

SOJABOON KULTIVARAANBEVELINGS VIR 2008/2009

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Hoewel sojabone 'n gewas is wat bykans wêreldwyd verbou word, het individuele kultivars 'n beperkte gebiedsaanpassing. Gevolglik sal die kultivar wat die beste aangepas is vir 'n gegewe lokaliteit, dié een wees wat oor 'n aantal jare die hoogste opbrengs en saadkwaliteit lewer vir dié spesifieke plaas. Onder vergelykbare omgewings-toestande en produksiepraktyke kan 'n seleksie uit kultivars gemaak word wat 'n hoë opbrengs en 'n meer akkurate oesekerheids-waarde het. Die Nasionale Sojaboonkultivarproewe van die LNR-Instituut vir Graangewasse lewer in die opsig waardevolle inligting ten opsigte van verskillende produksie areas in Suid-Afrika.

BELANGRIKE INLIGTING VIR KULTIVARKEUSE

Die belangrikste inligting wat in ag geneem moet word ten opsigte van kultivarkeuse by sojabone, is **lengte van groeiseisoen**. Anders as by die meeste algemeen verboude gewasse, is sojabone gevoelig vir daglengte (fotoperiode) en sal 'n gegewe kultivar al hoe later ryp word hoe verder suid dit in Suider Afrika geplant word. Vir dieselfde rede sal plantdatum ook die lengte van die groeiseisoen beïnvloed en sal 'n gegewe kultivar heelwat gouer blom by 'n later plantdatum. Heersende temperatuur (veral nagtemperatuur) het ook 'n invloed en sojabone groei heelwat stadiger op die hoëveld, vergeleke met die

SOYBEAN CULTIVAR RECOMMENDATIONS FOR 2008/2009

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Although soybeans as a crop is grown worldwide, individual cultivars or genotypes demonstrate a limited adaptation to specific geographical areas due to it's sensitivity to photoperiod as affected by latitude and planting date. The best adapted cultivar is therefore the one that will, in the long term, give the best yield and quality for a specific locality within a specific geographical area. A selection can be made for cultivars with high yield and optimal yield reliability under comparable environmental conditions as well as production practises. The National Soybean Cultivar Trials conducted by the ARC-Grain Crops Institute render a valuable service in identifying such cultivars for different production areas in South Africa.

IMPORTANT CHARACTERISTICS FOR CULTIVAR CHOICE

The **length of the growing season** is the most important characteristic to take into consideration in terms of cultivar choice for soybean. Unlike the other most commonly cultivated crops, soybean are sensitive to day length (photo period) and a given cultivar will ripen later and result in a longer growing season cultivar the further south it is planted in Southern Africa. Planting dates will therefore also influence the length of the growing season and a given cultivar will flower much earlier should it be planted at a later planting

warmer laeveld. Tabel 1 illustreer die invloed wat die lengte van groeiseisoene het ten opsigte van die verskillende kultivars asook vir 'n spesifieke kultivar in verskillende produksiegebiede. Dit is belangrik om te onthou dat vroeë en later plantdatums binne dieselfde gebied ook die groeiseisoenlengte van 'n kultivar beïnvloed.

Vir produsente met ondervinding van sojaboonproduksie kan die gevoeligheid vir daglengte en die genetiese variasie vir relatiewe groeiseisoenlengte, met vrug gebruik word vir byvoorbeeld hooiproduksie (gebruik van lang groeiseisoen kultivars), stroopskedulering (plant kultivars met verskillende rypword datums) en vir droogteontwyking of noodaanplantings (kultivars met 'n relatief kort groeiseisoen). Vir produsente wat nie ondervinding het van sojaboonproduksie nie, kan dié eienskap ook by wyse van verkeerde kultivarkeuse tot gevolg hê dat die sojabone, a) nie wil ryp word nie waar 'n kultivar met 'n te lang groeiseisoen in 'n tipiese kort-groeier gebied aangeplant is, b) reeds oesgereed is terwyl reën en hoë temperature stroop bemoeilik en kwaliteit benadeel waar 'n kultivar met 'n te kort groeiseisoen vir 'n gebied gekies is en c) onstroopbaar is as gevolg van 'n te lae peulhoogte.

Prosedure vir kultivarkeuse op grond van groeiseisoenlengte is dan as volg: Die lokaliteite waar sojaboonkultivarproewe uitgevoer is, is groepeer om warm-, matig- en koel gebiede aan te dui (Tabel 2). Dit is belangrik dat u moet bepaal of die gebied waar u sojabone produseer, 'n klimaat soortgelyk aan die warm, matig of koel groe-

date. Prevailing temperature also has an affect, with soybean growing much slower on the Highveld compared to the warmer Lowveld. Table 1 illustrates the substantial variation for length of growing season among cultivars as well as for the different production areas.

Producers well experienced in soybean cultivation can utilize the photo period sensitivity of soybeans, along with the genetic variation for relative length of the growing season with great success, for example, for hay production (a long growing season cultivar can be used), for scheduling of harvest (plant cultivars with different ripening dates) and for drought avoidance or emergency planting (use relatively short growing season cultivars). For producers with little or no experience in soybean cultivation, this characteristic could prove to be hazardous when the wrong cultivar choice is made and optimal yield is not realised because a) the cultivar does not ripen (a too long grower has been planted for the area), b) is ready for harvesting while rain and high temperatures hamper harvesting and adversely affect quality (a too short grower has been planted for the area), and c) the cultivar is unable to be harvested because of a too low pod height (possibly a good cultivar, but planted too far to the north).

