



2016/2017

Droëboonkultivaraanbevelings Dry Bean Cultivar Recommendations

D. Fourie

LNR-Instituut vir Graangewasse / ARC-Grain Crops Institute

Privaatsak / Private Bag X1251, Potchefstroom, 2520

Tel. (018) 299 6312, Faks \ Fax. (018) 297 6572

Inleiding

Die doel van hierdie pamflet is om produsente te help om die beste bonekultivars vir hulle omstandighede te kies. Dit is opgestel na aanleiding van die resultate van die Nasionale Droëboonkultivarproewe. Drie seisoene se data is gebruik (2013/14 tot 2015/16). Die proewe is moontlik gemaak deur die finansiële ondersteuning van die Landbounavorsingsraad (LNR), die Droëbone Produsente Organisasie (DPO) en saadmaatskappye. 'n Groot aantal medewerkers het proewe uitgevoer soos die KZN Departement van Landbou, landbou koöperasies en landbou maatskappye. Die DPO het 'n groot bydrae gelewer.

Hoe om die inligting te gebruik

- Besluit eers op 'n saad tipe byvoorbeeld Rooi Gespikkelde bone of Kleinwit Inmaakbone. Doen dit aan die hand van die aanvraag, ondervinding en moontlike pryse. Kontak die DPO by 012 819 8100 of 082 388 0510 vir meer inligting.
- Kies tussen beskikbare kultivars dié met die hoogste gemiddelde opbrengs en oessekerheid. Tabel 1 toon 22 kultivars vir die 2015/2016 seisoen en Tabel 2 toon die inligting van hierdie kultivars oor drie seisoene (2013/14-2015/16).
- Sommige kultivars is beter aangepas in sekere produksiegebiede en dit word nie weerspieël in die oessekerheid nie. Kyk dus hoe die kultivars met mekaar vergelyk in u produksiegebied (Tabel 3).

Introduction

This pamphlet is aimed at helping producers decide on the best bean cultivars for their particular conditions. Recommendations are based on the results of the National Dry Bean Cultivar Trials. Three seasons' data were used for this purpose (2013/14 to 2015/16). The trials were made possible by the financial support of the Agricultural Research Council (ARC), the Dry Bean Producers Organization (DPO) and the seed companies. A large number of co-operators conducted trials i.e. the Department of Agriculture of KZN, agricultural co-ops and agricultural companies. The DPO made a large contribution in this regard.

How to use this information

- First decide on a seed type, for instance Red Speckled beans or Small White Canning beans. It is important to keep the demand and possible prices in mind. Contact the DPO at 012 819 8100 or 082 388 0510 for more information.
- From the available cultivars choose those with the highest mean yield and yield reliability. Table 1 shows the data of 22 cultivars for the 2015/16 season and Table 2 shows data of these cultivars for three seasons (2013/14-2015/16).
- Some cultivars are better adapted in certain production areas but this is not shown in the yield reliability table. Use Table 3 to compare the mean yield of the cultivars for your production area.

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- Vergelyk kultivars in Tabela 1 en 2 met mekaar by realistiese opbrengsmikpunte vir u plaas. Hoe nader die kultivar se berekende opbrengs aan 'n bepaalde mikpunt is hoe hoër is die opbrengspotensiaal by die betrokke mikpunt. Dit dui op hoër opbrengstabiliteit.
- Kyk nou na die eienskappe van die kultivar (Tabel 4) om seker te maak dat dit nie ongewenste eienskappe het ten opsigte van, byvoorbeeld: oopspring, siektevatbaarheid, groeiseisoenlengte en saadgrootte nie.
- Kultivars verskil min van mekaar in hulle vatbaarheid vir bakteriese siektes, wortelsiektes en Ascochyta. Almal is vatbaar behalwe Kranskop-HR 1 met vetvleksierte weerstand en Werna en RS 7 met gewone skroei weerstand, maar dit word nie in Tabel 4 aangetoon nie.
- Compare cultivars in Tables 1 and 2 at a realistic yield target for your particular farm. The nearer the calculated yield of a cultivar comes to the yield target, the higher its yield potential at that particular target. This indicates higher yield stability.
- Thereafter study the characteristics of the cultivar of your choice (Table 4) to ensure that it has no undesired characteristics with respect to: shattering, disease susceptibility, growing season requirements or seed size.
- Cultivars do not differ much with respect to their susceptibility to bacterial diseases, root diseases and Ascochyta (they are all susceptible except Kranskop-HR1 with halo blight resistance and Werna and RS 7 with common blight resistance) but this is not indicated in Table 4.

Tabel 1 Oessekerheid by die verskillende opbrengsmikpunte, 2015/16

Table 1 Yield reliability at different yield targets, 2015/16

KULTIVAR CULTIVAR	OPBRENGSMIKPUNTE YIELD TARGETS								GEM MEAN	RANG RANK	D-PARAM
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0			
KLEIN WIT INMAAK / SMALL WHITE CANNING											
TEEBUS-RR 1	0.41*	0.79*	1.18*	1.57	1.95	2.34	2.73	3.11	2.24	9	0.1050
SW 1	0.43*	0.98*	1.53*	2.08*	2.62*	3.17*	3.72*	4.27*	2.93	1	0.1543
PAN 123	0.00	0.30	0.68	1.06	1.45	1.83	2.21	2.59	2.12	14	0.3258
ROOI GESPIKKELD / RED SPECKLED											
KRANSKOP	0.31*	0.67*	1.04	1.40	1.76	2.12	2.48	2.84	1.94	19	0.0598
KRANSKOP-HR 1	0.00	0.02	0.66	1.31	1.95	2.59	3.23*	3.87*	2.23	10	0.1671
OPS-RS 4	0.00	0.58	1.15*	1.73*	2.31*	2.89*	3.47*	4.05*	2.34	4	0.0475
RS 5	0.21*	0.59	0.97	1.35	1.73	2.12	2.50	2.88	2.12	14	0.1448
RS 6	0.16	0.70*	1.24*	1.78*	2.32*	2.85*	3.39*	3.93*	2.30	6	0.0319
SEDERBERG	0.15	0.62*	1.10	1.57	2.04	2.52	2.99	3.47	2.07	15	0.0327
PAN 148	0.00	0.45	0.98	1.50	2.02	2.54	3.07	3.59	2.13	13	0.0644
PAN 9213	0.00	0.10	0.76	1.42	2.08	2.74*	3.40*	4.05*	2.47	3	0.2374
PAN 9292	0.00	0.42	0.91	1.40	1.89	2.37	2.86	3.35	2.14	12	0.1119
DBS 310	0.24*	0.67*	1.10	1.54	1.97	2.40	2.83	3.26	2.04	17	0.0403
DBS 360	0.00	0.29	0.82	1.34	1.87	2.40	2.93	3.46	1.95	18	0.0552
DBS 830	0.10	0.60	1.09	1.58	2.07	2.57	3.06	3.55	2.21	11	0.0689
DBS 840	0.00	0.47	0.96	1.44	1.93	2.42	2.91	3.40	2.32	5	0.1786
WERNA	0.00	0.00	0.55	1.15	1.76	2.36	2.96	3.57	2.34	4	0.3465
TYGERBERG	0.00	0.48	1.17*	1.86*	2.54*	3.23*	3.91*	4.60*	2.66	2	0.1011
KAMIESBERG	0.16	0.65*	1.14*	1.63*	2.12	2.61	3.09	3.58	2.27	7	0.0745
RUBY	0.00	0.25	0.64	1.03	1.41	1.80	2.19	2.58	1.94	19	0.2302
PAN 9216	0.39*	0.77*	1.15*	1.53	1.91	2.29	2.67	3.05	2.05	16	0.0495
RS 7	0.00	0.54	1.09	1.63*	2.18*	2.73*	3.28*	3.83*	2.26	8	0.0581

