BELANGRIK

Resultate van 'n kultivarproef by 'n enkele lokaliteit in enige jaar, of selfs 'n beperkte aantal lokaliteite in 'n enkele jaar, kan as gevolg van die kenmerkende seisoenale variasie in die RSA hoogs misleidend wees en kan sodoende onregverdiglik teen die beste genotypes vir daardie omgewing diskrimineer. **'N ERNSTIGE BEROEP WORD OP ALLE BETROKKENES GEDOEN OM NIE HUL GENOTIPEADVIES OP SO 'N HOOGS ONBETROUBARE METODE TE BASEER NIE.** Produsente word veral versoek om nougeset daarteen te waak dat hulle nie ook foutiewe genotipe uitsprake op dieselfde wyse doen nie, of op hierdie wyse mislei word nie.

Resultate van hierdie nasionale kultivarproewe, wat deur die LNR- Instituut vir Graangewasse uitgevoer is en gepubliseer word, geskied in belang van produsente, adviesdienste en die teeltbedryf. Die resultate mag derhalwe vryelik gebruik word, mits dit wetenskaplik korrek gedoen word deur die totale spektrum van lokaliteite en waarnemings in berekening te bring. Vrye gebruik van die resultate word ook met 'n verdere voorwaarde toegelaat, naamlik dat die nodige erkenning aan die bron van die inligting verleen word.

LNR-Instituut vir Graangewasse

Privaatsak X1251

POTCHEFSTROOM

2520

DANKBETUIGINGS

Die sukses van hierdie navorsingsprojek is toe te skryf aan die goeie samewerking en medewerking tussen die private en openbare sektore asook boere by wie genotypeproewe geplant is. Die verantwoordelike navorsers betuig hiermee hul grootste waardering vir die besondere samewerking en ondersteuning wat hulle van al die betrokkenes ontvang het.

Medewerkende Instansies

Medewerkers vir die 2009/2010 proefreeks word in Tabel 2 aangedui. **Hul getroue ondersteuning en uitstekende samewerking verdien vermelding en word erken.**

Saadfirmas

Agricol Saad (Edms) Bpk

Capstone Seeds South Africa (Edms) Bpk

Link Saad (Edms) Bpk

K_2 Agri

Monsanto SA (Edms) Bpk

National Seeds (Edms) Bpk

Pannar Saad (Edms) Bpk

Pioneer Hi-Bred RSA (Edms) Bpk

LNR - Navorsingsinstituut vir Graangewasse

Hierdie verslag se samestelling, voorbereiding en vermeerdering het bydraes deur verskeie kollegas en beamptes geverg. Spesiale vermelding moet egter gemaak word aan Mnr. D De V Bruwer vir sy beplanning en bestuur van die proewe.

Dank gaan aan die Limpopo Provinsie se Departement van Landbou, Grond en Omgewing vir die hantering van die proef op Warmbad.

Die LNR-IGG wil hiermee ook sy dank uitspreek teenoor die Mielietrust vir hul finansiële ondersteuning wat die uitvoering van die proewe moontlik gemaak het.

IMPORTANT

Due to typical seasonal variations in the RSA, results of a Cultivar trial at a single locality in any year, or even at a limited amount of localities in a single year can be highly misleading and can discriminate unfairly against genotypes which may in reality be the best for certain areas. **ALL THOSE INVOLVED, ARE STRONGLY URGED NOT TO BASE THEIR GENOTYPE RECOMMENDATIONS ON A HIGHLY UNRELIABLE METHOD SUCH AS THIS.** Producers, especially, are requested to guard against letting themselves be misled in this way and against making incorrect genotype judgements.

The Institute in the interest of producers, advisory services and the breeding industry publishes results of these national Cultivar trials, carried out by the ARC - Grain Crops Institute. These results may thus be freely used, as long as they are used in a scientifically correct manner, incorporating the whole spectrum of localities and observations. The source of the information should also be awarded the necessary recognition when using these results.

ARC-Grain Crops Institute

Private Bag X1251

POTCHEFSTROOM

2520

ACKNOWLEDGEMENTS

The success of this research project is a result of the good co-operation between the private, co-operative, and public sectors as well as farmers on whose farms cultivar trials were planted. The researchers wish to express their utmost appreciation for the exceptional co-operation and support received from all those involved.

Co-workers

The 2009/2010 trial series co-workers are listed in Table 2. **Their loyal support and excellent co-operation deserves mentioning and is acknowledged.**

Seed Companies

Agricol Seed (Pty) Ltd

Capstone Seeds South Africa (Pty) Ltd

K_2 Agri

Link Seed (Pty) Ltd

Monsanto SA (Pty) Ltd

National Seeds (Pty) Ltd

Pannar Seed (Pty) Ltd

Pioneer Hi-Bred RSA (Pty) Ltd

ARC - Grain Crops Institute

The compilation of this report was made possible by the efforts of many colleagues and officials. A special thanks goes to Mr D De V Bruwer for his planning and management of the trials.

Our thanks go to the Limpopo Province Department of Agriculture, Land and Environment for conducting the trial at Warmbad.

The ARC-GCI would like to thank the Maize Trust for their financial support that made these trials possible.

INHOUDSOPGAWE / CONTENTS

EENJARIGE TABELLE / ONE YEAR TABLES

MEERJARIGE TABELLE / MULTI SEASON TABLES

FIGURE/FIGURES

INLEIDING

Eenjarige resultate van 2009/2010 seisoen en meerjarige resultate vir, 2007/2008, 2008/09 en 2009/2010 van die Nasionale Kultivarproewe met kommersieel beskikbare mieliegenotipes is in hierdie verslag saamgevat. Kommersiële kultivars word jaarliks vir hul aanpassingsvermoë in 'n wye reeks potensiaaltoestande in hierdie proewe geëvalueer. Inskrywings vir hierdie proefreeks bestaan uit gewilde genotipes sowel as ander nuwer kommersiële genotipes wat volgens verwagting ook gewild by produsente sal word.

Hierdie resultate is `n aanduidend van genotipeprestasie onder spesifieke omgewingstoestande wat gedurende die groeiseisoen voorgekom het. Meerjarige resultate wat vanuit hierdie proewe saamgevat word, is meer betroubaar as eenjarige resultate en is by uitstek vir die doel van genotipe aanbevelings geskik.

NAVORSINGSPROSEDURE

Standaard en wetenskaplik aanvaarde prosedures is vir die uitvoering van die navorsingsprogram voorgeskryf. Medewerkers is 'n vrye keuse gelaat om die beste verbouingspraktyke in hul omgewing vir die proewe te gebruik ten einde graanopbrengs sover moontlik te kan optimaliseer en om verskillende potensiaaltoestande te skep.

Proefontwerp

'n Gerandomiseerde blokontwerp met drie herhalings is deurgaans gebruik om die 50 genotipeinskrywing te akkommodeer. Elke proeflokaliteit is 'n eie proefrandomisasie toegeken wat ook van jaar tot jaar verskil.

Genotipe inskrywings

Dieselfde 50 genotipes het in elkeen van die proewe voorgekom en het bestaan uit inskrywings deur die betrokke saadfirmas gedoen. Inskrywings deur firmas geskied in orde van prioriteit en indien te veel inskrywings ontvang is, is die inskrywingslys deur onderhandeling met elkeen van die saadfirmas gefinaliseer.

Perseelgrootte en spasiëring

'n Standaard van 40 plante per netto perseel is deurgaans voorgeskryf terwyl 'n vrye keuse ten opsigte van plantpopulasies (plante/ha), rywydtes en spasiëring binne die plantry toegelaat is. 'n Plantestand van 22 plante in elk van twee plantrye per bruto perseel is vir rywydtes minder as 1.5 m en 'n plantestand van 42 plante in 'n enkele plantry per bruto perseel vir rywydtes van 1.5 m en wyer aanbeveel. Geen kantrye is tussen persele benodig nie en slegs kantrye rondom die proef is voorgeskryf. Een grensplant op elke punt van elke plantry moes verwyder word voor oestyd.

Grond en bemesting

Grondsoorte wat algemeen vir mielieproduksie in die betrokke omgewings geskik is, is waar moontlik uitgesoek. Verskille in produksiepotensiaal is ook benut deur spesifieke grondtoestande vir spesifieke proefdoeleindes uit te kies. Bemesting geskied hoofsaaklik volgens grondvrugbaarheid asook die potensiaal vir mielies in die betrokke omgewings en is derhalwe nie voorgeskryf nie.

Planttyd

Die aangewese planttyd vir suksesvolle mielieproduksie in die betrokke omgewings is as planttyd aanbeveel.

Plant- en oesmetodes

Proewe is meganies of met die hand geplant (twee of meer pitte per plantgat) en uitgedun sodra die saailinge sterk genoeg was. Proewe is met die hand of meganies geoes. Al drie herhalings van die proewe moes deurgaans geoes word en die totale.

Plaagbeheer

Doeltreffende plaagbeheer (onkruide en insekte) is noodsaaklik en die gebruik van onkruiddoders en insekmiddels is vryelik toegelaat. Die gebruik van grondsistemiese-insekdoders is ook toegelaat. Die gebruik van plaagmiddels moet gerapporteer word.

Siektes

Medewerkers word elke jaar versoek om die voorkoms van enige siektes onmiddellik te rapporteer sodat die nodige opvolging en data-insameling kon geskied. Natuurlike besmetting moes egter straf genoeg wees om genotipereaksie te kon rapporteer. ‘n Besmetting van meer as 10.0% word as riglyn gebruik.