Cultivar choice using length of growing season – Localities where soybean trials were conducted during the past season were divided into warm-, moderate- and cool production areas (Table 2). It is important for a soybean producer to determine whether the area that

pering van lokaliteite het. As algemene reël word aanvaar dat kultivars met 'n langer groeiseisoen die beste sal doen in gebiede met 'n warmer klimaat, medium groeiseisoen kultivars in gebiede met 'n gematigde klimaat en korter groeiseisoen kultivars in gebiede met 'n koeler klimaat. Dit is egter belangrik om te onthou dat daar ook uitsonderings op die reël is en daarom word aanbeveel dat sowel opbrengs en aanpassingsvermoë van kultivars soos aangedui in Tabele 4 & 5, 7 & 8 en 10 & 11 saam met groeiseisoenlengte gebruik sal word om 'n meer akkurate kultivarkeuse te maak.

Plantdatum beïnvloed sojabone se aanpassing en gevolglik kultivarkeuse. Die optimale plantdatum is normaalweg tydens November. In warmer gebiede kan produsente egter tot die eerste week in Januarie nog plant, maar dan word nouer rywydte, hoër plantpopulasie en 'n vinniger-groeiende kultivar aanbeveel. Waar grond- en lugtemperatuur aanvaarbare vlakke vroeg in die seisoen bereik, word 'n Oktober plantdatum, veral op die hoërliggende gebiede aanbeveel. Dit is belangrik om te onthou dat 'n vroeër of 'n later plantdatum in al die produksiegebiede kultivarkeuse kan beïnvloed.

Peul- en planthoogte beïnvloed die stroopbaarheid en die staanvermoë van 'n sojabone en is faktore wat in ag geneem moet word by kultivarkeuse. Oor die algemeen is daar 'n verband tussen peul- en planthoogte en relatiewe lengte van die groeiseisoen. Relatief kort groeiseisoenkultivars het gewoonlik 'n laer peul- en planthoogte as langgroeiseisoenkultivars onder vergelykbare toestan-

will be used for soybean production is similar to the grouping of localities indicated by the warm-, moderate- and cool production areas in Table 2. It is generally accepted that cultivars with a longer growing season will perform better in the warmer growing areas, cultivars with a medium growing season in the moderate growing areas and cultivars with a shorter growing season in the cooler production areas. There are however exceptions to the rule and it is therefore recommended to also use yield performance and cultivar adaptation presented in Tables 4 & 5, 7 & 8 and 10 & 11 in combination with length of growing season during cultivar selection for a specific area.

Planting date influences the adaptation of soybean cultivars and therefore also cultivar choice. The optimum planting date is usually during November. In warmer areas though, soybean can be planted until the first week of January. With later planting dates narrow rows, higher plant populations and shorter growing seasons are recommended. A planting date during October, especially in areas with a higher altitude, will be recommended where soil and air temperatures reach acceptable levels early in the growing season. Planting at an earlier or later planting date will affect cultivar choice.

Pod- and plant height have an impact on the ability to harvest the crop, and are characteristics that should be taken into account during deciding on what cultivar to plant. A relationship exists between pod- and plant height and relative length of the growing season. Cultivars with a shorter growing season tend

de. Beide eienskappe word egter ook deur produksiepraktyke beïnvloed. 'n Nouer tussenry- en binnery spasiëring sal peulhoogte betekenisvol verhoog. In die Nasionale Kultivarproewe word onder gestandaardiseerde toestande vir peulhoogte geëvalueer en kan kultivars met aanvaarbare peulhoogtes gekies word. Peulhoogte word aangedui in Tabel 3.

Staanvermoë kan beïnvloed word deur die aantal bewolkte dae wat tydens die seisoen voorkom. Dit kan tot gevolg hê dat kultivars wat normaalweg goed staan, hoër groei en dus word die risiko van omval verhoog.

Groeiwyse onderskei tussen bepaalde en onbepaalde groeiers. Kultivars met 'n bepaalde groeiwyse word verkieslik onder besproeiing geplant, terwyl kultivars met 'n onbepaalde groeiwyse (wat nie lengtegroei tydens blom staak nie) onder droëland- en koelweergroei-toestande verkies word. Die groeiwyse van geregistreerde kultivars word in Tabel 3 aangedui.

Genetiese **weerstand teen siektes en insekte** kan goed gebruik word waar die siektes en insekte die oes kan verlaag. Die kultivar met weerstand teen sojaboon mosaïekvirus is Ibis, terwyl SCS 1 teen paranocheta bestand is. Inligting ten opsigte van die vatbaarheid/bestandheid van kultivars vir plantparasitiese knopwortelaalwurms, word in Tabel 3 aangedui.

Rywydte kan ook kultivarkeuse beïnvloed aangesien 'n betekenisvolle interaksie tussen die twee bestaan. Kultivars wat geneig is tot sytakvorming en 'n digte blaredak het, is beter aangepas in wye rye,

to have lower plant- and pod heights compared to longer growing season cultivars under similar growing conditions.

Both characteristics are also influenced by production practices. More narrow inter- and intra row spacing will increase pod height significantly. Pod clearance for the cultivars evaluated is reported in Table 3.

Standability is influenced by the number of overcast days experienced during the growing season. Plant height tends to increase when overcast weather occur and could result in a higher lodging percentage of plants.