Waardes met (*) sterretjies aangedui binne dieselfde kolom is betekenisvol hoër as die gemiddeld
 (*) Star printed values in the same column are significantly higher than the mean

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- Stel vas wat die bemarkingsmoontlikhede van die bepaalde kultivar is, byvoorbeeld of die inmaakwaliteit, saadgrootte en kleur vir die inmakers of bonehandelaars aanvaarbaar is. Dit bepaal die prys en dus die winsgewendheid.
- Bestel saad deur u koöperasie, landboumaatskappy, saadhandelaar of direk van die betrokke saadfirma. Doen dit een seisoen vooruit om te verseker dat u saad kry. Waar aangedui word dat dit 'n nuwe kultivar is moet in gedagte gehou word dat twee tot drie jaar nodig is om voldoende gesertifiseerde saad daarvan te produseer.
- Dring aan op Siektevry Gesertifiseerde saad om die gevaar van saadgedraagde siektes te beperk (bakteriële siektes en antraknose). As dit nie beskikbaar is nie, gebruik minstens Gesertifiseerde saad.
- Determine the possible market for a specific cultivar, for instance whether the canning quality, seed size and colour are acceptable to bean dealers. This determines the price and therefore the profitability.
- Order seed from your local cooperative, agricultural company, seed dealer or directly from the seed company. Do this one season in advance to prevent disappointment. In the case of a new cultivar it must be borne in mind that at least two years (probably three years) are needed to produce sufficient certified seed.
- Insist on Disease Free Certified seed to limit the detrimental effect of seed borne diseases. If this is not available, you should ensure that it is at least certified.

Tabel 2 Oessekerheid by verskillende opbrengsmikpunte, 2013/14 - 2015/16
Table 2 Yield reliability at different targets, 2013/14 - 2015/16

KULTIVAR CULTIVAR	OPBRENGSMIKPUNTE (t/ha) YIELD POTENTIAL								GEM MEAN	RANG RANK	D-PARAM D-PARAM
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0			
KLEIN WIT INMAAK / SMALL WHITE CANNING											
TEEBUS-RR 1	0.38*	0.76*	1.14*	1.52	1.89	2.27	2.65	3.03	2.17	10	0.1459
SW 1	0.20*	0.69*	1.19*	1.69*	2.18*	2.68*	3.18*	3.67	2.53	1	0.2392
PAN 123	0.18*	0.52	0.86	1.21	1.55	1.89	2.23	2.58	2.03	17	0.2629
ROOI GESPIKKELD / RED SPECKLED											
KRANSKOP	0.00	0.34	0.81	1.29	1.76	2.24	2.71	3.19	1.97	20	0.1359
KRANSKOP-HR1	0.00	0.29	0.85	1.41	1.98	2.54	3.10	3.66	2.13	14	0.1392
OPS-RS4	0.10*	0.63*	1.17*	1.70*	2.23*	2.76*	3.30*	3.83*	2.28	5	0.0797
RS5	0.00	0.31	0.82	1.33	1.84	2.36	2.87	3.38	2.13	14	0.1980
RS6	0.07	0.60*	1.14*	1.67*	2.20*	2.74*	3.27*	3.81*	2.23	7	0.0720
SEDERBERG	0.01	0.54	1.07*	1.59*	2.12*	2.65*	3.18*	3.71*	2.16	11	0.0730
PAN 148	0.00	0.48	0.99	1.51	2.02	2.53	3.05	3.56	2.09	15	0.0855
PAN 9213	0.00	0.53	1.10*	1.67*	2.24*	2.82*	3.39*	3.96*	2.36	3	0.1219
PAN 9292	0.02	0.54	1.07*	1.59*	2.11*	2.63*	3.15*	3.68*	2.28	5	0.1348
DBS 310	0.00	0.35	0.87	1.40	1.92	2.45	2.97	3.50	2.05	16	0.1153
DBS 360	0.00	0.42	0.92	1.42	1.92	2.42	2.92	3.42	2.01	19	0.0884
DBS 830	0.00	0.47	1.02	1.56	2.11*	2.65*	3.20*	3.75*	2.15	12	0.0779
DBS 840	0.00	0.43	0.95	1.46	1.97	2.48	3.00	3.51	2.14	13	0.1283
WERNA	0.11*	0.58*	1.05	1.51	1.98	2.45	2.92	3.39	2.25	6	0.1729
TYGERBERG	0.00	0.52	1.09*	1.66*	2.24*	2.81*	3.38*	3.96*	2.47	2	0.1930
KAMIESBERG	0.00	0.43	0.88	1.33	1.78	2.23	2.68	3.12	2.20	8	0.2719
RUBY	0.00	0.44	0.89	1.34	1.78	2.23	2.68	3.12	2.02	18	0.1474
PAN 9216	0.11*	0.60*	1.09*	1.57	2.06	2.55	3.03	3.52	2.18	9	0.0969
RS7	0.16*	0.68*	1.20*	1.72*	2.24*	2.77*	3.29*	3.81*	2.31	4	0.0818

Waardes met (*) sterretjies aangedui binne dieselfde kolom is betekenisvol hoër as die gemiddeld
 (*) Star printed values in the same column are significantly higher than the mean

Table 3: Gemiddelde saadopbrengs (kg/ha-1) van verskillende produksiegebiede, 2015/16 en 2013-16.
Table 3: Mean seed yield (kg/ha-1) of different production regions, 2015/16 and 2013-16

