	SST 0117

This research was made possible through funding by the Agricultural Research Council (ARC), the South African Winter Cereal Industry Trust (SAWCIT) and the Department of Agriculture, Land Reform and Rural Development (DALRRD)

WESTERN CAPE PRODUCERS...

3 RÛENS AVERAGE YIELD (T/HA) OF ENTRIES FROM 2020 TO 2023.

CULTIVAR	2023	R	2022	R	2021	R	2020	R	4-YEAR AVERAGE 2020 - 2023	R	3-YEAR AVERAGE 2021 - 2023	R	2-YEAR AVERAGE 2022 - 2023	R
PAN 3471	2,87	16	2,43	15	4,12	9	3,25	11	3,17	12	3,14	11	2,65	15
PAN 3774	3,49	13	2,97	7	-	-	-	-	-	-	-	-	3,23	8
PAN 3783	3,52	12	2,75	12	-	-	-	-	-	-	-	-	3,14	10
PAN 3855	3,28	15	2,77	11	-	-	-	-	-	-	-	-	3,03	14
PAN 3976	2,83	17	2,42	16	-	-	-	-	-	-	-	-	2,63	16
RATEL	3,55	10	2,70	13	4,15	8	3,42	9	3,46	8	3,47	8	3,13	11
SST 0117	3,91	2	3,18	3	4,44	5	3,90	4	3,86	4	3,84	4	3,55	2
SST 0127	3,86	4	3,20	1	4,61	3	3,85	5	3,88	3	3,89	3	3,53	3
SST 0147	3,72	6	3,16	4	4,51	4	3,99	2	3,84	5	3,80	5	3,44	5
SST 015	3,55	10	2,89	9	4,09	10	3,38	10	3,48	7	3,51	7	3,22	9
SST 0166	4,06	1	3,20	2	4,65	2	3,92	3	3,96	2	3,97	1	3,63	1
SST 0187	3,91	2	3,10	5	4,73	1	4,11	1	3,96	1	3,91	2	3,51	4
SST 0208	3,85	5	-	-	-	-	-	-	-	-	-	-	-	-
SST 056	3,72	6	2,94	8	4,43	6	3,48	8	3,64	6	3,70	6	3,33	7
SST 087	3,68	8	2,99	6	2,62	12	3,76	6	3,26	11	3,10	12	3,34	6
STEENBOK	3,31	14	2,84	10	4,17	7	2,93	12	3,31	10	3,44	9	3,07	13
TREDOU	3,59	9	2,62	14	3,94	11	3,66	7	3,45	9	3,38	10	3,10	12
MEAN	**3,57**	**-**	**2,86**	**-**	**4,21**	**-**	**3,64**	**-**	**3,61**	**-**	**3,60**	**-**	**3,22**	**-**
LSD$_t$ (0,05)	**0,2**	**-**	**0,2**	**-**	**0,2**	**-**	**0,2**	**-**	**0,1**	**-**	**0,1**	**-**	**0,1**	**-**

R = Ranking LSD = Least significant difference

4 SWARTLAND AVERAGE YIELD (T/HA) OF ENTRIES FROM 2020 TO 2023.

CULTIVAR	2023	R	2022	R	2021	R	2020	R	4-YEAR AVERAGE 2020 - 2023	R	3-YEAR AVERAGE 2021 - 2023	R	2-YEAR AVERAGE 2022 - 2023	R
PAN 3471	3,16	17	2,91	15	4,16	11	3,94	10	3,54	12	3,41	12	3,04	16
PAN 3583	4,10	2	3,02	13	-	-	-	-	-	-	-	-	3,56	8
PAN 3774	3,95	7	3,31	5	-	-	-	-	-	-	-	-	3,63	6
PAN 3855	3,78	11	3,17	10	-	-	-	-	-	-	-	-	3,48	10
PAN 3976	3,78	11	3,05	12	-	-	-	-	-	-	-	-	3,42	11
RATEL	3,78	11	2,85	16	4,18	10	4,13	5	3,73	10	3,60	11	3,32	14
SST 0117	4,00	5	3,44	2	4,26	9	4,14	4	3,96	5	3,90	5	3,72	4
SST 0127	4,23	1	3,31	5	4,42	4	4,14	3	4,03	3	3,99	3	3,77	1
SST 0147	3,91	9	3,42	3	4,49	3	4,13	7	3,99	4	3,94	4	3,67	5
SST 015	3,74	14	3,06	11	4,36	6	3,94	11	3,78	8	3,72	8	3,40	12
SST 0166	4,10	2	3,42	3	4,63	2	4,20	2	4,09	2	4,05	2	3,76	2
SST 0187	3,97	6	3,51	1	4,68	1	4,22	1	4,09	1	4,05	1	3,74	3
SST 0208	4,10	2	-	-	-	-	-	-	-	-	-	-	-	-
SST 056	3,95	7	3,27	7	4,41	5	3,99	9	3,91	6	3,88	6	3,61	7
SST 087	3,87	10	3,21	8	4,11	12	4,13	5	3,83	7	3,73	7	3,54	9
STEENBOK	3,42	16	3,21	8	4,27	8	3,86	12	3,69	11	3,63	10	3,32	14
TREDOU	3,69	15	2,99	14	4,28	7	4,02	8	3,74	9	3,65	9	3,34	13
MEAN	**3,85**	**-**	**3,20**	**-**	**4,35**	**-**	**4,07**	**-**	**3,86**	**-**	**3,80**	**-**	**3,52**	**-**
LSD$_t$ (0,05)	**0,1**	**-**	**0,1**	**-**	**0,2**	**-**	**0,2**	**-**	**0,1**	**-**	**0,1**	**-**	**0,1**	**-**