Growth habit distinguishes between determinate and indeterminate genotypes. Cultivars with a determinate growth habit are preferably planted under irrigation, while indeterminate cultivars (that do not stop vertical growth during flowering) are preferred under dry land and cool weather growing conditions. Growth habit for registered cultivars is indicated in Table 3.

Genetic resistance against diseases and pests are characteristics that are relevant where the probability of such risks exists. Ibis is a cultivar with known resistance against soybean mosaic virus, while SCS 1 has resistance against paranocheta. Host suitability of registered cultivars to root-knot nematode is also reported in Table 3.

Row width will also influence cultivar selection, since a significant relation exists between cultivars and row width. Cultivars with

terwyl kultivars met 'n oop blaredak en min sytakke, beter aangepas is by relatief nouer rywydtes.

Weerstand teen oopspring van peule kan 'n belangrike rol speel tydens ongunstige toestande gedurende die oes van sojabone. Volgens inligting uit die Nasionale Kultivarproewe is dit duidelik dat relatief kort groeiseisoenkultivars die grootste risiko vir oopspring het, terwyl relatief lang groeiseisoenkultivars die minste daardeur geraak word. 'n Aanduiding ten opsigte van genetiese weerstand tussen kultivars van dieselfde groeiseisoenlengte wat oopspring aanbetref, kon egter nie verkry word nie. Kultivars word evalueer op 'n skaal van 1 (goed) tot 9 (swak) wat oopspring aanbetref en die resultate word in Tabel 3 aangebied.

Gevoeligheid vir onkruidodder kan in sommige gevalle kultivarkeuse beïnvloed. Geen sojaboonkultivar is bestand teen die atrazine-tipe onkruidodders nie en die volle wagperiode moet nagekom word voordat die plant van sojabone oorweeg word. Sommige kultivars soos Dumela, Ibis, Komatie en Edgar is besonder gevoelig vir metribusin. In alle gevalle moet seker gemaak word dat aanwysings op die onkruidodderetiket voorsiening maak vir die kultivar wat aangeplant gaan word.

Saadgrootte, hilumkleur, proteïengehalte en GMO-status is eienskappe wat 'n premieprys kan beding. Saadgrootte is geneties, maar word sterk beïnvloed deur omgewingstoestande. Gunstige toestande tydens saadvulperiode sal saadgrootte positief beïnvloed. Proteïeninhoud van die saad is ook geneties maar kan nadelig beïn-

more side branches and leaves are better adapted to wider rows, while cultivars with less side branches and leaves are better adapted to more narrow rows.

Resistance against seed shattering can play an important role during unfavourable harvesting conditions. Information obtained during the National Soybean Cultivar Trials indicates that cultivars with a relative short growing period tend to shatter more than cultivars with a longer growing period. Rating of cultivars in terms of their susceptibility to shattering are done on a scale from 1 (good) to 9 (poor) and are presented in Table 3.

Sensitivity to herbicides can, in some cases, influence the choice of a cultivar. No soybean is resistant to the atrazine type herbicides and the full waiting period have to be maintained before the planting of soybean can be considered. Some cultivars, such as Dumela, Ibis, Komatie and Edgar, are extremely sensitive to metribusin and this should under no circumstances be used when these cultivars are planted.

Seed size, hilum colour, protein qualities and GMO status are characteristics that can negotiate a premium price for soybean assignments. Seed size is genetically regulated, but is greatly influenced by the environment conditions. Favourable conditions during the seed filling period will positively influence seed size. The protein content of soybean seed is also genetically regulated and can be adversely affected by environmental conditions (rainfall, temperature, stress) and crops management (poor or no nodulating, acidic

vloed word deur omgewingstoestand (reënval, temperatuur en stremming) en bestuur (swak of geen nodulering, suur grond en lae grondvrugbaarheid). Proteïeninhoud (vogvrye basis) onder 36% is onbevredigend en bokant 40% is uitstekend wat sojabone aanbetref.

Saadopbrengs gee 'n aanduiding van 'n kultivar se genetiese aanpassing en geskiktheid vir 'n bepaalde gebied. Vir die 2007/2008 seisoen is 20 kultivars geplant en geëvalueer en was die data van 16 proewe aanvaarbaar vir statistiese analises. Die oesekerheidswaardes van die 20 kultivars vir die drie verbouingsgebiede (warm, matig en koud) word in Tabelle 4 & 5, 7 & 8 en 10 & 11 aangebied. Tabela 4, 7 en 10 asook Tabela 5, 8 en 11 bevat inligting oor kultivars wat vir onderskeidelik drie en twee jaar in dié proewe ingesluit was. Tabela 6, 9 en 12 bevat inligting aangaande die opbrengs van die kultivars vir die 2007/2008 produksieseisoen op die onderskeie lokaliteite. Dit is belangrik dat u die verdeling van lokaliteite in Tabel 2 gebruik om te bepaal in watter gebied u plaas geleë is. Vergelyk dan die kultivars in die oesekerheidstabel wat u gekies het met mekaar by die realistiese opbrengsmikpunt vir u plaas.

VERDERE INLIGTING

Volledige inligting oor die Nasionale Sojaboon Kultivarproewe en twee nuttige bronne van inligting oor sojaboonproduksie nl "Jou Gids tot Suksesvolle Sojaboonproduksie" en "Sojaboonsiektes en -plae" is beskikbaar by:

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soil and low soil fertility). Protein contents of soybean seed below 36 % are unsatisfactory, while that above 40%, on a moisture free basis, is regarded as excellent.