Kultivars Cultivars	Westelike gebied Western region		Mpumalanga		Oos-Vrystaat Eastern Free State		KwaZulu-Natal		Limpopo		* Gemiddeld * Mean		Rangorde Rank		Saadfirma Seed Firm
	2013-16	2015/16	2013-16	2015/16	2013-16	2015/16	2013-16	2015/16	2013-16	2015/16	2013-16	2015/16	2013-16	2015/16	
Kleinwit Inmaak / Small White Canning															
Teebus-RR 1	1667	1852	1844	1650	1695	1744	1651	2096	3408	1904	2061	13	13	DBS	
SW 1	2056	2706	2227	2275	1833	1912	1889	3144	4839	2338	2724	1	1	IGG/GCI	
PAN 123	1671	1916	1788	1765	1595	1630	1516	1818	2688	1783	1903	21	20	PANNAR	
Rooi Gespikkeld / Red Speckled															
Kranskop	1614	1548	2052	1535	1517	1588	1370	1847	3344	1777	1877	22	22	DBS	
Kranskop-HR 1	1871	2660	1944	1553	1635	1594	1350	2521	4063	1987	2244	9	9	DBS	
OPS-RS 4	1957	2072	2013	1839	1517	1568	1523	2565	4548	2038	2310	6	5	DBS	
RS 5	1535	1624	1642	1339	1560	1694	1575	2361	3952	1871	2037	17	16	DBS	
RS 6	1993	2147	2068	1726	1689	1630	1526	2366	4227	2036	2251	7	8	DBS	
Sederberg	1724	1839	1940	1551	1544	1634	1435	2287	3730	1918	2038	11	15	DBS	
PAN 148	1729	2204	1960	1489	1555	1616	1486	1981	3840	1867	2127	18	12	PANNAR	
PAN 9213	2224	2942	2051	1701	1697	1522	1580	2533	4324	2148	2414	3	3	PANNAR	
PAN 9292	1929	2158	1958	1337	1638	1588	1527	2311	3623	2003	2047	8	14	PANNAR	
DBS 310	1570	1670	1992	1566	1427	1639	1431	2015	3546	1806	1970	19	18	DBS	
DBS 360	1788	2012	1909	1559	1468	1437	1286	2297	3674	1894	1994	15	17	DBS	
DBS 830	1804	1986	2004	1880	1588	1632	1468	2133	3827	1907	2159	12	11	DBS	
DBS 840	1511	1742	2019	1974	1312	1666	1518	2469	4645	1881	2309	16	6	DBS	
Weerna	1796	1773	2093	2057	1561	1453	1474	2829	5288	2083	2409	5	4	IGG/GCI	
Tygerberg	2328	2872	2414	1854	1826	1933	1575	2452	4618	2254	2570	2	2	DBS	
Kamiesberg	1946	2005	2071	1637	1663	1714	1553	2120	3985	1962	2179	10	10	IGG/GCI	
Ruby	1566	1567	1866	1617	1628	1576	1450	1962	3354	1797	1913	20	19	Mostert, J.S.C.	
PAN 9216	1597	1646	1883	1529	1465	1481	1515	2331	3260	1896	1886	14	21	PANNAR	
RS7	1930	1990	2053	1726	1510	1545	1544	2818	4558	2097	2273	4	7	IGG/GCI	

* Gemiddelde van alle proewe in Suid-Afrika / Mean of all trials in South Africa

Faktore wat kultivaraanpassing beïnvloed

- **Roes** kom meer in KwaZulu-Natal en Mpumalanga voor, veral tydens nat seisoene en by laat aanplantings. Roesvatbare kultivars moet dus in dié gebiede vermy word. Die risiko kan verminder word deur so vroeg moontlik te plant en/of goeie chemiese beheer toe te pas.
- In Tabel 4 word die invloed van **swamdoders** op die gemiddelde opbrengs, oor drie seisoene, van verskillende kultivars op bespuite en onbespuite proewe op Cedara en Greytown. Die persentasie dui die grootste moontlike opbrengsverhoging aan wat 'n produsent kan verwag as gevolg van die beheer van swamsiektes. In die geval van kultivars met roesweerstand, was die opbrengsverhogings die gevolg van die beheer van ander swamsiektes byvoorbeeld *Ascochyta* en hoekige blaarvlek (HBV). Let asseblief daarop dat die resultate van sommige kultivars baie tussen seisoene gewissel het en groot afwykings, van die gemiddeldes wat hier gegee word, kom dus voor. Hierdie syfers moet slegs beskou word as aanduidings van wat kan gebeur as toestande gunstig is vir die ontwikkeling van swamsiektes. Hoe verder wes die kultivars geplant word hoe kleiner sal die effek van swambeheer wees.
- Alle kleinsadige kultivars het weerstand teen **HBV**. Die meeste grootsadige kultivars is vatbaar maar ses (6) met weerstand was die afgelope seisoen ingesluit: PAN 9213, PAN 9292, PAN 9216, Sederberg, Tygerberg en Kamiesberg.
- Besmetting met **bakteriese siektes**, veral vetvlek en bakteriese bruinvlek, is meer algemeen wes van die Drakensberge as in KwaZulu-Natal.
- Kultivars met 'n **kort groeiseisoen en 'n bepaalde groeiwyse** het oor die algemeen 'n laer opbrengspotensiaal (veral in gebiede met koue nagte) maar is beter aangepas by hoër nagtemperatuur.
- Kies 'n kultivar wat inpas in die beskikbare **groeiseisoen**. Oor die algemeen kan 7 dae afgetrek word van die groeiseisoenlengte wat in Tabel 4 aangegee word omdat die bone dan reeds fisiologies volwasse is en nie meer deur ryp benadeel sal word nie. Hoë of lae temperatuur sal die groeiseisoen verkort of verleng en die syfers in Tabel 4 moet dus nie as absoluut beskou word nie. Kultivars kan gemiddeld 10 dae vroeër as normaal ryp word weens warm droë toestande voor oestyd. As gevolg van koel nat toestande kan hulle 10 tot 20 dae later as normaal ryp word.
- Vermy groot aanplantings van kultivars wat geneig is tot **oopspring**. Oes sulke kultivars so gou moontlik nadat hulle oesryp is. Al die kultivars wat hier bespreek word het goeie oopspringweerstand.