R = Ranking LSD = Least significant difference

Dryland wheat trials successful despite weather challenges

LIENTJIE VISSER, DAWIE DU PLESSIS, THOBEKA KHUMALO, RICHARD TAYLOR, ERNEST DUBE and **TOI TSILO,** ARC-Small Grain, Bethlehem

Dryland wheat farming in the Free State stands out for its reliance on winter dry planting on soils with high water tables, utilising stored moisture for germination and growth. Given the high drought risk, attributable to the mere 200 to 300 mm of rainfall received during the May to December growing period of the dryland wheat, producers must employ highly efficient farming techniques. These include reduced tillage, precise fertiliser application, optimal timing of planting, and crucially, selecting the appropriate cultivar.

In light of this, ARC-Small Grain annually conducts the national wheat cultivar evaluation programme (NWCEP). This programme systematically evaluates and characterises wheat cultivars from all seed companies, providing an objective and scientific basis for comparison of cultivars. By offering an independent assessment across different localities, the trials enable the adoption of cultivars that are well suited to producer localities, thereby enhancing yield and quality under drought conditions.

The Free State is categorised into four distinct regions based on crop production potential. Of these, the south-western Free State is the warmest and driest region and hosts the fewest dryland wheat producers. The north-western Free State also experiences high temperatures, but it has deep (500 to 1 000 mm) yellow, sandy loam soils that often have a high water table. The central Free State has moderate rainfall and temperatures, leading to lower evaporation needs, but its shallow (250 to 500 mm) duplex soils challenge moisture retention for dryland wheat producers. The eastern Free State stands out for its high dryland wheat production potential, benefiting from higher rainfall during crucial growth stages, low average temperatures that reduce evaporation, and fairly deep soils.

The 2023/2024 dryland wheat season in the Free State began promisingly, but ultimately posed significant challenges for producers. Initial conditions were favourable, with, for example, the Wesselsbron weather station in the north-western Free State recording 110 mm of rain from March to May 2023. Bethlehem in the eastern Free State recorded over 140 mm over the same period. These conditions led to excellent emergence and early development in the trials. However, there was a prolonged and severe dry spell mid-season from June till October, especially in the north-western Free State. Thus, the north-western Free State cultivar trials for the 2023/2024 season produced low yields because of the mid-season drought. There was exceptionally heavy rainfall in December in the eastern Free State, which caused delayed harvesting and some yield loss. Damage from red-billed quelea birds was reported by some producers, and this problem seems to be worsening with each passing year.

Despite these challenges, the dryland wheat cultivar trials were successful. Twelve trials featuring 15 cultivars from ARC-Small Grain, Syngenta Seeds, and Corteva were conducted in the north-western and eastern Free State. The yield results for the 2023/2024 season, alongside two-, three-, and four-year results for each region and planting date, are detailed in **Tables 1** to **4** (on pages 9 - 11). For each region, results for an earlier and a later planting are presented.

Producers seeking more comprehensive information on the yield potential of dryland wheat cultivars are encouraged to consult the production guidelines published annually by ARC-Small Grain. These guidelines, encompassing one-year performance and long-term data across all production regions and planting times, will be available on the ARC website (*www.arc.agric.za*) from the end of February 2024.