Seed yield indicates the genetic adaptation and suitability of a cultivar to be planted in a specific area. During the 2007/2008 season 20 cultivars were included in the National Soybean Cultivar Trials, while data of 16 localities were acceptable for statistical analyses.

Yield reliability values of the 20 cultivars for the three production areas (warm, moderate and cool) are presented in Tables 4 & 5, 7 & 8 and 10 & 11. Tables 4, 7 and 10 as well as Tables 5, 8 and 11 contain information regarding cultivars included in the trials for three and two years respectively. Yield of the cultivars at the different localities for the 2007/2008 growing season is presented in Tables 6, 9 and 12. It is also important to use the information provided in Table 2 to determine whether the area to be planted corresponds with the warm, moderate or cool localities. Use the selected yield reliability table (warm, moderate or cool) to select cultivars for the yield potential of the specific farm.

FURTHER INFORMATION

Information on the National Soybean Cultivar Trials and two useful guides, namely "Your Guide to Successful Soybean Production" and "Soybean Diseases and Pests" are available at:

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*** Kultivars wat in die verslag opgeneem is, is die enigste kultivars wat deur die LNR getoets en aanbeveel word.**

ERKENNING

Die uitvoer van die proewe is moontlik gemaak deur die finansiële ondersteuning van die Landbounavorsingsraad, Proteïennavorsingstigting, verskeie Saadmaatskappye en 'n groot aantal medewerkers wat proewe uitgevoer het.

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*** The cultivars in this report are the only cultivars tested and recommended by the ARC.**

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Tabel 1. Gemiddelde aantal dae tot 50% blom en oesryp vir warm, matig en koue gebiede gedurende 2007/08 groeiseisoen.

Table 1. Average number of days to 50 % flower and harvest for warm, moderate and cool areas during 2007/08 growing season.

Kultivar/ Cultivar	Dae tot 50% blom/Days to 50% flower			Dae tot oesryp/Days to harvest		
	Warm/Warm ¹	Matig/Moderate ²	Koud/Cool ³	Warm/Warm ⁴	Matig/Moderate ⁵	Koel/Cool ⁶
PAN 1454 R	55	58	86	130	132	-
PAN 535 R	67	63	87	128	134	-
PAN 660	65	62	85	130	136	-
SNK 440	67	65	85	128	135	-
LS 6161 R	67	65	85	133	141	-
LS 6164 R	66	62	87	136	139	-
LS 6150 R	65	63	89	136	141	-
PAN 1666 R	67	64	89	134	141	-
LS 6050 R	67	63	89	136	140	-
LS 677	68	67	89	137	147	-
A 5409 RG	68	69	89	128	134	-
PAN 737 R	69	71	87	137	148	-
PAN 1652	69	70	87	132	136	-
PAN 626	70	72	89	134	141	-
Heron	71	72	89	137	149	-
LS 678	72	75	89	136	147	-
SNK 500	71	75	89	136	141	-
Egret	74	76	89	140	152	-
Stork	75	76	89	139	151	-
Ibis 2000	74	75	89	138	150	-

¹ - Gemiddeld van 2 lokaliteite, average of 2 localities

³ - Gemiddeld van 1 lokaliteit, average of 1 locality

⁵ - Gemiddeld van 3 lokaliteite, average of 3 localities

² - Gemiddeld van 4 lokaliteite, average of 4 localities

⁴ - Gemiddeld van 2 lokaliteite, average of 2 localities

⁶ - Gemiddeld van 0 lokaliteit, average of 0 locality

Tabel 2. Groepering van lokaliteite volgens warm, matig en koue gebiede gedurende die 2007/08 groeiseisoen.

Table 2. Grouping of localities according to warm, moderate and cool areas during the 2007/08 growing season.

Warm/Warm	Matig/Moderate	Koud/Cool
Koedoeskop (B/I) Rustenburg (D) Vaalharts (B/I)	Cedara (D) Dundee (D) Glen (B/I) Greytown (D) Greytown Kranskop (D) Newcastle (D) Potchefstroom B90 (B/I) Potchefstroom D90 (D) Potchefstroom Plot (B/I) Vryheid (D)	Ficksburg (D) Kinross (D) Wonderfontein (D)

B - Besproeing/I - Irrigation

D - Droëland/Dry land

Tabel 3. Algemene inligting ten opsigte van geregistreeerde sojaboonkultivars wat tydens die 2007/08 geëvalueer is.
Table 3. General information on registered soybean cultivars that were evaluated during the 2007/08 growing season.