Waarnemings

Die volgende inligting en waarnemings word jaarliks aangevra:

1. Hoeveelheid bemesting, tyd en metode van toediening.
2. Hoeveelheid plaagdoder, tyd en metode van toediening.
3. Plant-, opkoms- en oesdatum.
4. Spasiëring, bruto en netto perseeloppervlaktes.
5. Maandelikse reënval (en besproeiing waar van toepassing).
6. Aantal dae vanaf plantdatum tot 50 % stuifmeelstorting (slegs navorsingstasies en proefplase).
7. Aantal dae vanaf plantdatum tot 50 % baardverskyning (slegs navorsingstasies en proefplase).
8. Aantal plante wat teen oestyd omgeval het (meer as 45 grade omlê).
9. Aantal plante per netto perseel.
10. Aantal spruite per netto perseel.
11. Aantal koppe per netto perseel.
12. Ongedorste kopmassa of graanmassa van alle persele oor al drie herhalings.
13. Gedorste graanmassa van Herhaling 1, indien kopmassa bepaal is.
14. Graanvogpersentasie.
17\. Addisionele waarnemings oor opmerklike en sinvolle genotipeverskille waar en wanneer dit voorkom.

Statistiese verwerking

Graanopbrengs was die enigste parameter wat statisties ontleed is. In die algemeen is ‘n AMMI analise gebruik om die aanpasbaarheid en stabiliteit van genotipes aan te dui vir verskillende omgewings. Die gekombineerde variansieanalise volgens die “Additive Mean Effective And Multiplicative Interaction (AMMI)” model is uitgevoer met die GENSTAT program (Tabel 1). Die “Principle Component

Interaction Analysis (IPCA)" van genotipes in die AMMI analise gee 'n aanduiding van die genotipe se stabiliteit oor verskillende omgewings. Hoe groter die IPCA-waarde, beide negatief of positief, hoe meer is 'n genotipe aangepas vir 'n spesifieke omgewing. Hoe nader die IPCA-waardes aan nul kom hoe meer stabiel is die genotipes vir al die omgewings waarin dit getoets is. AMMI Stabiliteits-Waardes (ASW) is die afstand vanaf nul in 'n tweedimensionele verspreidingsgrafiek van IPCA 1-waardes teenoor IPCA 2-waardes. Soos die ASW-waarde nader kom aan nul kan 'n spesifieke genotipe as meer stabiel geklassifiseer word vir omgewings. Addisionele beskrywings en informasie oor AMMI is beskikbaar in Aanhangsel A.

Statistiese prosedures wat normaalweg gebruik word om uitskieterproewe te identifiseer, is vir doeleindes van hierdie verslag wel toegepas. Sekere statistiese parameters is egter ook vir diagnostiese doeleindes gebruik aan die hand waarvan besluit is watter proewe liefs weggelaat moes word.

Diagnostiese parameters:

KV- Die Koëffisient van Variasie verwys na die fout van enkel persele en gee 'n aanduiding van die grootte van die variasie tussen perseelwaardes wat vanaf verskeie bronne afkomstig is. Die KV gee dus 'n aanduiding van die akkuraatheid van die perseelwaardes (grootte van die waarde). Bronne van variasie is byvoorbeeld grondvariasie (vrugbaarheid, diepte, grondvog, kleipersentasie, ongelykheid, ens) en plantvariasie (bevolkingsgrootte, oneweredige groei ens). Stremmingstoestande (vog, temperatuur, siektes, ens) het so dikwels tot gevolg dat normaalweg aanvaarbare grond- en plantvariasie baie sterker in die proefdata tot uiting kan kom en die KV vergroot. 'n Relatief hoë KV, wat aan hand van bekende bronne van variasie verklaar kan word, kan nie as die enigste parameter gebruik word om onbetroubare proefdata te identifiseer nie.

GKV- Die Genetiese Koëffisient van Variasie verwys na die verskille in genotype-opbrengs. Die GKV is dus 'n aanduiding van die variasiegrootte wat aan verskille in genetiese samestelling tussen genotypeinskrywings toegeskryf kan word. Hoë waardes kan die gevolg wees van siektevatbaarheid, groot verskille in rypwordingstadium, temperatuurgevoeligheid en soortgelyke afwykings. Dit word ook gebruik om uitskieterproewe te identifiseer.

tn- Genotipeherhaalbaarheid verwys na die herhaalbaarheid van genotypegemiddeldes en kan gedefinieer word as die verwantskap tussen die genotipe variansie en die totale variansie. Hierdie parameter is eintlik van waarde vir proewe waarvan die aantal herhalings nie dieselfde is nie.

t- Die Intraklas Korrelasie verwys na die herhaalbaarheid van perseelwaardes oor herhalings. Hoe groter die ooreenstemming tussen perseelwaardes oor herhalings vir elke genotipeinskrywing is, hoe nader sal "t" na 1.0 neig.

SF(t)- Die Standaard Fout van die Intraklas Korrelasie (t) gee 'n aanduiding van hoe akkuraat die skatting van "t" is.

t/SF(t)- Hierdie verhouding word as 'n belangrike parameter beskou daar die Intraklas Korrelasie (t) moet verkieslik minstens drie keer groter as sy foutterm moet wees. 'n Verhouding van kleiner as 3.0 dui aan dat die betrokke stel proefdata as minder betroubaar beskou kan word.

EENJARIGE RESULTATE

Proeflokaliteite

Lokaliteite, proefplasings en die besonderhede van medewerkers vir die 2009/2010 proefreeks verskyn in Tabel 2.

Lokaliteitsbeskrywing

Beskikbare inligting aangaande die grondbeskrywing met bemesting en ander relevante inligting oor verbouing verskyn in Tabel 3, reënval en besproeiing in Tabel 4.

Groeitoestande

Groeitoestande het verskil tussen lokaliteite en moet in ag geneem word wanneer resultate geïnterpreteer word. In die algemeen het bo-normale reënval voorgekom oor die somer produksiegebied van die land. Wydverspreide reën en donderstorms het voorgekom oor die sentrale en oostelike streke met swaar buie veral oor die noordelikeVrystaat,Gauteng en Noordwes wat gelei het tot vloede en versuiptoestande.

n' Goeie groeiseisoen is ondervind in meeste van die mielies produksiegebiede.

Groeitoestande verskil tussen lokaliteite en dit moet in ag geneem word wanneer die genotiperesultate vertolk word.

Standaard van proefuitvoering

Tydens proefbesoeke is vasgestel dat voorskriftelike prosedures oor die algemeen nagekom is en dat proefversorging aan die verwagtings voldoen het. Dataverwerking is vertraag deurdat proefdata in sommige gevalle nie in die voorgeskrewe vorm voorsien is nie. Resultate is dikwels ook onvolledig verskaf, wat die inligting onaanvaarbaar of onbetroubaar gemaak het.

Proefmislukkings

Die proewe by Wolmaranstad en Bultfontein (Link Seed), Koster D P1 en Koster D P2 (National Seed), Vilijoenskroon en Wesselsbron (K_2 Agri), is nie aangeplant nie of het misluk .

Statistiese diagnostiek

Volgens die statistiese parameters in Tabel 5 was die graanopbrengs van die proewe te, Warmbad (LP-DDLGO) nie vir statistiese verwerking en vir verdere opbrengsanalises aanvaarbaar nie.

Staanvermoë

Die gemiddelde totale persentasie omgevalde plante, dit sluit beide stambreek en wortelvrot in, word in Tabel 6 aangegee. Die groeiseisoenlengte (groeidae tot blom plus groeidae tot fisiologiese volwassenheid) en die afdrogingstempo van genotipes dra ook verder by tot omval. Genotipeverskille is vanselfsprekend in al die proewe waarneembaar en hierdie feite moet noodwendig aan omval gekoppel word.

Omval is nie statisties verwerk nie, maar die gemiddeldes in Tabel 6 kan 'n aanduiding gee van die staanvermoë van genotipes. Omdat die genotipes egter tot verskillende vogpersentasies uitgedroog het, is dit moeilik om gevolgtrekkings te maak. ‘n Lae graad van omval is vanjaar in die proewe waargeneem.

Spruitvorming

Die invloed van omgewingsfaktore soos onder andere grondvrugbaarheid, bemesting, vog, temperatuurtoestande, plantbevolking en plantspasiëring is sodanig dat die bydrae van elkeen by spruitvorming nie altyd duidelik is nie. Die gemiddelde persentasie spruitvorming van die genotipes word in Tabel 7 aangegee. Die gemiddelde persentasie spruitvorming wissel tussen 16.72 % by Koster e tot 53.20 % at by Coligny. Die wit genotipe IMP 51-11 (61.54%) en geel genotipe IMP 51-22 (53.55%) het die hoogste persentasie spruitvorming getoon

Meerkoppigheid

Enkelkoppigheid of meerkoppigheid by genotipes is ‘n eienskap wat ook deur 'n hele aantal omgewingsfaktore beïnvloed word en die 2007/2008 seisoen dui aan dat groeikondisies geskik was vir kopvorming (Table 8). Die hoogste gemiddeld vir koppe plant was gemeet by at Hoogekraal (2.49), terwyl die laagsre gemiddeld vir antal koppe gemeet is by Delareyville (1.34). Genotipes PAN 6Q-445B (2.59) en PAN 6Q-419B (2.47) her die hoogste meerkoppige voorkoms.

Graanvog

Die persentasie vog van die graan tydens oestyd word in Tabel 9 weergegee. Die graanvog saam met die groeiseisoenlengte van 'n genotipe kan 'n aanduiding gee van die afdrogingstempo van die spesifieke genotipe. Oor die algemeen was die graanvog redelik laag gewees. Die gemiddelde persentasie graanvog het gewissel van 9.66% by Leeudoringstad tot 17.24 % by Hoogekraa. Van die geel genotypes het Phb 32W72B (10.73%) en PAN 6Q-308B (13.15%) onderskeidelik die laagste en hoogste persentasie graanvog getoon terwyl PAN 4P-313B (11.36 %) en LS 8511 (15.17%) die ooreenstemmende wit genotipes was.

Die vogpersentasie van elke genotipe was geplot teenoor die opbrengs van elke genotipe en word aangedui in Figuur 2a & b. Vanuit die figuur kan produseerders aflei dat op grond van graanvogpersentasie, die genotipes geklassifiseer kan word as vroeë of laat groeiseisoen genotipes.