For additional information and hard copies, producers can contact Toi Tsilo at 058 307 3400 or via email at *tsilot@arc.agric.za.*

1 NORTH-WESTERN FREE STATE (EARLIER PLANTING). AVERAGE YIELD (T/HA) OF ENTRIES DURING THE PERIOD FROM 2020 TO 2023.

CULTIVAR	2023	R	2022	R	2021	R	2020	R	4-YEAR AVERAGE 2020 - 2023	R	3-YEAR AVERAGE 2021 - 2023	R	2-YEAR AVERAGE 2022 - 2023	R
ELANDS	0,92	6	2,64	3	3,80	11	2,42	5	2,44	7	2,45	8	1,78	4
KOONAP	0,85	9	2,06	9	3,73	12	2,14	10	2,19	10	2,21	11	1,45	10
KOUGAS	0,69	13	1,88	11	4,02	9	2,14	9	2,18	11	2,20	12	1,29	12
KUBETU	0,92	6	2,00	10	5,35	2	2,40	6	2,67	4	2,76	4	1,46	9
MATLABAS	1,14	4	2,62	4	5,07	3	2,93	1	2,94	1	2,94	2	1,88	3
MKUZE	1,15	2	-	-	-	-	-	-	-	-	-	-	-	-
MOKOLO	0,79	11	2,42	6	4,45	8	2,26	8	2,48	6	2,55	6	1,61	6
PAN 3111	0,96	5	2,26	7	5,79	1	2,31	7	2,83	2	3,00	1	1,61	5
PAN 3161	1,17	1	2,71	2	4,76	6	2,53	2	2,79	3	2,88	3	1,94	1
PAN 3373	1,14	3	2,73	1	-	-	-	-	-	-	-	-	1,93	2
SENQU	0,69	12	2,45	5	3,97	10	2,09	11	2,30	9	2,37	9	1,57	7
SST 3197	0,89	8	2,23	8	4,60	7	-	-	-	-	2,57	5	1,56	8
SST 356	0,56	14	1,59	14	4,93	4	2,46	4	2,38	8	2,36	10	1,08	13
SST 374	0,42	15	-	-	-	-	-	-	-	-	-	-	-	-
WEDZI	0,79	10	1,87	12	4,86	5	2,53	2	2,51	5	2,51	7	1,33	11
MEAN	**0,87**	**-**	**2,23**	**-**	**4,61**	**-**	**2,38**	**-**	**2,52**	**-**	**2,57**	**-**	**1,58**	**-**
LSD$_t$ (0,05)	**0,2**	**-**	**0,2**	**-**	**0,4**	**-**	**0,1**	**-**	**0,2**	**-**	**0,2**	**-**	**0,3**	**-**

R = Ranking LSD = Least significant difference

DRYLAND WHEAT TRIALS...

2 NORTH-WESTERN FREE STATE (LATER PLANTING). AVERAGE YIELD (T/HA) OF ENTRIES DURING THE PERIOD FROM 2020 TO 2023.

CULTIVAR	2023	R	2022	R	2021	R	2020	R	4-YEAR AVERAGE 2020 - 2023	R	3-YEAR AVERAGE 2021 - 2023	R	2-YEAR AVERAGE 2022 - 2023	R
ELANDS	0,93	4	2,00	2	4,42	9	3,52	5	2,72	4	2,45	3	1,47	4
KOONAP	0,88	6	1,94	4	4,01	11	3,06	10	2,47	10	2,28	8	1,41	5
KOUGAS	0,78	11	1,37	11	4,46	8	3,36	8	2,49	9	2,20	11	1,08	11
KUBETU	0,80	9	1,57	8	4,77	4	4,04	1	2,80	3	2,38	5	1,19	8
PAN 3111	1,03	3	1,92	5	5,21	1	3,41	7	2,89	2	2,72	1	1,48	3
PAN 3161	1,11	2	2,02	1	4,97	2	3,91	3	3,00	1	2,70	2	1,57	2
PAN 3373	1,20	1	1,99	3	-	-	-	-	-	-	-	-	1,60	1
SENQU	0,93	4	1,89	6	4,72	6	3,13	9	2,67	5	2,44	4	1,41	5
SST 3197	0,70	12	1,72	7	4,04	10	-	-	-	-	2,21	10	1,21	7
SST 356	0,88	6	1,39	10	4,73	5	3,66	4	2,67	6	2,33	6	1,14	9
SST 374	0,85	8	1,05	12	4,81	3	3,92	2	2,66	7	2,24	9	0,95	12
WEDZI	0,80	9	1,46	9	4,58	7	3,49	6	2,58	8	2,28	7	1,13	10
MEAN	**0,91**	**-**	**1,69**	**-**	**4,61**	**-**	**3,58**	**-**	**2,69**	**-**	**2,38**	**-**	**1,30**	**-**
LSD$_t$ (0,05)	**0,2**	**-**	**0,2**	**-**	**0,4**	**-**	**0,2**	**-**	**0,1**	**-**	**0,1**	**-**	**0,1**	**-**