Kultivar/ Cultivar	Groei- wyse/ Growth habit ¹	Hilum- kleur/ Hilum colour ²	Oliepersenta- sie/ Oil percentage	Proteïenper- sentasie/ Protein percentage	Aalwurm gasheerstatus/ Nematode host status ³		Peul- hoogte/ Pod height ⁴	Opspring/ Shatter ⁵	Verskaffer/ Supplier
					<i>M incognita</i>	<i>M javanica</i>			
PAN 1454 R	I	BL	18.42	41.34	-	-	10	3.13	Pannar
PAN 535 R	D	B	17.64	41.24	-	S	12	1.50	Pannar
PAN 660	D	BL	17.68	40.59	R	S	12	2.13	Pannar
SNK 440	I	B	17.45	41.44	S	-	16	1.75	Afgri
LS 6161 R	I	IB	17.65	41.45	S	-	15	1.63	Link Seed
LS 6164 R	D	LB	18.05	40.64	S	-	14	1.63	Link Seed
LS 6150 R	I	LB	17.57	40.02	S	-	13	1.63	Link Seed
PAN 1666 R	I	BL	18.21	41.30	-	-	14	1.13	Pannar
LS 6050 R	D	LB	18.05	40.47	S	-	11	1.75	Link Seed
LS 677	D	LB	16.73	40.98	S	S	13	2.13	Link Seed
A 5409 RG	I	G	17.30	41.28	S	S	13	1.29	Pannar
PAN 737 R	D	IB	18.21	40.22	S	-	13	1.25	Pannar
PAN 1652	I	B	17.35	41.72	S	-	14	1.50	Pannar
PAN 626	I	KL	17.09	40.75	S	S	17	2.13	Pannar
Heron	D	LB	16.41	40.44	-	-	17	1.13	LNR
LS 678	D	LB	17.98	40.17	S	S	11	1.13	Link Seed
SNK 500	D	LB	17.58	40.63	S	R	11	2.00	Afgri
Egret	D	KL	15.67	42.22	R	R	15	1.63	LNR
Stork	D	KL	15.49	42.94	S	-	15	1.63	LNR
Ibis 2000	D	IB	16.93	41.55	-	-	16	1.50	LNR

¹ D - Bepaald/determinate

I - Onbepaald/Indeterminate

² BL - Swart/Black

IB - Onvolledig swart/Imperfect black

B - Bruin/Brown

LB - Ligbruin/Buf

G - Grys/Grey

KL - Kleurloos/Buf

³ R - Nie vatbaar vir die spesifieke knopwortel aalwurm spesie en/of ras

Resistant to the specific root-knot nematode species and/or race

S - Vatbaar vir die spesifieke knopwortel aalwurm spesie en/of ras

Susceptible to the specific root-knot nematode species and/or race

⁴ Peulhoogte in cm/Pod height in cm

⁵ Geneigdheid tot oopspring evalueer op 'n skaal van 1-9 waar 1 = goed en 9 = swak

Tendency to shatter evaluated on a scale from 1-9 where 1 = good and 9 = poor

Tabel 4. Oessekerheid by die verskillende opbrengsmikpunte vir die koeler produksiegebiede verkry gedurende die 2005/06, 2006/07 en 2007/08 groeiseisoene.

Table 4. Yield reliability at different yield targets for the cooler production areas obtained during the 2005/06, 2006/07 and 2007/08 growing seasons.

KULTIVAR CULTIVAR	OPBRENGSMIKPUNTE/YIELD TARGETS ton ha ⁻¹							GEM MEAN	D ²
	1.0	1.5	2.0	2.5	3.0	3.5	4.0		
PAN 535 R	0.44	0.89	1.33	1.78	2.22	2.67	3.11	1.88	0.1418
PAN 660	0.41	0.86	1.31	1.77	2.22	2.67	3.12	1.94	0.1877
SNK 440	0.59*	1.08*	1.56*	2.05*	2.54	3.03	3.52	2.02	0.0982
LS 677	0.42	0.91	1.39	1.88	2.36	2.84	3.33	2.06	0.2132
A 5409 RG	0.36	0.90	1.44	1.98	2.52	3.07	3.61*	2.18	0.2616
PAN 737 R	0.59*	1.13*	1.67*	2.21*	2.76*	3.30*	3.84*	2.17	0.1157
PAN 626	0.50	1.04*	1.58*	2.11*	2.65*	3.19*	3.72*	2.09	0.1256
LS 678	0.39	0.89	1.39	1.89	2.40	2.90	3.40	1.82	0.0878
SNK 500	0.52*	1.03*	1.54*	2.05	2.55	3.06	3.57	1.95	0.0808

* Waardes in dieselfde kolom is betekenisvol beter/Values in the same column are significantly higher

D² dui stabiliteit van 'n kultivar aan. Hoe kleiner die D² waarde hoe meer stabiel is die kultivar

D² indicates the stability of a cultivar. A smaller D² value indicates a more stable cultivar

Tabel 5. Oessekerheid van kultivars by die verskillende opbrengsmikpunte in die koeler produksiegebiede gedurende die 2006/07 en 2007/08 groeiseisoene.

Table 5. Yield reliability of cultivars at different yield targets for the cooler production areas during the 2006/07 and 2007/08 growing seasons.