Graanopbrengs

Die opbrengspotensiaal en aanpassingsvermoë van genotipes in spesifieke omgewings bly die belangrikste maatstaf om genotipeprestasie te vergelyk. Omgewingstoestande verskil van jaar tot jaar en afleidings van genotipeprestasie vanaf een jaar se data is nie so betroubaar soos vanaf meerjarige data nie. Die gekombineerde variansieanalise (ANOVA) van die 50 genotipes oor 23 lokaliteite wat ontleed is volgens die AMMI 2 model word weergegee in Tabel 1. Die ANOVA dui op hoogs betekenisvolle verskille vir omgewings, genotipes en belangrik, genotipe x omgewingsinteraksies. Die IPCA 1 en IPCA 2 – waardes was ook hoogs betekenisvol. Tabel 10 toon die gemiddelde graanopbrengs aan van 50 mielie genotipes wat getoets is by 23 omgewings.

Die hoogste gemiddelde opbrengs van 9.51 t ha^{-1} is by Viljoenskroon aangeteken en die laagste by Delareyville (3.19 t ha^{-1}). Die geel genotipe wat die beste gevaar het was LS 8518 with 6met ‘n gemiddeld van 6.36 t ha^{-1} en die beste wit genotipe was PAN 6Q-445B met ‘n gemiddeld van 7.25 t ha^{-1} behaal het. Tabel 11 verteenwoordig data van die AMMI analise met die IPCA 1 en IPCA 2 – waardes vir die omgewings.

Tabel 12 toon die AMMI stabiliteitswaardes aan vir elke genotipe. Die mees stabiele geel genotipe was Phb 31D48B wat gevolg is deur PAN 6616. Die mees stabiele wit genotipes was LS 8513 wat gevolg is deur DKC 78-45BR. Tabel 13 dui die beste AMMI seleksies aan van genotipes in omgewings.

Gemiddelde waardes van eienskappe

‘n Samevatting van die gemiddelde waardes van alle eienskappe word in Tabel 14 weergegee.

INTRODUCTION

The annual results of 2009/2010 and the multi- seasonal results of 2007/2008,2008/09 and 2009/2010 series of National Cultivar Trials with commercially available maize genotypes are summarised in this report. The adaptability of commercial genotypes to a wide range of yield potentials is evaluated in these trials. Genotype entries consist of popular as well as newer commercial genotypes with the potential to become popular.

These results are indicative of genotype performance under specific environmental conditions occurring during a season. Results of more than one year, compiled from these trials, are more reliable and are more suitable for genotype recommendations than annual results.

RESEARCH PROCEDURE

Standard, and scientifically acceptable procedures were prescribed for the execution of this research programme. Co-workers were given a free hand to implement the most suitable cultivation practices in their areas in order to optimise yield and to create conditions of varying yield potential.

Trial design

A randomized Complete Block Design with three replicates to accommodate the 50 entries was used throughout. Each locality was allocated it's own trial randomisation which differs annually.

Genotype entries

The same 50 genotypes were used in all the trials and consisted of genotypes entered by the seed companies involved. Seed company entries are in order of priority. Where too many entries were received the final genotype choice was made through negotiations with each seed company.

Plot size and spacing

A standard of 40 plants per net plot was prescribed throughout whereas the choice of plant population (plants ha^{-1}), row widths and spacing was left to the discretion of the co-workers. A number of 22 plants in each of two plant rows per gross plot was recommended for row widths less than 1.5 m, while a number of 42 plants in a single plant row per gross plot was recommended for row widths of 1.5 m and greater.

Border rows were only prescribed for the perimeter of the trial and no border rows were required between plots. One boundary plant had to be removed from each end of the plant row at harvest.

Soil and fertilization

Soil types normally used for maize production were used where possible. Choosing specific soil conditions for specific trial purposes also incorporated differences in production potentials. Fertilizer applications were not prescribed but applied according to soil fertility and maize yield potential of that area.

Planting date

Accepted planting dates for successful maize production in the area involved were recommended.

Planting and harvesting methods

Trials were mechanically or manually planted (two or more seeds per hill) and thinned out as soon as the seedlings were strong enough. Trials were mechanically or hand harvested.

Pest control

The use of suitable herbicides and insecticides were freely allowed as effective pest control, weed and insects, was required. Use of suitable systemic soil insecticides were also allowed. The use of pesticides was required to be reported.

Disease

Co-workers were requested to report the incidence of any diseases immediately to ensure that the necessary follow-up and data collecting could be done. Natural infection of any disease should be severe enough to give genotype reaction and differences. A disease infestation of more than 10.0 % is used as a guideline.

Observations

The following information and observations are requested each year:

1. Fertilizer quantity, time and method of application.
2. Pesticide quantity, time and method of application.
3. Planting, plant emergence and harvesting dates.
4. Spacing, gross and net plot size.
5. Monthly rainfall (and irrigation where applicable).
6. Number of days from planting date to 50 % pollen shed (where possible).
7. Number of days from planting date to 50 % silking (where possible).
8. Number of plants lodged (leaning more than 45 degrees) at harvest.
9. Number of plants per net plot.
10. Number of tillers per net plot.
11. Number of ears per net plot.
12. Ear mass or grain mass of all plots of all three replications.
13. Grain mass of Replication 1, if ear mass was measured.
14. Grain moisture percentage.
15. Additional observations, for example the amount of rotted ears or other noticeable and meaningful genotype differences.

Statistical analysis

Grain yield was the only parameter statistically analyzed. In general, an AMMI analysis was used to indicate the adaptability and stability of genotypes for different environments. The combined analysis of variance according to the Additive Mean Effects And Multiplicative Interaction (AMMI) model was preformed using the GENSTAT Package (Table1).

AMMI Stability Value (ASV) is the distance from zero in a two dimensional scatter-gram of IPCA 1 scores against IPCA 2 scores.

As the ASV nearing zero the genotype can be considered more stable for the environments. Additional explanations and information about AMMI are available in Appendix A

Statistical procedures normally used to identify and exclude outlier trials from the AMMI model were used for the purposes of this report. Certain statistical parameters (diagnostic parameters) were also used to help in the selection of trials for presentation.

The diagnostic parameters were as follows:

CV- The coefficient of variation - this parameter relates to the error of a single plot, and as such relates to the variability as induced by soil variation or plant population i.e. the larger the variation the larger the CV. Stress conditions (moisture, temperature, diseases, etc.) result in acceptable soil variation to be more pronounced in trials and a higher CV is recorded. The CV on its own cannot be used as a parameter to discard trials.

GCV- The genetic coefficient of variation - this parameter relates to the yield differential between the highest and lowest entry yield, relative to the trial mean i.e. the greater the difference between the extreme values, the larger the GCV. High values are indicative of disease sensitivity, differences in maturity stage, temperature sensitivity and like problems.

tn - Repeatability of genotype mean yield - relates to the repeatability of entry means, and can be defined as the relationship of genetic variance of observed means. In genotype trials this parameter is useful only when the number of replications between trials varies, otherwise the t-value is sufficient.

t - The repeatability of plot yield or intra class correlation coefficient - relates to the repeatability of plot means over replications, and is interpreted as is the normal correlation coefficient, i.e. the greater the concurrence of plot values per entry over replications the closer “t” will strive towards unity. The standard error calculated for a particular t-value indicates the accuracy of the estimate of “t”

SE (t) - Standard Error of the Intraclass Correlation (t) denotes how accurate the estimation of "t" is.

t/ SE (t) - This relationship is considered an important parameter as the Inter Class Correlation

(t) should be at least three times greater than it's error term. A relationship of less than 3.0 denotes low reliability.

SINGEL SEASONAL RESULTS

Trial localities

Localities, trial placements and co-worker particulars for the 2009/2010 trial series appear in Table 2

Locality descriptions

Avialable information about fertilization and other relevant cultivation information appear in Table 3, rainfall and irrigation in Table 4 and chemical pest control in Table 5.

Growing conditions

Growing conditions differed between localities and this must be taken into consideration when interpreting results. In general, above-normal rainfall occurred over the entire summer production area of the country. Widespread rain and thundershowers occurred over the central and eastern parts with heavy falls especially over the northern Free State, Gauteng and North West which cased flooding and water logging condition in those areas.

A good growing season was experienced in most of the maize production area.

Growing conditions differed between localities and this must be taken into account, when interpreting results.

Standard of trial execution

Visits to trials confirmed that prescribed procedures were followed and that trials were satisfactorily carried out. Data processing was delayed as some of the trial data was not in the prescribed format or incomplete, which made it unacceptable or unreliable.

Trial failures

The trials at Wolmaranstad and Bultfontein (Link seeds), Koster D P1 and Koster D P2 (National Seed), Vilijoenskroon and Wesselsbron (K_2 Agri) were not planted or failed during the season.

Statistical diagnostics

According to the statistical parameters in Table 5 the grain yield of the trial at Warmbad (LP-DDLGO) were unacceptable for statistical and yield analysis.

Stand ability

The mean total percentages of lodged plants, which include both stalk and root lodging, appear in Table 6. The length of the growing season (days to flowering plus days to physiological maturity) and the rate of drying of the genotypes also have an effect on lodging and must be borne in mind. Genotype differences were noted and must be kept in mind.

Lodging was not statistically analysed, but the means in Table 6 give an indication of the stand ability of the genotypes. It is, however, difficult to make any conclusions as the genotypes dried out to different moisture percentages. Lodging was observed to be low in all the trials.

Tillering

The influence of environmental factors like soil fertility, fertilization, moisture, temperature conditions, plant population and plant spacing is such that their contribution to the occurrence of tillering is not clear. The mean percentage tillering is presented in Table 7. The mean percentage of tillering ranged from 16.72 % at Koster to 53.20 % at Coligny. The white genotype IMP 51-11 (61.54%) and the yellow genotype IMP 51-22 (53.55 %) had the highest percentage tillering.