Factors that determine adaptation

- **Rust** is more common in KwaZulu-Natal and Mpumalanga especially on late plantings. Avoid rust susceptible cultivars in these areas. The risk can be reduced by planting as early as possible and/or by the application of effective chemical control.
- In Table 4 the effect of **fungicides** on the yield of different cultivars on sprayed and unsprayed trials is compared for three seasons at Cedara and Greytown. The percentages indicate the largest yield increase that a producer can expect as a result of the control of fungal diseases. In the case of rust resistant cultivars, the control of other fungal diseases e.g. *Ascochyta* and angular leaf spot (ALS) contributes to a yield increase. Please note that for some cultivars the results varied greatly between seasons. These figures must therefore only be taken as indications of what could happen if conditions are favourable for the development of fungal diseases. The effect of fungicide application will be less striking in productions further west.
- All small seeded cultivars are resistant to **ALS**. Most large seeded cultivars are susceptible. Six (6) resistant cultivars were included in the past season's trials, i.e.: PAN 9213, PAN 9292, PAN 9216, Sederberg, Tygerberg and Kamiesberg.
- **Bacterial diseases**, especially halo blight and bacterial brown spot, are more common west of the Drakensberg than in KwaZulu-Natal.
- Cultivars with a **short growing season as well as a determinate growth habit** generally have a lower yield potential (especially in areas with cool nights), than those with a long growing season but are better adapted to higher night temperatures.
- Decide on a cultivar that fits into the available **growing season**. Seven days can generally be deducted from the length of the growing season indicated in Table 4 as the beans are already physiologically mature at this stage and will not be harmed by frost. High or low temperatures will shorten or lengthen the growing season and the figures in Table 4 must therefore not be regarded as absolute. Under hot dry conditions before harvest time, beans will ripen on average 10 days earlier than normal. Under cool wet conditions, beans ripen 10 to 20 days later than normal.
- Avoid planting large areas with cultivars that are inclined to **shatter**. Harvest such cultivars as soon as possible after ripening. All the cultivars discussed here have good resistance to shattering.

Table 4: Algemene inligting oor droëboonkultivars 2013-2016 en 2015/16.
Table 4: General information on dry bean cultivars 2013-2016 and 2015/16

Kultivars Cultivars	Saad beskikbaar Seed available	Groeiwysse Growth habit	Groei seisoen (dae) Growing season (days) (2013-16)	Sade per 100g Seeds per 100g (2013-16)	Omvval Lodging	Opsprong Shattering	Siektes Diseases			Opbrengsverhoging (%) agv swamdoder Yield increase (%) as a result of fungicides		
							HBV ALS	Roes Rust	BCM MV	2013-16	2015/16	
Klein wit / Small white												
Teebus- RR1	Ja/Yes	I	109	393	B	B	B	B	B	B	-4	-9
SW 1	Nee/No	I	112	510	B	B	B	B	B	B	20	35
PAN 123	Ja/Yes	I	110	458	B	B	B	B	B	B		
Rooi gespikkeld / Red speckled												
Kranskop	Ja/Yes	II	111	215	MV	B	V	MB	B	B	24	34
Kranskop-HR1	Ja/Yes	II	117	234	MV	B	MB	MB	B	B	21	26
OPS-RS4	Ja/Yes	II	118	236	MV	B	MB	MB	B	B	19	28
RS5	Ja/Yes	I	113	214	B	B	V	MB	V	V	11	-1
RS6	Ja/Yes	II	115	231	MV	B	V	MB	B	B	18	23
Sederberg	Ja/Yes	II	116	216	MV	B	B	B	B	B	21	40
PAN 148	Ja/Yes	II	113	247	MV	B	V	MB	B	B	29	34
PAN 9213	Ja/Yes	II	115	220	MB	B	B	MB	B	B	6	5
PAN 9292	Ja/Yes	II	116	245	MB	B	B	B	B	B	9	13
DBS 310	Ja/Yes	II	117	231	MV	B	V	MV	B	B	16	26
DBS 360	Ja/Yes	II	117	251	MV	B	V	MV	B	B	26	40
DBS 830	Ja/Yes	II	117	225	MV	B	V	B	B	B	22	25
DBS 840	Nee/No	II	113	229	MV	B	V	V	B	B	22	12
Werna	Nee/No	II	116	240	MV	B	V	MV	B	B	14	28
Tygerberg	Ja/Yes	II	118	202	MV	B	B	B	B	B	17	26
Karniesberg	Nee/No	II	121	206	MV	B	B	B	B	B	26	15
Ruby	Nee/No	II	114	320	MV	B	V	MB	B	B	27	48
PAN 9216	Ja/Yes	II	109	201	MV	B	B	B	B	B	12	12
RS 7	Nee/No	II	119	246	MV	B	MB	MB	B	B	15	18

Type/Type I Bepaalde groeiwysse: Blomme aan punt van takke beeindig stamverlenging / Determinate growth habit: Flowers at end of branches top stem growth
Type/Type II Onbepaalde groeiwysse: Min kort en regopgroeiende sytakke, groei nog na blom / Indeterminate growth habit: Few short and upright branches, grow after flowering
Type/Type III Onbepaalde groeiwysse: Baie lang en plat - rankende sytakke / Indeterminate growth habit: Very long and low trailing branches
V Vatbaar / Susceptible: chemiese beheer noodsaaklik / chemical control necessary
MV Matig vatbaar / Moderately susceptible: chemiese beheer gewoonlik nodig / chemical control normally needed

MB Matige weerstand / Moderately resistant: chemiese beheer nie nodig nie / no chemical control needed
B Goeie weerstand / Good resistance: geen chemiese beheer nodig / no chemical control needed
BCM Boontjie Mosaiek Virus / Bean Common Mosaic Virus
HBV / ALS Hoekige blaarvlak / Angular leaf spot

Kleinwit Inmaakbone

Daar is 'n goeie mark vir inmaakbone. Slegs kultivars wat deur die inmakers aanvaar word, behoort aangeplant te word aangesien die mark vir klein wit verpakkingsbone beperk is.

- **Teebus-RR1** het die tweede hoogste gemiddelde opbrengs (oor drie seisoene) gehad. Dit kom baie ooreen met Teebus maar het goeie roesweerstand en is wyd aangepas. Die inmaakwaliteit is goed en is aanvaarbaar vir die inmakers. Saad is beskikbaar.
- **PAN 123** het 'n hoë gemiddelde opbrengs oor drie seisoene gehad en het goeie roesweerstand. Die inmaakwaliteit is goed en is aanvaarbaar vir die inmakers. Saad is beskikbaar.
- **SW 1** het die hoogste gemiddelde opbrengs tydens die 2015/16 seisoen, sowel as oor 'n drie jaar tydperk, gehad. Dit is 'n nuwe kultivar en ondergaan nog fabriekstoetse. Geen saad is beskikbaar nie.

Rooi Gespikkelde bone

Daar is 'n groot aanvraag vir Rooi Gespikkelde bone en goeie pryse word behaal, maar die mark kan diskrimineer teen kultivars met klein sade of 'n donker agtergrondkleur.