KULTIVAR CULTIVAR	OPBRENGSMIKPUNTE/YIELD TARGETS ton ha ⁻¹							GEM MEAN	D ²
	1.0	1.5	2.0	2.5	3.0	3.5	4.0		
PAN 535 R	0.83*	1.33*	1.83*	2.33*	2.82*	3.32*	3.82	1.41	0.0231
PAN 660	0.60	0.97	1.35	1.72	2.09	2.46	2.83	1.54	0.1996
SNK 440	0.58	1.13	1.68	2.22*	2.77*	3.32*	3.87*	1.46	0.1095
LS 6161 R	0.81*	1.34*	1.87*	2.40*	2.93*	3.45*	3.98*	1.39	0.0192
LS 6164 R	0.72*	1.26*	1.79*	2.33*	2.87*	3.41*	3.95*	1.47	0.0610
LS 6150 R	0.23	0.62	1.01	1.40	1.79	2.19	2.58	1.17	0.1980
LS 6050 R	0.44	0.92	1.40	1.89	2.37	2.85	3.33	1.42	0.1834
LS 677	0.75*	1.17*	1.60	2.03	2.46	2.88	3.31	1.35	0.0399
A 5409 RG	0.55	1.00	1.46	1.91	2.37	2.82	3.28	1.19	0.0457
PAN 737 R	0.42	1.01	1.61	2.21	2.80*	3.40*	3.99*	1.32	0.1028
PAN 1652	0.79*	1.38*	1.97*	2.56*	3.15*	3.74*	4.33*	1.49	0.0373
PAN 626	0.40	0.98	1.56	2.14	2.72	3.30*	3.88*	1.34	0.1275
LS 678	0.45	1.04	1.62	2.21	2.79*	3.38*	3.96*	1.37	0.1150
SNK 500	0.57	1.13	1.68	2.23*	2.79*	3.34*	3.89*	1.32	0.0556
Egret	0.40	0.90	1.40	1.90	2.40	2.90	3.39	1.24	0.1074
Stork	0.11	0.46	0.82	1.17	1.52	1.88	2.23	1.09	0.2349

* Waardes in dieselfde kolom is betekenisvol beter/Values in the same column are significantly higher
D² dui stabiliteit van 'n kultivar aan. Hoe kleiner die D² waarde, hoe meer stabiel is die kultivar
D² indicates the stability of a cultivar. A smaller D² values indicates a more stable cultivar

Tabel 6. Saadopbrengs (kg ha⁻¹) van elke kultivar by die verskillende lokaliteite vir die koel produksiegebiede gedurende die 2007/2008 groeiseisoen.

Table 6. Seed yield (kg ha⁻¹) of the cultivars at the different localities for the cool production areas during the 2007/2008 growing season

KULTIVAR CULTIVAR	FICKSBURG	KINROSS	WONDERFONTEIN	GEM MEAN
PAN 1454 R	2477	3004	2212	2564
PAN 535 R	2750	2715	3007	2824
PAN 660	2759	2970	964	2231
SNK 440	3183	2044	1458	2228
LS 6161 R	2907	2699	2570	2725
LS 6164 R	2818	2885	2435	2713
LS 6150 R	1888	2826	1632	2115
PAN 1666 R	2352	2585	2223	2387
LS 6050 R	3199	2681	2004	2628
LS 677	2451	1881	337	1556
A 5409 RG	2523	2478	2306	2436
PAN 737 R	2985	2252	1501	2246
PAN 1652	3053	3193	1746	2664
PAN 626	3298	3396	667	2454
Heron	3068	3163	1235	2489
LS 678	2376	2678	806	1953
SNK 500	2045	2330	543	1639
Egret	2186	2441	500	1709
Stork	2200	2226	624	1683
Ibis 2000	2435	2274	629	1779
				2251

Tabel 7. Oessekerheid by die verskillende opbrengsmikpunte vir die matige produksiegebiede gedurende die 2005/06, 2006/07 en 2007/08 groeiseisoene.

Table 7. Yield reliability at different yield targets for the moderate production areas during the 2005/06, 2006/07 and 2007/08 growing seasons.

KULTIVAR CULTIVAR	OPBRENGSMIKPUNTE/YIELD TARGETS ton ha ⁻¹							GEM MEAN	D ²
	1.0	1.5	2.0	2.5	3.0	3.5	4.0		
PAN 535 R	0.35	0.87	1.39	1.92	2.44	2.96	3.49	2.23	0.1459
PAN 660	0.24	0.76	1.28	1.79	2.31	2.83	3.35	2.25	0.2398
SNK 440	0.42	0.92	1.42	1.92	2.42	2.92	3.42	2.21	0.1304
LS 677	0.57	1.08*	1.60*	2.12*	2.63*	3.15*	3.67*	2.36	0.1086
A 5409 RG	0.50	1.03	1.57	2.10*	2.63*	3.16*	3.69*	2.37	0.1262
PAN 737 R	0.55	1.07	1.58*	2.09*	2.60*	3.11*	3.63*	2.32	0.1028
PAN 626	0.72*	1.17*	1.63*	2.09*	2.55	3.01	3.46	2.40	0.1316
LS 678	0.65*	1.12*	1.58*	2.04	2.50	2.96	3.42	2.27	0.0944
SNK 500	0.61*	1.09*	1.57*	2.05	2.53	3.01	3.49	2.30	0.1056

* Waardes in dieselfde kolom is betekenisvol beter/Values in the same column are significantly higher
D² dui stabiliteit van 'n kultivar aan. Hoe kleiner D² waarde, hoe meer stabiel is die kultivar
D² indicates the stability of a cultivar. A smaller D² value indicates a more stable cultivar

Tabel 8. Oessekerheid van kultivars by die verskillende opbrengsmikpunte vir die matige produksiegebiede gedurende die 2006/07 en 2007/08 groeiseisoene.

Table 8. Yield reliability of cultivars at different yield targets for the moderate production areas during the 2006/07 and 2007/08 growing seasons.