Prolificacy

A number of environmental conditions affect prolificacy in maize. Results for the 2009/2010 season indicate that growing conditions were favourable for ear development (Table 8**)**. The highest mean for ears per plant was recorded at Hoogekraal (2.49), while the lowest mean number of ears was recorded Delareyville (1.34). Genotypes PAN 6Q-445B (2.59) and PAN 6Q-419B (2.47) had the highest prolificacy incidence.

Grain moisture

The percentage moisture of the grain at harvest is presented in Table 9**.** The grain moisture together with the growing season length of a genotype can give an indication of the genotype's drying rate. The recorded grain moisture tended to be low. The mean percentage grain moisture recorded varied between 9.66 % for Leeudoringstad and 17.24 % at Hoogekraal. The yellow genotypes Phb 32W72B (10.73%) and PAN 6Q-308B (13.15%) had the lowest and highest grain moisture percentages respectively, while PAN 4P-313B (11.36%) and LS 8511 (15.17%) were the white counterparts. The moisture perecentage of each hybrid was plotted with the yield of each hybrid were shown in figure number 2a & 2b, from that figure the producers will be able to classified the hybrids according to the moisture percentage if it is late or early growing season hybrids.

Yield

The yield potential and adaptability of genotypes in specific environments are the most important criteria for measuring genotype performance. Environmental conditions differ from year to year, thus more reliable conclusions can be drawn from multi-seasonal data than from just one year's data. The combined analysis of variance (ANOVA) of the 50 genotypes over 25 environments, according to the AMMI 2 model are presented in Table 1. The ANOVA indicated highly significant differences for environments, genotypes and importantly, genotype X environment interaction. The IPCA 1 and IPCA 2 scores were also highly significant. Table 10 shows the mean grain yield of 50 maize genotypes tested at 25 environments.

The highest mean yield recorded was at Viljoenskroon (9.51 t ha^{-1}) and the lowest at Delareyville (3.19 t ha^{-1}). The yellow genotype that produced the highest mean yield was LS 8518 with 6.36 t ha^{-1} and the highest yielding white genotypes was PAN 6Q-445BWith a mean yield of 7.25 t ha^{-1}. Table 11 presents data of the AMMI analysis with the IPCA1 and IPCA2 scores for the environments.

Table 12 represents the AMMI stability values for each genotype. The most stable yellow genotype was Phb 31D48B followed by PAN 6616 and the most stable white genotypes were LS 8513 followed by DKC 78-45BR. Table (13) indicates the best AMMI selections of genotype per environment.

Mean values for all characteristics.

The mean values for all characteristics for which data were collected are presented in Table 14.

MEERJARIG PROEWE

INLEIDING

Resultate van, 2006/2007, 2007/2008 en 2005/2006 Nasionale Kultivar Proefreekse met mielies, is in hierdie verslag saamgevat. Hierdie meerjarige genotiperesultate is aanduidend van genotipeprestasie onder die spesifieke omgewingstoestande wat in die betrokke drie jaar ondervind is. Genotipe aanbevelings sal vir soortgelyke groeitoestande geldig wees.

NAVORSINGSPROSEDURE

Standaard en wetenskaplik erkende prosedures en waarnemings wat vir die navorsingsprogram voorgeskryf is, word in die jaarverslae beskryf en word dus nie herhaal nie. Slegs daardie prosedures wat gewysig is of spesifiek op hierdie meerjarige verslag van toepassing is, word aangehaal.

Genotipevergelyking

'n Regverdigbare genotipe vergelykingsnorm het tot gevolg dat slegs daardie genotipes wat elke jaar sedert 2006/2007 in die Nasionale Genotipeproewe met mielie genotipe ingeskryf is, in die verslag opgeneem kon word. Nuwe belowende genotipes of ander genotipes wat slegs vir een of twee van die drie jare in die proewe voorgekom het, is nie in hierdie verslag opgeneem nie. Meerjarige resultate van 21 genotipes word aangebied.

Die gemiddeld van al die genotipes oor al die lokaliteite word as 'n standaard genotipe vergelykingsnorm gebruik in die AMMI-analises.

Statistiese verwerking en diagnostiek

Graanopbrengs was die enigste parameter wat statisties ontleed is. In die algemeen is ‘n AMMI analise gebruik om die aanpasbaarheid en stabiliteit van genotipes aan te dui vir verskillende omgewings. Die gekombineerde variansieanalise volgens die “Additive Mean Effective And Multiplicative Interaction (AMMI)” model is uitgevoer met die GENSTAT program (Tabel 15).

Die “Principle Component Interaction Analysis (IPCA)” van genotipes in die AMMI analise gee ‘n aanduiding van die genotipe se stabiliteit oor verskillende omgewings. Hoe groter die IPCA-waarde, beide negatief of positief, hoe meer is ‘n genotipe aangepas vir ‘n spesifieke omgewing. Hoe nader die IPCA-waardes aan nul kom hoe meer stabiel is die genotipes vir al die omgewings waarin dit getoets is. AMMI Stabiliteits-Waardes (ASW) is die afstand vanaf nul in ‘n tweedimensionele verspreidingsgrafiek van IPCA 1-waardes teenoor IPCA 2-waardes. Soos die ASW-waarde nader kom aan nul kan ‘n spesifieke genotipe as meer stabiel geklassifiseer word vir omgewings. Addisionele beskrywings en informasie oor AMMI is beskikbaar in Aanhangsel A.

Die proewe wat gebruik is vir die multi-seisoenale vergelyking is daardie wat voldoen aan die voorvereistes van diagnostiese parameters en die toets vir uitskieters gedurende elk van die drie jaar.

RESULTATE

Groeitoestande

Dit is belangrik dat die groeitoestande wat gedurende die 2006/2007, 2007/2008 en 2009/2010 seisoene geheers het, deeglik in ag geneem word by die interpretasie van die resultate. Dit sal verhoed dat onregverdige genotipe uitsprake gemaak word.

Staanvermoë

Omval is as gevolg van die teenwoordigheid van stam- en wortelvrotsiektes sowel as oorsake wat nie met 'n swak stam verband hou nie, 'n gekompliseerde aspek. Die groeiseisoenlengte (groeidae tot blom plus groeidae tot fisiologiese volwassenheid) en die afdrogingstempo van genotipe dra ook by tot omval. Die genotipe droog egter tot verskillende vogpersentasies af, en duidelike gevolgtrekkings is moeilik om te maak. Min seisoensverskille het voorgekom volgens die omvalpersentasies van die 21 genotipes in Tabel 16**.** Meer omval het in die 2007/08 seisoen voorgekom as in sie ander twee seisoen en verskille tussen gentopies is waarneem baar.

Spruitvorming

‘n Hoë mate van spruitvorming het by van die 21 genotipes oor die drie seisoene voorgekom (Tabel 17). Dit kan die gevolg wees van die vele faktore soos grondvrugbaarheid, bemesting, vog, temperatuurtoestande, plantbevolking en plantspasiëring wat spruitvorming kan beïnvloed. Genotipeverskille kan tog tot 'n mate waargeneem word.

Kopvermoë

Enkelkoppigheid of meerkoppigheid by genotipe is eienskappe wat ook deur 'n hele aantal omgewingsfaktore beïnvloed word. Die aantal koppe per plant in Tabel 18 toon geringe variasie tussen genotipes en seisoene aan.

Graanvogpersentasie

Die gemiddelde persentasie vog van die graan tydens oestyd, word in Tabel 19 weergegee. Die graanvog saam met die groeiseisoenlengte van 'n genotipe kan 'n aanduiding gee van die pitvullings- en afdrogingstempo van 'n spesifieke genotipe. Figuur 2 dui die verhouding aan tussen vogpersentasie en graanopbrengs vir die 21 genotipes wat getoets is, oor ‘n periode van drie jaar. Produsente kan van die figuur aflei watter genotipes is vroeë of laat fisiologiese ryp genotipes.

Graanopbrengs

Die opbrengspotensiaal en aanpassingsvermoë van genotipe in spesifieke omgewings bly die belangrikste maatstaf om genotipeprestasie te vergelyk. Omgewingstoestande verskil van jaar tot jaar asook van lokaliteit tot lokaliteit, en afleidings van genotipeprestasie vanaf een jaar se data is nie so betroubaar soos vanaf meerjarige data nie. Die gekombineerde variansieanalise (ANOVA) van die 21 genotipes oor 70 lokaliteite wat ontleed is volgens die AMMI 2 model word weergegee in Tabel 15. Die ANOVA dui op hoogs betekenisvolle verskille vir omgewings, genotipes en belangrik, genotipe x omgewingsinteraksies. Die IPCA 1 en IPCA 2 – waardes was ook hoogs betekenisvol. Tabel 20 toon die gemiddelde graanopbrengs aan van 21 mielie genotipes wat getoets is by 70 omgewings.

Die hoogste gemiddelde opbrengs van 11.72 t ha^{-1} is by Hoogekraal 08 aangeteken en die laagste by Lichtenburg 08 (2.51 t ha^{-1}). Die geel genotipe wat die beste gevaar het was PAN 6Q-308B met ‘n gemiddeld van 6.33 t ha^{-1} en die beste wit genotipe was Phb 30Y79B wat ‘n gemiddeld van 6.69 t ha^{-1} behaal het. Tabel 21 verteenwoordig data van die AMMI analise met die IPCA 1 en IPCA 2 – waardes vir die omgewings.

Tabel 22 verteenwoordig die AMMI stabiliteitswaardes vir elke genotipe. Die mees stabiele geel genotipe was PAN 6Q-308B en die mees stabiele wit genotipe DKC 77-61B. Tabel 23 dui die beste AMMI genotipe seleksies aan per omgewing.

Gemiddelde waardes

Die samevatting van die gemiddelde waardes verskyn in Tabel 24 vir gerieflike gebruik.