- **Kultivars waarvan daar saad beskikbaar is:** lang seisoen kultivars hoë gemiddelde opbrengs en oessekerheid, sowel as goeie saadkwaliteit en siekteweerstand is **Tygerberg, PAN 9213, PAN 9292, RS 5, RS 6, PAN 9216, Sederberg, OPS-RS 4, KRANSKOP-HR 1, PAN 148, DBS 310, DBS 360 en Kranskop**. Opbrengsverskille binne die groep kan so hoog as 0.50 t ha⁻¹ wees **Ruby** het die kleinste sade in hierdie groep en **PAN 9216, Tygerberg** en **Kamiesberg** die grootste. **RS5** het 'n baie goeie staanvermoë.
- **Kultivars waarvan daar nie saad hierdie seisoen beskikbaar is nie:** **RS 7, Werna, Kamiesberg, DBS 830, DBS 840 en Ruby**.
- **Kranskop** het 'n laer opbrengspotensiaal as meeste van die langseisoenkultivars. Dit was ook as kontrole gebruik.

Lappiesbone

Daar was geen lappiesbone tydens die 2015/16 seisoen geëvalueer nie. Lappiesbone word hoofsaaklik in die Wes-Kaap onder besproeiing verbou vanweë sy siektevatbaarheid en kwaliteitsvereistes. Die mark daarvoor is baie beperk.

Small White Canning beans

There is a good market for canning beans. Only cultivars that are acceptable to the canners should be planted as the market for pre-packed small white beans is limited.

- **Teebus-RR1** had the second highest mean yield (over three seasons). It is similar to Teebus except that it is resistant to rust and is widely adapted. It has good canning quality that is acceptable to the canners. Seed is available.
- **PAN 123** had a high mean yield over three seasons and good disease resistance. It has good canning quality and has been approved for commercial scale canning. Seed is available.
- **SW 1** had the highest mean yield of the small white canning beans during the 2015/16 season as well as over a three year period. This is a new cultivar and is undergoing canning tests. No seed is available.

Red Speckled beans

There is a good market for red-speckled beans and high prices can be obtained, but the market can discriminate against cultivars with small seeds or a dark background colour.

- **Cultivars of which seed is available:** Long season cultivars with high mean yield, and yield reliability as well as good seed quality and disease resistance are: **Tygerberg, PAN 9213, PAN 9292, RS 5, RS 6, PAN 9216, Sederberg, OPS-RS 4, KRANSKOP-HR 1, PAN 148, DBS 310, DBS 360 and Kranskop**. Yield differences in this group can be as high as 0.50 t ha⁻¹. **Ruby** has the smallest seeds of the red speckled sugar beans and **PAN 9216, Tygerberg** and **Kamiesberg** the largest. **RS5** has good lodging resistance.
- **Cultivars of which no seed is available:** **RS 7, Werna, Kamiesberg, DBS 830, DBS 840 and Ruby**.
- **Kranskop** has a lower yield potential than most of the long season cultivars and was used as the standard.

Painted Lady

No cultivar of this seed type was evaluated during the 2015/16 season. Painted Lady cultivars are mainly produced in the Western Cape under irrigation because of its disease susceptibility and quality requirements. The market is very limited.

Ander saadtipes

Carioca bone

Die mark vir Carioca bone is baie beperk en produsente moet seker maak van 'n afset alvorens hulle dit plant. Geen Carioca kultivars is die afgelope seisoen in die kultivar proewe ingesluit nie. **Mkuzi** en **CAR 2008** (nie in proewe) het hoë opbrengste en oessekerheid, is wyd aangepas en het goeie siekte weerstand. Saad is egter nie beskikbaar nie.

Grootwit Nierbone

Daar is 'n beperkte plaaslike mark vir Groot Wit Nierbone. Dit behaal hoë pryse in seisoene wanneer oorproduksie nie voorkom nie.

- **SSN 1** (nie in proewe) is die enigste kultivar in hierdie saadtipe. Bye is nodig vir bestuiwing. Nierbone is baie gevoelig vir hoë temperature gedurende die blomperiode en dit word daarom slegs aanbeveel vir koel hoë reënvalgebiede waar dit hoë opbrengste gee. Weens sy hoë siekteweerstand is nierbone in hierdie gebiede beter aangepas as byvoorbeeld rooi gespikkelde bone. Geen gesertifiseerde saad is beskikbaar nie. Die mark vir nierbone is baie beperk.

Verdere inligting

'n Nuttige bron van verdere inligting is die **Droëbone Produksiehandleiding** wat op bestelling verkrygbaar is vanaf die DPO of LNR-IGG.

Hierdie publikasie is ook beskikbaar op:

<http://www.arc.agric.za/home.asp?pid=370&toolid=63&sec=1231>

Saad kan by saadhandelaars of direk by die leweransiers bestel word. Indien u probleme ondervind met u bestelling kontak die volgende:

Dry Bean Seed (Pty) Ltd., Posbus 15587, Lynn East, 0039.
Tel. 082 388 0510

PANNAR, Posbus 19, Greytown, 3250. Tel. (033) 413 9500,
Faks. (033) 413 2618.

Other seed types

Carioca beans

The market for Carioca beans is limited and producers must assure themselves of a market before planting these cultivars. **Mkuzi** and **CAR 2008** (not included in trials) are widely adapted and have high levels of resistance to nearly all diseases. However, no seed are available.

Large White Kidney beans

There is a limited local market for Large White Kidney beans. They fetch high prices in seasons when over-production does not occur.

- **SSN 1** (not included in the trials) is the only cultivar in this seed type. Kidney beans are sensitive to high temperatures during the flowering period. Bees are necessary for pollination. They are only recommended for the cool high rainfall areas where high yields can be obtained. Because of their disease resistance, kidney beans are better adapted in these areas than, for instance, red speckled beans. No certified seed is available.

Further information

A handy source of information is the **Dry Bean Production Manual** that can be ordered from the DPO or ARC-GCI.

This publication is also available on:

<http://www.arc.agric.za/home.asp?pid=370&toolid=63&sec=1231>

Seed can be ordered from seed dealers or directly from the suppliers. If you encounter problems with your order, please contact the following:

Dry Bean Seed (Pty) Ltd, P.O. Box 15587, Lynn East, 0039.
Tel. 082 388 0510

PANNAR, PO Box 19, Greytown, 3250. Tel. (033) 413 9500,
Fax. (033) 413 2618.