KULTIVAR CULTIVAR	OPBRENGSMIKPUNTE/YIELD TARGETS ton ha ⁻¹							GEM MEAN	D ²
	1.0	1.5	2.0	2.5	3.0	3.5	4.0		
PAN 535 R	0.40	0.96	1.53	2.09*	2.66*	3.22*	3.79*	2.03	0.1385
PAN 660	0.50	1.05*	1.59*	2.14*	2.68*	3.23*	3.77*	2.08	0.1331
SNK 440	0.56*	1.11*	1.65*	2.19*	2.73*	3.27*	3.82*	2.05	0.0887
LS 6161 R	0.41	0.95	1.48	2.02	2.56	3.10	3.64*	1.98	0.1334
LS 6164 R	0.70*	1.13*	1.56*	1.98	2.41	2.84	3.27	1.92	0.0733
LS 6150 R	0.55*	1.03	1.51	1.99	2.46	2.94	3.42	2.00	0.1306
LS 6050 R	0.36	0.88	1.40	1.92	2.45	2.97	3.49	1.96	0.1700
LS 677	0.48	1.00	1.51	2.02	2.53	3.05	3.56	1.96	0.1113
A 5409 RG	0.57*	1.03	1.49	1.95	2.41	2.87	3.33	2.01	0.1478
PAN 737 R	0.38	0.97	1.55*	2.13*	2.72*	3.30*	3.88*	2.01	0.1169
PAN 1652	0.53	1.03	1.53	2.03	2.53	3.03	3.53	2.01	0.1253
PAN 626	0.48	1.01	1.54*	2.07*	2.60*	3.13*	3.66*	2.05	0.1424
LS 678	0.47	0.93	1.39	1.84	2.30	2.76	3.22	1.90	0.1457
SNK 500	0.61*	1.03*	1.46	1.89	2.32	2.75	3.17	1.91	0.1102
Egret	0.23	0.74	1.25	1.77	2.28	2.79	3.30	1.95	0.2567
Stork	0.33	0.73	1.12	1.52	1.92	2.31	2.71	1.89	0.3078

* Waardes in dieselfde kolom is betekenisvol beter/Values in the same column are significantly higher
D² dui stabiliteit van 'n kultivar aan. Hoe kleiner die D² waarde, hoe meer stabiel is die kultivar
D² indicates the stability of a cultivar. A smaller D² value indicates a more stable cultivar

Tabel 9. Saadopbrengs (kg ha⁻¹) van kultivars by die verskillende lokaliteite vir die matige produksiegebiede verkry gedurende die 2007/2008 groeiseisoen.

Table 9. Seed yield (kg ha⁻¹) of cultivars at the different localities for the moderate production areas obtained during the 2007/2008 growing season

KULTIVAR CULTIVAR	CEDARA	DUNDEE	GLEN	GREYTOWN	GREYTOWN KRANSKOP	NEWCASTLE	POTCH EFSTROOM BESP/IRRI	POTCHEFSTROOM DROOG/DRY LAND	POTCHEFSTROOM PLOT BESP/IRRI	VRYHEID	GEM MEAN
PAN 1454 R	4383	1675	2399	2845	2809	3099	2847	1019	1815	718	2216
PAN 535 R	3481	1284	2699	2089	1867	3206	2440	1042	2301	997	2151
PAN 660	3648	1598	2134	2334	2095	3169	2718	1296	2296	1155	2146
SNK 440	2974	1579	3056	1904	1542	2689	2139	1505	2287	1331	2064
LS 6161 R	3413	1858	2241	2243	2257	2833	2477	1597	1815	1291	2171
LS 6164 R	3087	1092	2727	2434	2508	3330	2546	1620	2153	1082	2220
LS 6150 R	3349	1619	2639	2310	2246	3206	2338	1111	2130	1013	2154
PAN 1666 R	3303	1559	2162	2440	2071	3032	2593	1273	1829	806	2031
LS 6050 R	3232	1514	2227	2589	2350	3335	3079	1620	1704	1148	2174
LS 677	3599	2488	2324	2371	2227	3132	2407	1921	1903	1228	2241
A 5409 RG	2935	1536	2185	2525	2006	3068	2477	1273	2060	1185	2161
PAN 737 R	3370	1104	1884	2683	2381	2949	2477	1921	1690	853	2077
PAN 1652	3295	1581	3102	2639	1855	3076	2361	1037	2139	1119	2205
PAN 626	3246	1417	2884	2299	2513	3032	2222	1389	2431	1145	2242
Heron	3383	1265	2292	2776	2186	3092	2870	1343	1505	971	2149
LS 678	4129	2121	2269	2936	2507	2938	2671	1898	1769	1295	2383
SNK 500	3530	2050	1991	1671	1629	2812	2037	1736	1514	1710	2079
Egret	3498	1229	2079	3085	2201	2961	2569	1667	1736	1145	2175
Stork	3002	1282	2023	3317	1997	3210	3079	1829	1981	1103	2230
Ibis 2000	3020	1737	1843	2582	2207	2769	1968	1667	2037	1152	1973
											2162

Tabel 10. Oessekerheid van kultivars by die verskillende opbrengsmikpunte vir die warmer produksiegebiede verkry gedurende die 2005/06, 2006/07 en 2007/08 groeiseisoene.

Table 10. Yield reliability of cultivars at different yield targets for the warmer production areas obtained during the 2005/06, 2006/07 and 2007/08 growing seasons.