Vrywaring

Die opsteller van die dokument en enige ander bron/instansie/persoon verantwoordelik vir enige inligting genoem in hierdie dokument is na die beste wete van die opstellers korrek met druktyd. Die inligting is ontwikkel deur wetenskaplike prosesse en word in goeder trou aangebied. Enige persoon/instansie wat hierdie inligting gebruik doen dit op eie risiko en die opstellers of enige ander party sal onder geen omstandighede verantwoordelik gehou kan word vir enige verliese gelei deur enige persoon/instansie wat die inligting in hierdie dokument gebruik nie.

MULTISEASONAL TRIALS

INTRODUCTION

Results of 2006/2007, 2007/2008 and 2009/2010 National Cultivar Trial series with maize are summarised in this report. These multi-seasonal results are indicative of genotype performance under specific environmental conditions experienced during the relevant three years. Genotype recommendations will be valid for similar growing conditions.

RESEARCH PROCEDURE

Standard and scientifically acceptable procedures were prescribed for this research programme and are described in the annual reports and are therefore not repeated. Only those procedures that were adapted or are specifically applicable to this multi-seasonal report are mentioned.

Genotype comparison

To obtain fair genotype comparison only genotypes that were entered in the National Cultivar Trials with maize since 2006/2007 were included in this report. Promising new genotypes and other genotypes that were included in one or two of the three years were not included in this report. Multi-seasonal results of 21 genotypes are presented.

The mean of all genotypes over all localities is used as standard genotype comparison in the AMMI model analysis.

Statistical analysis and diagnostics

The grain yield data were statistically analysed and is presented in the form of AMMI model analysis which was used to indicate the adaptability and stability of genotypes for different environments. The combined analysis of variance according to the Additive Mean Effects and Multiplicative Interaction (AMMI) model was preformed using the GENSTAT Package (Table 15).

The Principle Component Interaction Analysis (IPCA) of genotypes in the AMMI analysis is an indication of the stability of a genotype over environments. The greater the IPCA scores, either negative or positive, the more specifically adapted a genotype is to a certain environment. The closer IPCA scores approach zero the more stable the genotype is over all environments sampled.

AMMI Stability Value (ASV) is the distance from zero in a two dimensional scatter-gram of IPCA 1 scores against IPCA 2 scores. As the ASV nearing zero the genotype can be considered more stable for the environments. Additional explanations and information about AMMI were available in Appendix A

The trials that are used for this multi-seasonal comparison are those that fulfilled the requirements of the diagnostic parameters and the test for outliers during each of the three years.

RESULTS

Growing conditions

It is most important that the growing conditions that prevailed during the 2006/2007, 2007/2008 and 2009/2010 seasons, are taken into account thoroughly in the interpretation of the results. This will prevent incorrect genotype comparisons.

Stand ability

The stand ability of genotypes is an important characteristic, but is often caused by moisture stress and the incidence of stalk and root rot and stalk borer damage, that genotype differences can very often not be directly linked to the genotype itself. The length of growing season (growing days to flowering, plus growing days to physiological maturity) and the rate of drying of genotypes, can contribute to lodging. Genotypes dried out to various moisture percentages and clear conclusions are difficult to draw. Significant lodging can also occur during times of drought. Relatively high seasonal differences did occur according to the results on mean percentage lodging of the 21 genotypes over three years as given in Table 16.

More lodging occurred during 2007/2008 than in the other season and differences between genotypes were noticeable.

Tillering

A high degree of tillering occurred amongst the 21 genotypes. Factors such as soil fertility, fertilization, moisture, temperature during the season, plant population, plant spacing and the genotype, determine the amount of tillers produced.

The mean percentage tillering of the genotypes over three years is given in Table 17 where genotype differences can be noted.

Prolificacy

The number of ears produced per plant can be determined by a number of environmental conditions, but is also a characteristic of the genotype. The mean number of ears per plant of the genotypes over 3 years is given in Table 18.

Grain moisture percentage

The percentage grain moisture at harvest is presented in Table 19. The grain moisture percentage and length of growing season of a genotype can give an indication of the rate of drying. Figure 3 shows the relationship between moisture percentage and grain yield for the 21 genotypes have been tested for three seasons. From this figure the producers might conclude which genotypes are early maturing or late.

Grain Yield

The yield potential and adaptability of genotypes in specific situations are the most important criteria for measuring genotype performance. Environmental conditions differ between years and localities, thus more reliable conclusions can be drawn from multi- seasonal data than from that of one single year. The combined analysis of variance (ANOVA) of the 21 genotypes over 70 environments and three years, according to the AMMI 2 model, are presented in Table 15. The ANOVA indicated highly significant differences for environments, genotypes and importantly genotype x environment interaction. The IPCA 1 and IPCA 2 scores were also highly significant. Table 20 shows the mean grain yield of 21 maize genotypes tested at 70 environments. The highest mean yield recorded was at Hoogekraal 08 (11.72 t ha^{-1}) and the lowest at Lichtenburg 08 (2.51 t ha^{-1}). The yellow genotype that produced the highest mean yield was PAN 6Q-308B with 6.33 t ha^{-1} and the highest yielding white genotype was PhB 30Y79B with a mean yield of (6.69) t ha^{-1}.

Table 21 presents data of the AMMI analysis with the IPCA1 and IPCA2 scores for the environments. Table 22 represents the AMMI stability values for each genotype. The most stable yellow genotype was PAN 6Q-308B and the most stable white genotype was DKC 7-61B Table 23 indicates the best AMMI selections of genotypes per environment.

Mean values

The mean values of all characteristics are summarised in Table 24 for easy use.

Indemnity

The composer of this document and any other source/institution/person responsible for any information contained in this document is to the best knowledge of the composers correct at printing. The information was developed using sound scientific procedures and is presented in good faith. Institutions or people use this information at own risk and the composers or any other party will under no circumstances be under any legal obligation regarding any losses occurring by using the information contained in this document.

Tabel 1 ANOVA analise van mielie genotipes geevalueer met die gebruik van die AMMI 2 model vir die westelike gebiede gedurende die 2009/2010 seisoen
Table 1 Combined analysis of variance (ANOVA) according to the AMMI 2 model of maize genotypes evaluated in the western areas during 2009/2010 season

Bron Source	df	SS	MS	F	F_ prob
Totaal/Total	3749	15460	4.12	*	*
Behandeling/Treatment	1249	13795	11.04	18.42	0
Genotipe/Genotype	49	1174	23.96	39.97	0
Omgewing/Environment	24	10986	457.74	116.28	0
Block	50	197	3.94	6.57	0
Interaksie/Interaction	1176	1635	1.39	2.32	0
IPCA 1	72	370	5.13	8.56	0
IPCA 2	70	239	3.41	5.69	0
Res/Residual	1034	1027	0.99	1.66	0
Fout/Error	2450	1469	0.60	*	*

Table 2 Trial localities and co-workers 2009/2010

Lokaliteit Locality	Maatskappy Company	Medewerker Co-worker
Bothaville D	Monsanto	M. Alberts
Bothaville D	Pannar	C. Badenhorst
Bothaville D	Link Seed	P. Herbst
Bultfontein D	Link Seed	P. Herbst
Delareyville	Pannar	C. Badenhorst
Coligny D	LNR / ARC-GCI	F.P. Van Rooyen
Delareyville D	NW Koöp	C.D. van Gerve / J.H. Swart
Glaudina D	Monsanto	M. Alberts
Hartbeesfontein D	LNR / ARC-GCI	A. Kilian
Hoogekraal D	Pannar	C. Badenhorst
Kapsteel D	Monsanto	M. Alberts
Kapsteel D	Pioneer Hi-Bred	
Koster D	NW Koöp	C.D. van Gerve / C.A. Pitout
Koster D P1	National Seed	
Koster D P2	National Seed	
Leeudoringstad D	LNR / ARC - GCI	A. Roux
Lichtenburg D	Monsanto	M. Alberts
Lichtenburg D	NW Koöp	C.D. Gerve
Lichtenburg D	Pioneer Hi-Bred	
Nampo D	LNR / ARC-GCI	
Ottosdal D	LNR / ARC-GCI	
Potchefstroom D	LNR / ARC-GCI	
Rushof D	LNR / ARC-GCI	
Tweebuffels D	LNR / ARC-GCI	
Ventersdorp D	LNR / ARC-GCI	
Viljoenskroon D	K2 Agri	
Viljoenskroon D	Agricol	
Viljoenskroon D	Link Seed	P. Herbst
Viljoenskroon D	Monsanto	M. Alberts
Warmbad D	LP-DDLGO	
Wesselsbron D	LNR / ARC-GCI	
Wesselsbron D	Pioneer Hi-Bred	
Wesselsbron D	K2 Agri	
Wolmaranstad D	Link Seed	

Tabel 3 Grondbeskrywing, bemesting, plantdatum, spasiëring en plantbevolking van elke proeflokaliteit 2009/2010
Table 3 Soil description, fertilization, planting date, row width and plant populatin for localities 2009/2010