Verslag oor die droëbone strookproewe Report on the dry bean strip trials

September 2016

D Fourie LNR-Instituut vir Graangewasse / ARC-Grain Crops Institute

Inleiding/Introduction

Sedert die 2006/07 seisoen word droëboonstrookproewe beplan en uitgevoer as 'n gesamentlike projek tussen die Droëbone Producentse Organisasie (DPO), die saadmaatskappy PANNAR en die LNR-Instituut vir Graangewasse (LNR-IGG) met die volgende doelwitte:

- Evaluering van die verskillende kommersieel beskikbare droëboonkultivars op 'n skaal wat produsente in staat sal stel om dit te vergelyk met hulle eie toestande
- Vergelyking van die aanpassing en opbrengspotensiaal van kultivars op 'n groter skaal as in die nasionale droëbone kultivarproewe.
- Evaluering van akkerboukundige eienskappe soos weerstand teen omval, oopspring en geskiktheid vir meganiese oes.
- Gebruik deursaadmaatskappye vir bemarkingsdoeleindes tydens inligtingsdae en besoeke deur produsente en verteenwoordigers.

Metodes/Methods

One 25kg bag of certified seed per cultivar was supplied for each trial and planted under the production practices of the producer in strips of three, four or eight rows. Each trial consisted of 12 red speckled cultivars, with a control strip at the start and finish, as well as after every four cultivars. Only one cultivar was used as control within each trial, but different controls were used in the different production regions (see Tables 1 - 4). The trials were planted and harvested at the same time as the commercial beans and a representative of a seed company supervised both activities. During the growing season producers and representatives visited the trials. Information days were held at some of the trials.

Die proefresultate is statisties ontleed en die opbrengs is bereken. Die opbrengs (t ha⁻¹) en die opbrengs as persentasie van die kontrole asook hulle rangordes is bereken vir elke proef en produksiegebied. Die variasie tussen die kontrolestroke is gebruik om die uniformiteit (koëffisient van variasie(CV)) van 'n proef te bereken. Wanneer die CV te hoog was (groter as 15%) is die resultate as onbetroubaar beskou en is nie gebruik in die berekening van die gemiddeldes van 'n produksiegebied nie. Vir elke gebied is die gemiddelde opbrengs van die kultivars ook vergelyk met dié in die kultivarproewe. Wanneer die rangordes van 'n kultivar in die twee stalle proewe met drie of minder verskil het is dit beskou as 'n goeie ooreenkoms.

RESULTATE / RESULTS

Eleven (11) red speckled sugar (RSS) bean trials were planted in four provinces (Free State (4), Mpumalanga (2), Northwest (3) and Limpopo Province (2)) during the 2015/16 season. No strip trials were planted in KwaZulu-Natal. The data of eight (8) trials was reliable (CV<15%) to use in the report. PAN 9249 and DBS 310 that was included in the 2014/15 trials were omitted and replaced by Tygerberg and KRANSKOP-HR 1 during the 2015/16 season. Yields of the different sites varied mainly as a result of the difference in rainfall/irrigation and soil type. The yields are expressed in t ha⁻¹ and as a percentage of the control. The ranks of the yield in t ha⁻¹ and percentage of the control differed slightly in a few instances.

Wanneer die gemiddelde opbrengs van die strook- en kultivarproewe van die gespikkelde suikerbone vergelyk word sien ons die volgende verskille en ooreenkomste: Comparing the means of the strip and cultivar trials of the red speckled sugar beans we observe the following:

Oos Vrystaat / Eastern Free State (Tabelle 1, 5 en 6)

- Die resultate van twee (2) proewe was betroubaar om te gebruik.
- Die gemiddelde opbrengs van die strookproewe was 25% (0.53 t ha⁻¹) hoër as dié van die kultivarproewe.
- Cultivars met die hoogste opbrengste in die strookproewe tydens die 2015/16 seisoen was: PAN 9213, PAN 148, Sederberg, PAN 9216 en OPS-RS 4. Die rangordes van PAN 148, Sederberg, OPS-RS 4 en DBS 360 in die strook- en kultivarproewe het goed vergelyk.
- Die opbrengste van meeste van die kultivars in die 2015/16 strookproewe het baie goed gekorreleer met opbrengste oor die drie jaar tydperk (2013-2016). Al die kultivars, behalwe PAN 148, RS 5 en PAN 9216, het ook goeie ooreenkomste getoon tussen die strook- en kultivarproewe oor 'n drie jaar tydperk.

Mpumalanga (Tabelle 2, 5 en 6)

- Twee (2) proewe is gebruik in die berekeninge.
- Die gemiddelde opbrengs van die strookproewe was 13% (0.24 t ha⁻¹) hoër as dié van die kultivarproef.

- c) PAN 9213 het die hoogste opbrengs in die strookproewe (2015/16) gelewer gevolg deur PAN 148, RS 6, PAN 9216, PAN 9292 en Sederberg. Rangordes van RS 5, Sederberg en RS 6 het goed gekorreleer met dié verkry in die kultivarproewe.
- d) Oor die langtermyn (2014-2016) het PAN 9216, PAN 148, PAN 9213, Sederberg, RS 6 en RS 5 goed presteer in die strookproewe. Die rangordes van al die kultivars, behalwe PAN 9292, OPS-RS 4, RS 6 en PAN 9216 het goeie ooreenkomste met die kultivarproewe oor dieselfde tydperk getoon.

Noordwes / North West (Tables 3, 5 and 6)

- a) The data of two (2) trials was used in the report.
- b) The mean yield of the strip trials was higher (16%, 0.41 t ha⁻¹) than that of the cultivar trials
- c) PAN 9213 had the highest mean yield in the strip trials followed by DBS 360, Tygerberg, Sederberg, KRANSKOP-HR 1 and RS 6. The yield of all the cultivars, except PAN 148, PAN 9292, Sederberg, DBS 360 and PAN 9216 correlated well with yields obtained in the cultivar trials.
- d) PAN 9213 was the highest yielding cultivar in the strip trials over a three-year period followed by PAN 9292, Sederberg, DBS 360, RS 6 and PAN 9216. The rankings of all the cultivars, except PAN 9292 and PAN 9216, also correlated well with the ranking in the cultivar trails over the same period.

Limpopo (Tables 4, 5 and 6)

- a) The data of two (2) trials was used for the report.
- b) The mean of the strip trials was 20% (0.80 t ha⁻¹) lower than that of the cultivar trials.
- c) RS 6 had the highest mean yield in the strip trials during 2015/16 followed by PAN 9216, PAN 9231, OPS-RS 4, PAN 148 and PAN 9292. Ranking orders of PAN 148, Sederberg, OPS-RS 4, DBS 360, PAN 9213 and DBS 830 correlated well between the strip- and cultivar trials.
- d) OPS-RS 4 was the highest yielding cultivar over the past three seasons (2013-2016) followed by PAN 148, RS 5, PAN 9216 and RS 6. The rankings of all the cultivars, except PAN 148, PAN 9213 and PAN 9216, also correlated well with the ranking in the cultivar trails over the same period.