KULTIVAR CULTIVAR	OPBRENGSMIKPUNTE/YIELD TARGETS ton ha ⁻¹							GEM MEAN	D ²
	1.0	1.5	2.0	2.5	3.0	3.5	4.0		
PAN 535 R	0.08	0.58	1.07	1.57	2.07	2.56	3.06	2.69	0.4452
PAN 660	0.09	0.63	1.17	1.71	2.25	2.79*	3.33*	2.74	0.3595
SNK 440	0.17	0.68	1.18	1.69	2.20	2.71	3.22	2.72	0.3611
LS 677	0.52*	0.94*	1.36*	1.78*	2.20	2.61	3.03	2.64	0.2554
A 5409 RG	0.52*	0.94*	1.37*	1.79*	2.22	2.64	3.06	2.71	0.2996
PAN 737 R	0.04	0.61	1.19	1.76*	2.34*	2.91*	3.48*	2.54	0.1702
PAN 626	0.29	0.79	1.29*	1.79*	2.29*	2.78*	3.28	2.59	0.1993
LS 678	0.23	0.71	1.19	1.67	2.15	2.63	3.11	2.61	0.2966
SNK 500	0.00	0.55	1.11	1.66	2.22	2.78*	3.33*	2.77	0.4178

* Waardes in dieselfde kolom is betekenisvol beter/Values in the same column are significantly higher

D² dui stabiliteit van 'n kultivar aan. Hoe kleiner die D² waarde, hoe meer stabiel is die kultivar

D² indicates the stability of a cultivar. A smaller D² value indicates a more stable cultivar

Tabel 11. Oesekerheid van kultivars by die verskillende opbrengsmikpunte vir die warmer produksieareas verkry gedurende die 2006/07 en 2007/08 groeiseisoene.

Table 11. Yield reliability of cultivars at different yield targets for the warmer production areas obtained during the 2006/07 and 2007/08 growing seasons.

KULTIVAR CULTIVAR	OPBRENGSMIKPUNTE/YIELD TARGETS ton ha ⁻¹							GEM MEAN	D ²
	1.0	1.5	2.0	2.5	3.0	3.5	4.0		
PAN 535 R	0.37	0.83	1.30	1.76	2.23	2.69	3.16	2.88	0.3023
PAN 660	0.24	0.78	1.31	1.84	2.37	2.90	3.43	2.73	0.1466
SNK 440	0.43	0.92	1.40	1.89	2.37	2.86	3.34	2.65	0.0980
LS 6161 R	0.00	0.46	1.10	1.75	2.39	3.04	3.68*	2.84	0.2164
LS 6164 R	0.88*	1.31*	1.74*	2.18*	2.61*	3.04	3.47	2.74	0.0399
LS 6150 R	0.85*	1.23*	1.61*	1.99	2.37	2.75	3.13	2.76	0.1286
LS 6050 R	0.08	0.71	1.35	1.99	2.63*	3.26*	3.90*	2.88	0.1149
LS 677	0.16	0.79	1.41	2.04*	2.67*	3.29*	3.92*	2.87	0.0910
A 5409 RG	0.27	0.88	1.49*	2.10*	2.72*	3.33*	3.94*	2.95	0.1019
PAN 737 R	0.95*	1.36*	1.76*	2.17*	2.58*	2.99	3.40	2.85	0.0834
PAN 1652	0.17	0.78	1.39	2.00	2.60*	3.21*	3.82*	2.74	0.0653
PAN 626	0.64*	1.12*	1.60*	2.08*	2.56*	3.05	3.53	2.79	0.0783
LS 678	0.12	0.73	1.33	1.93	2.53	3.13*	3.74*	2.85	0.1367
SNK 500	0.47	0.74	1.01	1.29	1.56	1.83	2.10	2.59	0.5554
Egret	0.00	0.00	0.34	0.79	1.24	1.70	2.15	2.79	1.2736
Stork	0.00	0.13	0.49	0.85	1.21	1.57	1.93	2.73	1.1804

* Waardes in dieselfde kolom is betekenisvol beter/Values in the same column are significantly higher
D² dui stabiliteit van 'n kultivar aan. Hoe kleiner die D² waarde, hoe meer stabiel is die kultivar
D² indicates the stability of a cultivar. A smaller D² value indicates a more stable cultivar

Tabel 12. Saadopbrengs (kg ha⁻¹) van kultivars by die verskillende lokaliteite vir die warmer produksiegebiede verkry gedurende die 2007/2008 groeiseisoen.

Table 12. Seed yield (kg ha⁻¹) of cultivars at the different localities for the warmer production areas obtained during the 2007/2008 growing season

KULTIVAR CULTIVAR	KOEDOESKOP	RUSTENBURG	VAALHARTS	GEM MEAN
PAN 1454 R	1313	1646	2960	1973
PAN 535 R	2877	2889	5523	3763
PAN 660	3262	2844	5031	3712
SNK 440	3171	2744	4883	3599
LS 6161 R	3429	2433	4648	3503
LS 6164 R	3415	2678	3930	3341
LS 6150 R	3541	3122	5010	3891
PAN 1666 R	2612	2600	4175	3129
LS 6050 R	3038	3322	3797	3386
LS 677	3737	2944	3855	3512
A 5409 RG	2954	2917	4732	3534
PAN 737 R	3101	3311	4696	3703
PAN 1652	3297	3039	4445	3594
PAN 626	3143	3039	4072	3418
Heron	3352	2822	4201	3458
LS 678	3611	2928	4844	3794
SNK 500	3310	3050	2781	3047
Egret	3695	3317	5041	4018
Stork	3324	2167	5504	3665
Ibis 2000	3611	2539	3845	3332
				3469