Lokaliteit	Grondvorm & serie	Bemesting voor/ met planttyd	Bemesting na planttyd	Plant- datum	Oes- datum	Rywydte	Plant- bevolking
Locality	Soil vorm & series	Fertilization before/ at planting (kg/ha)	Fertilization after planting (kg/ha)	Planting date	Harvest date	Row width (cm)	Plant population x1000
Bothaville D				10/12/2009	23/07/2010	320	40
Bothaville D				17/11/2009	21/06/2010	90	40
Bothaville D		350kg 2.3.4 (30) per ha	200kg Urea /ha	18/11/2009	23/06/2010	91	
Bultfontein D		350kg 2.3.4 (30) per ha	200kg Urea /ha				
Delareyville				16/12/2009	21/06/2010	150	40
Coligny D		145 kg/ha 4:3:3 (36) +Zn	105 kg/ha Ureum	26/11/2009	25/06/2010	230	40
Delareyville D	Clovelly 3200 Mooilaagte	150 kg/ha 20:7:3 (30)	150kg/ha Greensulf	21/12/2009	14/07/2010	152	
Glaudina D				17/11/2009	30/06/2010	230	40
Hartbeesfontein D		160 kg/ha 20:7:3 (30)	120 kg/ha 3:0:1 (31)	23/11/2009		204	40
Hoogekraal D				18/11/2009	12/05/2010	150	40
Kapsteel D				04/12/2009	09/06/2010	230	
Kapsteel D				26/11/2009	28/05/2010	225	30
Koster D	Hutton 3100 Stella	150 kg/ha 20:7:3 (30)	150kg/ha Greensulf	16/11/2009	01/06/2010	152	
Koster D P1							
Koster D P2							
Leeudoringstad D		260 kg Ureum + 114 kg supers + 40 kg K2SO4 /ha	200 kg/ha 5:2:0	13/11/2009		165	40
Lichtenburg D				16/12/2009	16/07/2010	230	40
Rietgat D	Hutton Stella	150 kg/ha 20:7:3 (30)	150kg/ha Greensulf	24/11/2009	15/06/2010	152	
Lichtenburg D				30/11/2009	26/05/2010	150	30
Nampo D				25/11/2009	29/06/2010	91	40
Ottosdal D	Clovelly	40.2 N; 16.4 P; 7.2 K	47 N	11/12/2009		91	40
Potchefstroom D				18/12/2009	19/07/2010	150	40
Rushof D				14/12/2009	01/07/2010	150	40
Tweebuffels D				27/11/2009	23/06/2010	150	
Ventersdorp D				17/12/2009		135	35
Viljoenskroon D							
Viljoenskroon D							
Viljoenskroon D		350 kg/ha 2.3.4 (30)	200kg Urea /ha	18/11/2009	23/06/2010	91	
Viljoenskroon D				09/12/2009	21/07/2010	230	40
Warmbad D							
Wesselsbron D				12/11/2009		150	40
Wesselsbron D				24/11/2009	17/06/2010	215	32
Wesselsbron D							
Wolmaranstad D							

Tabel 4 Reënval en besproeiing by proeflokaliteite 2009/2010
Table 4 Rainfall and irrigation at trial localities 2009/2010

Lokaliteite Localities	Reënval vir 2009 Rainfall for 2009 (mm)						Reënval vir 2010 Rainfall for 2010 (mm)						Totaal Total	Besproeiing Irrigation
	Jul	Aug	Sept	Okt/Oct	Nov	Des/Dec	Jan	Feb	Mrt	Apr	Mei	Jun		
Bothaville D														
Bothaville D														
Bothaville D														
Bultfontein D														
Delareyville	0.0	18.0	8.0	102.0	27.0	53.0	158.0	111.0	69.0	65.0	16.0	0.0	627.0	
Coligny D	29.0	0.0	15.0	59.0	83.0	106.0	194.0	159.0	115.0	112.0	31.0	0.0	903.0	
Delareyville D														
Glaudina D														
Hartbeesfontein D	22.0	8.0	17.0	67.0	73.0	117.0	201.0	77.0	98.0	57.0	18.0	0.0	755.0	
Hoogekraal D														
Kapsteel D														
Kapsteel D														
Koster D	0.0	27.0	14.0	31.0	94.0	114.0	156.0	107.0	129.0	135.0	87.0	0.0	894.0	
Koster D P1														
Koster D P2														
Leeudoringstad D	0.0	0.0	38.0	130.0	79.0	485.0	315.0	46.0	138.0	48.0	12.0	0.0	1291.0	
Lichtenburg D														
Lichtenburg D	31.0	2.0	18.0	65.0	61.0	78.0	151.0	129.0	129.0	108.0	21.0	0.0	793.0	
Lichtenburg D														
Nampo D														
Ottosdal D	0.0	30.0	0.0	105.0	36.0	68.0	121.0	290.0	85.0	70.0	27.0	0.0	832.0	
Potchefstroom D														
Rushof D														
Tweebuffels D														
Ventersdorp D														
Viljoenskroon D														
Viljoenskroon D														
Viljoenskroon D														
Viljoenskroon D														
Warmbad D														
Wesselsbron D														
Wesselsbron D														
Wesselsbron D														
Wolmaranstad D														

Tabel 5 Diagnostiese parameters vir die statistiese aanvaarbaarheid van proewe vir betroubare opbrengsanalises

Table 5 Diagnostic parameters for the statistical acceptabilitiy of trials for reliable yield analysis

Omgewing Environment	Proefgemiddeld Trial mean	KV CV %	GKV GCV %	tn %	t	SF(t) SE(t)	t/Sf(t) t/Se(t)
Bothaville (5)	7.86	11.80	10.16	69.14	0.43	0.09	4.94
Bothaville (6)	**2.40**	**34.90**	**#NUM!**	**-10.60**	**-0.03**	**0.01**	**-2.74**
Bothaville (8)	8.85	6.00	12.96	93.31	0.82	0.05	15.98
Coligny(3)	6.37	16.30	9.78	51.80	0.26	0.07	3.84
Coligny(8)	4.83	6.20	14.60	94.31	0.85	0.05	18.45
Delareyville(7)	3.19	12.50	11.38	71.34	0.45	0.09	5.18
Glaudin(6)	**5.36**	**15.70**	**#NUM!**	**-16.45**	**-0.05**	**0.02**	**-2.70**
Hartbeesfontein(3)	3.93	11.90	10.42	69.59	0.43	0.09	4.99
Hoogekraal(8)	8.73	7.90	13.75	89.99	0.75	0.07	11.31
Kapsteel(6)	3.53	13.20	9.66	61.80	0.35	0.08	4.35
Kapsteel(9)	5.62	16.70	12.72	63.47	0.37	0.08	4.47
Koster (7)	5.03	9.10	15.98	90.20	0.75	0.07	11.50
Leeudoringstad(3)	6.23	10.63	17.04	85.00	0.65	0.08	8.17
Lichtenburg(6)	5.47	12.30	11.44	72.26	0.46	0.09	5.28
Lichtenburg(7)	5.38	8.10	13.04	88.60	0.72	0.07	10.15
Lichtenburg(9)	6.23	19.70	10.78	47.43	0.23	0.06	3.68
Nampo(3)	6.61	19.40	6.72	29.89	0.12	0.04	3.23
Ottosdal(3)	6.63	11.60	12.68	78.22	0.54	0.09	6.21
Potchefstroom(3I)	6.88	7.50	12.62	89.36	0.74	0.07	10.75
Rushof(3)	6.41	10.80	8.50	64.99	0.38	0.08	4.58
Tweebuffels(3)	3.87	20.20	6.75	25.10	0.10	0.03	3.14
Ventersdorp(3)	4.31	13.70	11.67	68.60	0.42	0.09	4.89
Viljoenskroon(1)	9.51	8.50	11.12	83.63	0.63	0.08	7.64
Viljoenskroon(5)	8.20	12.40	10.15	66.92	0.40	0.09	4.74
Viljoenskroon(6)	3.87	17.70	7.01	32.00	0.14	0.04	3.27
Wesselsbron(3)	6.16	15.60	9.53	52.82	0.27	0.07	3.88
Wesselsbron(9)	5.78	13.80	10.95	60.61	0.34	0.08	4.28
Warmbad(10)	**4.48**	**38.90**	**14.21**	**51.80**	**0.12**	**0.05**	**3.21**

1=Agricol, 2=Free state, 3=GGI, 4=K2, 5=Link seeds, 6=Monsanto, 7=North West, 8=Pannar, 9=Pioneer, 10=LPDoA

Bold =Trials have been rjected

Vetgedruk=Proewe is verwerp

Tabel 6 Gemiddelde persentasie plante omval vir die 2009/2010 seisoen
Table 6 Mean percentage lodged plants 2009/2010 season