Die waarde van die inligting/The value of the information

Die strookproef data kan gebruik te word as 'n aanduiding van die opbrengspotensiaal van die kultivars. Die groter oppervlakte wat geplant word en die meganisasie van die plant, oes en dors prosesse is vergelykbaar met normale boerderypraktyke. Die kultivarproefdata daarteen, behoort gebruik te word om die relatiewe prestasies van al die beskikbare kultivars met mekaar te vergelyk. Dit is meer betroubaar want dit is die resultaat van 'n groter aantal proewe en onbetroubares word makliker geïdentifiseer en uitgeskakel.

Table 1. Yield of dry bean cultivars in the strip trials in the eastern Free State with PAN 148 as control

CULTIVAR		STRIP TRIALS 2015/2016										NATIONAL CULTIVAR TRIALS	
		Bok van Zyl Balmoral, Bethlehem		Jan Scheepers Fouriesburg		Mean Yield of Trials						2015/2016	
No	Name	Mean Yield (t ha ⁻¹)	% Control	Mean Yield (t ha ⁻¹)	% Control	Mean Yield (t ha ⁻¹)	Rank	% Control	Rank	Mean Yield (t ha ⁻¹)	Rank	Mean Yield (t ha ⁻¹)	Rank
1	PAN 148	1.97	109	2.69	96	2.33	3	103	2	1.61	4	1.61	4
2	PAN 9292	1.48	81	2.70	96	2.09	10	89	8	1.59	5	1.59	5
3	RS5	1.48	82	2.36	84	1.92	11	83	10	1.69	2	1.69	2
4	Sederberg	1.74	96	2.74	98	2.24	4	97	4	1.63	3	1.63	3
5	OPS-RS 4	1.94	107	2.49	89	2.22	6	98	3	1.57	7	1.57	7
6	RS6	1.58	87	2.25	80	1.92	11	84	9	1.63	3	1.63	3
7	DBS 360	1.52	84	-	-	1.52	12	84	9	1.44	10	1.44	10
8	PAN 9213	2.01	111	2.68	96	2.35	2	104	1	1.52	8	1.52	8
9	KRANSKOP-HR 1	1.72	95	2.60	93	2.16	8	94	6	1.59	5	1.59	5
10	PAN 9216	1.83	101	2.62	94	2.23	5	98	3	1.48	9	1.48	9
11	DBS 830	1.76	97	2.57	92	2.17	7	95	5	1.63	3	1.63	3
12	Tygerberg	1.73	96	2.54	91	2.14	9	94	6	1.93	1	1.93	1
13	Ruby	-	-	2.54	91	2.54	1	91	7	1.58	6	1.58	6
Trial Mean		1.73		2.56		2.14		93		1.61		1.61	
Mean of control		1.81		2.80									
CV (%)		7.38		11.30									
Planting date		05/01/2016		22/12/2015									
Harvest date		29/04/2016		18/04/2016									

Table 2. Yield of dry bean cultivars in the strip trials in Mpumalanga with Kranskop as control

CULTIVAR		STRIP TRIALS 2015/2016										NATIONAL CULTIVAR TRIALS	
		Braam Roos Wonderfontein, Carolina		Louis Botha Rietspruit, Heidelberg		Mean Yield of Trials						2015/2016	
No	Name	Mean Yield (t ha ⁻¹)	% Control	Mean Yield (t ha ⁻¹)	% Control	Mean Yield (t ha ⁻¹)	Rank	% Control	Rank	Mean Yield (t ha ⁻¹)	Rank	Mean Yield (t ha ⁻¹)	Rank
1	PAN 148	2.09	105	2.16	162	2.13	2	134	2	1.49	9	1.49	9
2	PAN 9292	1.80	90	1.87	140	1.84	6	115	5	1.34	10	1.34	10
3	RS5	1.79	90	1.42	106	1.61	11	98	9	1.34	10	1.34	10
4	Sederberg	1.78	90	1.87	140	1.83	7	115	5	1.55	7	1.55	7
5	OPS-RS 4	2.03	102	1.35	101	1.69	9	102	7	1.84	3	1.84	3
6	RS6	2.25	113	1.73	130	1.99	3	122	3	1.73	4	1.73	4
7	DBS 360	1.72	87	1.47	110	1.60	12	99	8	1.56	6	1.56	6
8	PAN 9213	2.20	111	2.24	168	2.22	1	140	1	1.70	5	1.70	5
9	KRANSKOP-HR 1	1.92	97	1.42	107	1.67	10	102	7	1.55	7	1.55	7
10	PAN 9216	2.04	103	1.85	139	1.95	4	121	4	1.53	8	1.53	8
11	DBS 830	1.86	94	1.97	148	1.92	5	121	4	1.88	1	1.88	1
12	Tygerberg	2.04	103	1.58	119	1.81	8	111	6	1.85	2	1.85	2
Trial Mean		1.96		1.74		1.85		115		1.61		1.61	
Mean of control		1.99		1.33									
CV (%)		5.94		0.63									
Planting date		23/11/2015		15/12/2015									
Harvest date		05/04/2016		08/04/2016									

Table 3. Yield of dry bean cultivars in the strip trials in North West Province with Kranskop as control

CULTIVAR		STRIP TRIALS 2015/2016										NATIONAL CULTIVAR TRIALS	
		Gielie van Niekerk Brazen Sun, Brits		Kobus du Preez Grootpan		Mean Yield of Trials						2015/2016	
No	Name	Mean Yield (t ha ⁻¹)	% Control	Mean Yield (t ha ⁻¹)	% Control	Mean Yield (t ha ⁻¹)	Rank	% Control	Rank	Mean Yield (t ha ⁻¹)	Rank	Mean Yield (t ha ⁻¹)	Rank
1	PAN 148	1.83	82	-	-	1.83	12	82	10	2.20	4	2.20	4
2	PAN 9292	1.72	77	3.10	86	2.41	8	82	10	2.16	5	2.16	5
3	RS5	1.44	65	2.69	74	2.07	10	70	11	1.62	12	1.62	12
4	Sederberg	1.93	87	3.85	106	2.89	4	97	5	1.84	10	1.84	10
5	OPS-RS 4	2.26	102	-	-	2.26	9	102	4	2.07	7	2.07	7
6	RS6	2.09	94	3.01	83	2.55	6	89	8	2.15	6	2.15	6
7	DBS 360	2.56	115	4.07	112	3.32	2	114	2	2.01	8	2.01	8
8	PAN 9213	2.28	102	4.60	127	3.44	1	115	1	2.94	1	2.94	1
9	KRANSKOP-HR 1	1.86	84	3.62	100	2.74	5	92	7	2.66	3	2.66	3
10	PAN 9216	1.94	88	3.13	87	2.54	7	88	9	1.65	11	1.65	11
11	DBS 830	2.06	93	-	-	2.06	11	93	6	1.99	9	1.99	9
12	Tygerberg	2.27	102	3.79	105	3.03	3	104	3	2.87	2	2.87	2
Trial Mean		2.02		3.54		2.59		94		2.18		2.18	
Mean of control		2.22		3.62									
CV (%)		3.34		4.22									
Planting date		04/02/2016		15/12/2015									
Harvest date		08/06/2016		03/05/2016									