R = Ranking LSD = Least significant difference

3 EASTERN FREE STATE (EARLIER PLANTING). AVERAGE YIELD (T/HA) OF ENTRIES DURING THE PERIOD FROM 2020 TO 2023.

CULTIVAR	2023	R	2022	R	2021	R	*2020	R	4-YEAR AVERAGE 2020 - 2023	R	3-YEAR AVERAGE 2021 - 2023	R	2-YEAR AVERAGE 2022 - 2023	R
ELANDS	1,77	11	1,63	12	3,16	11	2,35	9	2,23	10	2,19	11	1,70	12
KOONAP	1,57	15	1,53	13	3,14	12	2,54	7	2,20	11	2,08	12	1,55	13
KOUGAS	1,93	5	1,90	10	3,33	10	1,85	11	2,25	9	2,39	9	1,92	9
KUBETU	1,76	12	2,28	5	3,63	7	2,84	3	2,63	4	2,56	7	2,02	7
MATLABAS	2,04	2	3,07	2	3,77	4	3,09	1	2,99	1	2,96	3	2,56	2
MKUZE	2,01	3	-	-	-	-	-	-	-	-	-	-	-	-
MOKOLO	1,98	4	2,26	6	3,65	6	2,58	6	2,62	5	2,63	6	2,12	5
PAN 3111	1,73	13	2,72	3	4,17	1	2,62	5	2,81	3	2,87	4	2,23	3
PAN 3161	2,1	1	2,31	4	3,60	8	2,29	10	2,57	6	2,67	5	2,21	4
PAN 3373	1,92	6	1,92	9	-	-	-	-	-	-	-	-	1,92	8
SENQU	1,84	8	1,72	11	3,35	9	2,48	8	2,35	8	2,30	10	1,78	11
SST 3197	1,87	7	3,34	1	3,76	5	-	-	-	-	2,99	2	2,61	1
SST 356	1,64	14	2,07	7	3,96	2	2,85	2	2,96	3	3,02	1	2,07	6
SST 374	1,8	9	-	-	-	-	-	-	-	-	-	-	-	-
WEDZI	1,78	10	1,94	8	3,88	3	2,65	4	2,56	7	2,53	8	1,86	10
MEAN	**1,85**	**-**	**2,25**	**-**	**3,62**	**-**	**2,57**	**-**	**2,56**	**-**	**2,60**	**-**	**2,04**	**-**
LSD$_t$ (0,05)	**0,2**	**-**	**0,3**	**-**	**0,3**	**-**	**0,2**	**-**	**0,2**	**-**	**0,2**	**-**	**0,3**	**-**

** Only Clarens data*

R = Ranking LSD = Least significant difference

4 **EASTERN FREE STATE (LATER PLANTING).**
AVERAGE YIELD (T/HA) OF ENTRIES DURING THE PERIOD FROM 2020 TO 2023.

CULTIVAR	2023	R	2022	R	2021	R	*2020	R	4-YEAR AVERAGE 2020 - 2023	R	3-YEAR AVERAGE 2021 - 2023	R	2-YEAR AVERAGE 2022 - 2023	R
ELANDS	2,08	4	2,69	7	3,48	6	2,78	5	2,76	6	2,75	6	2,39	4
KOONAP	1,91	7	1,98	12	2,90	10	2,34	10	2,28	10	2,26	11	1,95	12
KOUGAS	1,58	12	2,40	10	3,12	8	2,72	7	2,45	9	2,37	10	1,99	11
KUBETU	1,99	5	3,05	1	3,58	5	2,75	6	2,84	5	2,87	4	2,52	1
PAN 3111	1,85	8	3,04	2	4,09	1	2,46	9	2,86	3	2,99	1	2,45	3
PAN 3161	2,17	1	2,83	4	3,94	4	2,89	3	2,96	1	2,98	2	2,50	2
PAN 3373	2,17	1	2,42	9	-	-	-	-	-	-	-	-	2,30	7
SENQU	1,76	10	2,62	8	3,29	7	2,59	8	2,57	7	2,56	7	2,19	9
SST 3197	1,93	6	2,79	5	2,80	11	-	-	-	-	2,51	8	2,36	5
SST 356	1,79	9	2,92	3	3,99	2	3,09	1	2,95	2	2,90	3	2,36	6
SST 374	2,09	3	2,15	11	3,08	9	2,82	4	2,54	8	2,44	9	2,12	10
WEDZI	1,73	11	2,73	6	3,95	3	3,00	2	2,85	4	2,80	5	2,23	8
MEAN	**1,92**	**-**	**2,63**	**-**	**3,47**	**-**	**2,73**	**-**	**2,71**	**-**	**2,68**	**-**	**2,28**	**-**
LSD$_t$ (0,05)	**0,2**	**-**	**0,5**	**-**	**0,2**	**-**	**0,2**	**-**	**0,2**	**-**	**0,3**	**-**	**0,3**	**-**

** Only Clarens data*

R = Ranking LSD = Least significant difference

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