Genotipes Genotypes	Koster	Botha-ville	Ottos-dal	Botha-ville	Lichten-burg	Viljoens-kroon	Gem Mean
AFG4434R	0.00	0.00	0.00	0.00	0.85	0.86	0.14
AFG4479R	2.72	0.00	0.83	0.00	0.00	0.00	0.59
AFG4530	1.69	0.00	0.85	0.00	0.00	0.00	0.42
AFG4577B	0.93	0.00	0.00	0.00	0.00	0.00	0.15
CRN3505	0.00	0.00	0.00	0.93	0.00	1.55	0.15
DKC66-36R	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DKC73-74BR	0.00	0.00	0.00	0.00	0.00	0.78	0.00
DKC73-76R	0.00	0.00	0.00	0.00	0.00	0.81	0.00
DKC77-61B	1.39	0.98	2.70	0.00	0.00	0.00	0.85
DKC77-71R	1.19	1.19	0.00	1.75	0.00	1.59	0.69
DKC78-15B	0.00	1.19	0.00	0.00	0.00	0.81	0.20
DKC78-35R	0.00	0.00	0.00	5.22	0.00	0.67	0.87
DKC78-45BR	0.00	0.00	0.83	0.00	0.00	1.01	0.14
DKC80-12B	0.00	2.57	1.75	0.00	1.67	1.52	1.00
DKC80-40BR	0.62	2.22	0.85	0.00	0.00	0.00	0.62
IMP51-22	2.86	0.00	0.00	2.78	2.08	0.86	1.29
IMP51-92	0.68	0.00	0.83	0.00	0.00	0.00	0.25
IMP52-11	0.00	0.00	0.00	0.00	0.00	1.96	0.00
LS8504	1.36	0.98	3.33	0.00	0.00	3.07	0.95
LS8511	0.76	0.85	0.85	1.04	1.75	0.00	0.88
LS8512	0.00	0.00	0.83	0.00	0.00	4.04	0.14
LS8513	0.74	0.00	0.00	0.98	1.80	6.61	0.59
LS8518	0.00	0.00	0.00	0.95	0.81	0.00	0.29
LS8519	0.00	0.00	0.00	0.00	2.03	2.50	0.34
LS8521B	1.31	2.30	0.00	1.01	0.00	1.61	0.77
LS8523B	0.00	1.01	0.00	0.00	0.00	9.05	0.17
NS5920	0.00	1.15	1.75	0.00	0.00	0.00	0.48
PAN4P-313B	0.60	0.67	0.00	0.00	0.00	2.72	0.21
PAN4P-316B	0.00	0.00	0.00	0.00	0.88	0.00	0.15
PAN4P-516R	1.85	0.00	0.00	0.88	0.00	1.55	0.45
PAN4P-716BR	0.00	0.00	0.00	0.00	1.11	2.63	0.19
PAN5Q-433B	1.82	0.98	0.00	0.00	0.00	4.19	0.47
PAN5Q-649R	0.00	0.00	0.00	1.08	0.00	0.00	0.18
PAN5R-541R	0.65	0.00	0.93	0.83	0.00	0.79	0.40
PAN6611	0.74	0.00	0.00	0.00	0.00	4.00	0.12
PAN6616	0.00	0.90	0.00	0.93	0.00	6.35	0.30
PAN6723	0.00	0.00	0.85	0.00	0.00	0.00	0.14
PAN6P-110	0.00	0.00	3.42	1.92	1.75	0.00	1.18
PAN6Q-308B	0.72	0.00	0.83	0.93	0.00	0.00	0.41
PAN6Q-419B	0.00	0.00	0.83	5.05	0.00	1.67	0.98
PAN6Q-445B	0.67	0.00	0.00	0.95	0.00	0.00	0.27
PAN6Q-508R	0.81	0.00	0.00	0.00	0.00	0.00	0.14
PAN6Q-708BR	0.00	2.08	0.00	0.00	0.00	0.00	0.35
Phb30B97BR	0.00	0.95	0.83	0.00	6.81	0.00	1.43
Phb30Y79B	1.21	0.00	0.85	0.00	0.90	0.00	0.49
Phb30Y83	0.00	0.00	0.00	0.00	0.00	6.37	0.00
Phb31D48B	0.00	0.00	1.67	1.67	0.00	0.73	0.56
Phb32D95BR	0.00	3.43	6.84	0.00	0.00	1.78	1.71
Phb32W72B	0.00	2.94	0.00	0.00	0.00	2.29	0.49
QS7646	0.74	0.00	3.33	0.00	0.00	4.25	0.68
Gem/Mean	0.52	0.53	0.72	0.58	0.45	1.57	0.47

Tabel 7 Gemiddelde persentasie spruitvorming vir die 2009/2010 seisoen
Table 7 Mean percentage tillering 2009/2010 season

Genotipes Genotypes	Leeudoring- stad	Rus- hof	Wessels- bron	Coligny	Koster NW	Potchef- stroom	Ottos- dal	Lichten- burg	Botha- ville	Hartbees- fontein	Nampo	Twee- buffels	Venters- dorp	Gem Mean
AFG4434R	24.11	18.04	48.57	62.93	0.00	20.18	37.50	50.05	1.23	26.20	34.87	43.63	20.79	29.85
AFG4479R	12.97	19.52	21.14	24.46	3.83	9.80	18.44	5.88	1.85	9.09	6.54	15.92	10.06	12.27
AFG4530	18.45	9.61	13.75	17.89	0.00	18.84	9.27	4.45	1.45	17.50	10.66	23.49	23.53	12.99
AFG4577B	17.17	25.99	20.59	48.53	9.72	21.36	33.95	34.73	13.85	24.13	16.09	40.25	16.85	24.86
CRN3505	20.13	24.49	32.71	49.47	38.54	22.43	50.83	27.56	17.96	41.31	30.25	26.09	25.74	31.35
DKC66-36R	12.84	20.83	35.57	42.49	17.62	20.19	48.33	24.55	23.80	32.82	19.65	28.78	33.84	27.79
DKC73-74BR	11.11	16.24	31.22	49.93	0.63	11.59	35.30	18.89	19.88	16.00	21.39	18.40	16.82	20.57
DKC73-76R	18.81	29.28	32.10	32.79	1.15	18.53	36.90	8.30	21.17	17.54	32.22	20.00	18.81	22.12
DKC77-61B	19.14	26.22	16.85	43.88	8.89	15.86	37.88	27.51	16.52	19.07	22.60	17.69	22.26	22.64
DKC77-71R	13.11	19.71	35.87	58.68	13.07	23.39	31.67	30.57	4.85	20.63	28.97	29.26	18.08	25.22
DKC78-15B	27.68	28.46	56.28	59.12	16.28	18.77	47.86	41.80	15.20	26.05	31.49	24.09	27.67	32.37
DKC78-35R	37.74	46.67	43.93	73.87	29.42	22.65	59.17	36.33	22.57	38.25	31.46	28.79	29.88	38.52
DKC78-45BR	19.29	22.93	101.53	47.90	17.08	25.97	60.00	44.25	16.60	26.35	35.78	31.32	43.24	37.86
DKC80-12B	14.65	30.34	24.64	47.26	0.61	11.94	32.63	8.02	10.52	21.74	24.39	41.54	11.21	21.50
DKC80-40BR	13.87	19.56	23.78	33.33	1.85	17.50	29.27	15.37	5.68	16.67	14.23	26.31	13.17	17.74
IMP51-22	68.75	56.94	49.29	75.24	36.84	40.56	47.86	49.24	30.29	66.09	30.50	58.10	86.47	53.55
IMP51-92	15.08	16.42	37.02	61.25	0.00	13.33	28.76	19.83	7.28	31.77	30.66	28.55	32.17	24.78
IMP52-11	74.27	46.17	71.39	70.11	55.61	45.58	67.78	71.92	49.82	53.30	45.50	58.98	89.64	61.54
LS8504	15.81	23.78	44.88	38.06	1.36	14.24	42.50	8.94	4.02	22.24	32.78	33.52	25.75	23.68
LS8511	52.70	25.59	32.50	55.30	26.64	29.00	54.34	49.03	27.33	36.87	28.78	31.40	38.44	37.53
LS8512	28.31	27.14	49.22	79.97	8.43	19.78	50.90	37.36	33.24	37.29	29.86	40.48	30.05	36.31
LS8513	31.04	35.87	26.00	43.27	21.40	22.08	49.17	43.47	23.48	47.27	32.82	24.97	40.00	33.91
LS8518	25.83	18.61	36.54	59.72	25.87	27.48	39.57	56.06	32.49	46.62	32.03	31.67	41.90	36.49
LS8519	16.44	32.37	37.44	54.04	16.98	18.94	40.00	30.76	24.16	42.23	27.26	27.97	28.18	30.52
LS8521B	18.74	29.27	30.19	35.97	5.30	9.13	16.53	19.16	10.34	34.75	18.46	22.83	24.91	21.20
LS8523B	23.96	15.48	19.00	44.67	16.58	15.10	32.78	25.16	8.80	20.53	29.93	29.29	31.43	24.05
NS5920	36.04	31.85	63.34	42.35	7.32	23.70	48.76	17.51	10.00	24.29	33.96	41.67	46.35	32.86
PAN4P-313B	48.68	19.48	63.82	65.13	36.37	31.72	53.46	51.65	33.97	49.14	33.77	50.43	51.11	45.29
PAN4P-316B	13.53	19.70	35.54	38.54	2.00	14.76	21.49	3.70	1.19	18.14	12.95	18.62	13.34	16.42
PAN4P-516R	12.76	23.54	34.29	50.00	0.00	13.63	19.17	4.02	15.41	15.36	14.25	15.52	20.77	18.36
PAN4P-716BR	19.98	23.34	36.13	40.67	2.13	18.52	22.17	8.85	4.06	19.02	7.90	11.32	26.06	18.47
PAN5Q-433B	25.81	29.00	30.05	54.41	17.14	27.73	52.50	35.56	20.74	26.92	30.22	22.97	27.01	30.77
PAN5Q-649R	12.50	26.82	14.25	32.98	0.61	22.74	8.55	3.47	0.98	16.67	9.04	27.48	10.42	14.35
PAN5R-541R	46.90	17.31	64.64	90.67	30.66	15.22	45.96	26.43	36.91	56.47	31.42	49.12	52.30	43.39
PAN6611	63.03	41.90	47.62	72.18	41.23	25.74	62.50	50.16	32.14	35.95	34.75	38.48	42.38	45.24
PAN6616	12.91	16.57	26.67	58.75	35.47	25.96	55.00	48.37	24.76	40.27	31.30	42.78	42.45	35.48
PAN6723	59.89	22.46	49.17	64.74	34.44	41.49	57.99	50.09	38.07	63.03	29.13	50.15	59.65	47.72
PAN6P-110	15.44	24.61	14.47	58.07	10.03	24.32	50.83	29.34	14.81	32.84	36.55	31.42	40.10	29.45
PAN6Q-308B	16.99	28.65	66.76	77.09	4.68	26.74	49.53	53.51	15.32	30.63	29.94	41.89	39.74	37.04
PAN6Q-419B	47.85	33.56	70.06	75.73	20.45	26.40	62.99	42.50	14.46	46.82	28.65	50.60	65.64	45.05
PAN6Q-445B	62.90	40.14	67.22	79.68	56.45	49.18	68.10	80.18	52.60	57.86	37.19	52.99	67.82	59.41
PAN6Q-508R	37.41	24.11	30.36	49.44	22.92	14.50	48.36	17.12	22.87	41.29	34.34	41.62	28.53	31.76
PAN6Q-708BR	26.03	27.96	41.86	35.24	3.03	27.11	44.47	56.52	20.61	40.50	26.94	38.16	29.01	32.11
Phb30B97BR	15.58	25.08	32.27	41.75	26.43	17.04	40.00	23.30	26.19	30.53	26.96	31.67	18.28	27.31
Phb30Y79B	39.10	21.13	38.60	76.69	39.53	44.98	55.77	67.79	29.98	45.01	39.83	37.71	68.40	46.50
Phb30Y83	59.01	31.49	52.63	73.57	61.45	43.90	63.89	57.23	33.18	51.49	37.54	60.84	87.90	54.93
Phb31D48B	19.55	16.67	30.11	35.00	1.89	16.39	35.83	18.26	10.23	16.84	25.34	24.34	23.81	21.10
Phb32D95BR	16.25	32.82	42.06	50.00	0.76	13.05	27.71	18.94	9.22	25.39	27.89	20.78	12.21	22.85
Phb32W72B	22.46	11.27	45.41	57.81	7.24	17.17	46.24	26.42	20.26	27.90	32.16	26.92	29.52	28.52
QS7646	14.12	23.13	18.85	29.29	0.00	16.32	14.17	5.88	10.63	18.07	12.63	30.93	16.94	16.23
Gem/Mean	27.93	25.96	39.76	53.20	16.72	22.65	41.89	31.72	18.86	32.45	27.28	33.23	34.41	31.24