Table 4. Yield of dry bean cultivars in the strip trials in Limpopo with Kranskop as control

CULTIVAR		STRIP TRIALS 2015/2016										NATIONAL CULTIVAR TRIALS	
		Kudu Botha Bela-Bela		Hannes Schutte Sudami, Groblersdal		Mean Yield of Trials						2015/2016	
No	Name	Mean Yield (t ha ⁻¹)	% Control	Mean Yield (t ha ⁻¹)	% Control	Mean Yield (t ha ⁻¹)	Rank	% Control	Rank	Mean Yield (t ha ⁻¹)	Rank	Mean Yield (t ha ⁻¹)	Rank
1	PAN 148	3.29	86	3.22	112	3.26	5	99	4	3.84	7	3.84	7
2	PAN 9292	3.52	92	2.97	103	3.25	6	98	5	3.62	11	3.62	11
3	RS5	2.42	64	3.14	109	2.78	12	87	10	3.95	6	3.95	6
4	Sederberg	3.22	85	3.08	107	3.15	7	96	6	3.73	9	3.73	9
5	OPS-RS 4	3.58	94	3.08	107	3.33	4	101	3	4.55	2	4.55	2
6	RS6	3.79	99	3.06	106	3.43	1	103	2	4.23	4	4.23	4
7	DBS 360	2.89	76	3.05	106	2.97	10	91	8	3.67	10	3.67	10
8	PAN 9213	3.67	96	3.04	105	3.36	3	101	3	4.32	3	4.32	3
9	KRANSKOP-HR 1	2.97	78	2.90	101	2.94	11	90	9	4.06	5	4.06	5
10	PAN 9216	3.33	87	3.48	121	3.41	2	104	1	3.26	12	3.26	12
11	DBS 830	3.48	91	2.60	90	3.04	9	91	8	3.83	8	3.83	8
12	Tygerberg	3.54	93	2.68	93	3.11	8	93	7	4.62	1	4.62	1
Trial Mean		3.31		3.02		3.17		96		3.97		3.97	
Mean of control		3.81		2.89									
CV (%)		3.65		5.16									
Planting date		27/01/2016		26/02/2016									
Harvest date		23/05/2016		29/06/2016									

Table 5. Mean seed yield (t·ha⁻¹) of strip trials conducted in different production areas during 2013/14 – 2015/16 and 2015/16

Cultivar Name	Eastern Free State			Mpumalanga			Northwest			Limpopo			National Mean					
	2013/14-2015/16	Rank	Mean t ha ⁻¹	2013/14-2015/16	Rank	Mean t ha ⁻¹	2013/14-2015/16	Rank	Mean t ha ⁻¹	2013/14-2015/16	Rank	Mean t ha ⁻¹	2013/14-2015/16	Rank	Mean t ha ⁻¹			
PAN 148	2.39	1	2.33	2	2.13	2	2.57	7	1.83	9	3.38	2	3.26	5	2.63	2	2.39	5
PAN 9292	2.20	3	2.09	6	1.84	5	2.79	2	2.41	6	3.04	7	3.25	6	2.49	6	2.40	4
RS5	2.03	7	1.92	7	1.61	8	2.53	8	2.07	8	3.30	3	2.78	9	2.45	7	2.10	8
Sederberg	2.16	5	2.24	3	1.83	6	2.79	2	2.89	3	3.04	7	3.15	7	2.54	4	2.53	2
OPS-RS 4	2.12	6	2.22	5	1.69	7	2.59	6	2.26	7	3.55	1	3.33	4	2.54	4	2.38	6
RS6	2.19	4	1.92	7	1.99	3	2.74	4	2.55	4	3.11	5	3.43	1	2.53	5	2.47	3
DBS 360	1.97	8	1.52	8	1.60	9	2.78	3	3.32	2	3.05	6	2.97	8	2.43	8	2.35	7
PAN 9213	2.37	2	2.35	1	2.22	1	3.26	1	3.44	1	3.03	8	3.36	3	2.71	1	2.84	1
PAN 9216	2.19	4	2.23	4	1.95	4	2.70	5	2.54	5	3.16	4	3.41	2	2.58	3	2.53	2
Trial Mean	2.18		2.09	2.06	1.87	2.06	2.75	2.75	2.59	3.18	3.18	3.22	3.18	2.54	2.44			

Table 6. Mean yields of three seasons' strip trials (2013/14 – 2015/16) compared with that of the cultivar trials over the same period

Cultivar Name	Eastern Free State			Mpumalanga			Northwest			Limpopo				
	Mean t ha ⁻¹	Rank	Strip Trials	Mean t ha ⁻¹	Rank	Strip Trials	Mean t ha ⁻¹	Rank	Strip Trials	Mean t ha ⁻¹	Rank	Strip Trials		
PAN 148	2.39	1	1.55	2	1.96	4	2.57	7	1.73	7	3.38	2	1.98	8
PAN 9292	2.20	3	1.64	8	1.96	4	2.79	2	1.93	5	3.04	7	2.31	5
RS5	2.03	7	1.56	6	1.64	8	2.53	8	1.54	9	3.30	3	2.33	4
Sederberg	2.16	5	1.54	4	1.94	5	2.79	2	1.72	8	3.04	7	2.29	7
OPS-RS 4	2.12	6	1.52	9	2.02	3	2.59	6	1.96	4	3.55	1	2.56	1
RS6	2.19	4	1.69	5	2.07	1	2.74	4	2.00	3	3.11	5	2.37	3
DBS 360	1.97	8	1.47	7	1.91	6	2.78	3	1.79	6	3.05	6	2.30	6
PAN 9213	2.37	2	1.70	3	2.05	2	3.26	1	2.22	1	3.03	8	2.53	2
PAN 9216	2.19	4	1.47	1	1.88	7	2.70	5	2.01	2	3.16	4	2.29	7
Trial Mean	2.18	1.57		2.06	1.94	2.75	1.88	3.18	2.33	3.18	2.33	2.33	2.33	2.33