Tabel 8 Gemiddelde aantal koppe per plant 2009/2010 seisoen
Table 8 Mean number of cobs per plant 2009/2010 season

Genotipes Genotypes	Coligny	Leeudoring-stad	Nampo	Rus-hof	Wessels-bron	Botha-ville	Delarey-ville	Potchef-stroom	Hooge-kraal	Ottos-dal	Botha-ville	Lichten-burg	Koster NW	Hartbees-fontein	Twee-buffels	Venters-dorp	Gem Mean
AFG4434R	1.99	1.34	1.43	1.26	1.21	1.30	1.10	1.46	1.65	1.32	1.31	2.14	1.16	1.36	1.49	1.22	1.42
AFG4479R	1.57	1.44	1.87	1.53	1.36	1.56	1.44	1.79	1.67	1.55	1.94	2.11	1.28	1.54	1.31	1.42	1.59
AFG4530	1.57	1.37	1.63	1.37	1.29	1.68	1.07	1.51	1.93	1.47	2.04	1.62	1.07	1.34	1.53	1.50	1.50
AFG4577B	2.53	1.75	1.84	1.71	1.44	1.42	1.40	2.06	2.38	1.98	2.09	2.40	1.62	1.59	1.69	1.83	1.86
CRN3505	2.31	1.98	2.11	2.13	1.85	1.59	1.72	2.24	2.67	2.21	2.34	2.48	2.56	2.34	2.09	1.89	2.16
DKC66-36R	1.96	1.48	1.71	1.62	1.37	1.38	1.20	1.85	2.52	1.77	2.03	2.31	1.65	1.53	1.64	1.71	1.73
DKC73-74BR	1.61	1.22	1.78	1.33	1.34	1.00	1.14	1.46	1.67	1.38	2.04	1.76	1.23	1.32	1.24	1.33	1.43
DKC73-76R	1.34	1.25	1.68	1.28	1.43	1.03	1.10	1.42	2.02	1.28	1.73	1.70	1.09	1.24	1.38	1.35	1.39
DKC77-61B	2.25	1.88	1.80	1.65	1.37	1.35	1.31	1.95	2.40	1.97	2.04	2.16	1.54	1.68	1.69	1.69	1.79
DKC77-71R	2.22	1.76	1.77	1.72	1.43	1.91	1.46	1.88	2.86	1.94	2.19	2.33	1.68	1.59	1.78	1.46	1.87
DKC78-15B	2.40	2.06	1.97	2.10	1.77	2.05	1.64	2.27	3.41	2.07	2.24	2.63	2.09	1.89	1.94	1.96	2.16
DKC78-35R	2.58	2.09	2.02	2.28	1.87	1.82	1.81	2.34	2.81	2.09	2.08	2.63	2.19	2.12	1.94	1.88	2.16
DKC78-45BR	2.61	1.86	2.08	2.10	2.47	1.77	1.67	2.21	2.88	2.20	2.01	2.52	2.08	1.89	2.10	1.81	2.14
DKC80-12B	2.40	2.05	1.92	2.09	1.69	1.89	1.23	2.04	2.53	2.19	2.15	2.19	1.98	2.11	2.00	1.97	2.03
DKC80-40BR	2.37	2.05	2.12	2.21	1.75	1.85	1.61	2.15	2.51	2.11	2.26	2.32	1.95	2.10	2.02	1.97	2.08
IMP51-22	2.30	2.08	2.11	1.78	1.75	1.10	1.48	1.90	2.74	1.99	2.05	2.63	2.08	2.00	1.97	1.90	1.99
IMP51-92	1.65	1.70	1.77	1.45	1.20	1.44	0.99	1.60	2.02	1.82	1.92	1.61	1.38	1.41	1.31	1.33	1.54
IMP52-11	2.37	1.99	2.03	1.57	1.89	1.09	1.04	1.53	2.55	1.86	1.53	1.82	1.86	1.59	1.49	1.90	1.76
LS8504	1.20	1.71	2.05	1.77	1.75	1.57	1.20	1.95	2.03	1.83	1.65	2.00	1.48	1.79	1.82	1.86	1.73
LS8511	1.94	1.88	1.51	1.38	1.41	1.30	1.28	1.77	2.30	1.81	2.43	2.08	1.67	1.46	1.50	1.31	1.69
LS8512	2.60	1.70	1.93	1.79	1.71	1.42	1.39	1.76	2.29	1.89	1.66	2.26	1.71	1.69	1.88	1.61	1.83
LS8513	1.68	1.86	1.68	1.57	1.35	1.53	1.16	1.57	2.20	1.70	2.02	2.14	1.72	1.64	1.50	1.51	1.68
LS8518	2.27	1.60	1.82	1.72	1.43	1.56	1.13	1.72	2.13	1.66	1.97	1.90	1.63	1.71	1.58	1.66	1.72
LS8519	2.06	1.68	2.05	1.55	1.52	1.55	1.12	1.87	2.34	1.90	2.29	2.02	1.70	1.74	1.50	1.64	1.78
LS8521B	2.05	1.78	1.72	1.68	1.57	1.53	1.27	1.67	1.84	1.77	1.84	2.09	1.44	1.74	1.60	1.78	1.71
LS8523B	1.75	1.51	2.08	1.36	1.28	1.42	1.13	1.60	1.63	1.64	1.93	2.10	1.40	1.42	1.66	1.53	1.59
NS5920	1.97	1.54	1.76	1.55	1.39	1.38	1.13	1.50	2.19	1.66	1.59	1.85	1.32	1.32	1.41	1.41	1.56
PAN4P-313B	2.53	2.28	2.20	1.75	1.88	1.52	1.37	2.35	2.75	2.19	2.59	2.75	2.11	1.81	1.83	2.15	2.13
PAN4P-316B	2.05	2.05	1.96	2.01	1.91	2.04	1.42	2.25	2.52	2.01	2.01	2.46	1.77	1.71	1.92	1.65	1.98
PAN4P-516R	2.54	2.11	1.98	2.13	2.34	2.29	1.22	2.20	2.48	2.18	2.02	2.54	1.99	1.78	1.84	1.79	2.09
PAN4P-716BF	2.42	2.13	1.87	2.20	2.10	1.70	1.14	2.24	2.58	2.12	1.83	2.38	1.59	1.88	1.74	2.04	2.00
PAN5Q-433B	2.66	2.06	2.14	2.11	1.71	1.71	1.68	2.18	2.71	2.02	2.49	2.45	2.06	1.97	1.71	2.08	2.11
PAN5Q-649R	2.45	2.06	1.91	2.00	1.87	2.45	1.44	2.30	2.43	2.04	2.11	2.21	2.02	1.83	1.96	1.96	2.06

Tabel 8 Vervolg

Table 8 Continued

Genotipes Genotypes	Coligny	Leeudoring-stad	Nampo	Rus-hof	Wessels-bron	Botha-ville	Delarey-ville	Potchef-stroom	Hooge-kraal	Ottos-dal	Botha-ville	Lichten-burg	Koster NW	Hartbees-fontein	Twee-buffels	Venters-dorp	Gem Mean
PAN5R-541R	2.85	2.12	2.00	1.88	2.11	1.49	1.20	2.10	2.48	2.07	2.46	2.32	2.20	2.03	1.96	1.85	2.07
PAN6611	2.61	2.38	1.76	1.89	1.64	1.12	1.26	2.16	2.37	2.19	2.26	2.56	2.07	1.63	1.56	1.83	1.95
PAN6616	2.44	1.91	1.93	1.97	1.66	1.69	1.56	2.04	2.76	2.14	1.75	2.53	1.99	1.88	1.81	1.93	2.00
PAN6723	2.94	2.50	2.30	2.00	2.06	1.61	1.50	2.42	3.18	2.26	1.77	3.29	2.46	2.31	2.00	1.92	2.28
PAN6P-110	2.50	2.17	1.96	2.03	1.97	1.84	1.26	2.40	3.18	2.06	2.23	2.57	2.02	2.04	1.71	1.88	2.11
PAN6Q-308B	2.54	2.34	2.16	2.09	2.17	1.81	1.50	2.24	3.19	2.08	2.64	2.65	2.00	2.00	1.80	1.95	2.20
PAN6Q-419B	3.17	2.41	2.36	2.31	2.38	2.27	1.92	2.32	2.93	2.44	2.87	3.19	2.38	2.20	2.12	2.31	2.47
PAN6Q-445B	2.88	2.80	2.33	2.37	2.36	1.46	1.74	2.69	3.52	2.83	3.80	3.14	2.60	2.42	2.15	2.34	2.59
PAN6Q-508R	2.68	2.43	2.25	2.24	1.98	1.73	1.39	2.23	3.02	2.20	2.55	2.58	2.45	1.98	2.01	1.88	2.22
PAN6Q-708BF	2.29	2.41	2.07	2.05	2.18	1.86	1.35	2.26	3.03	2.21	2.68	3.05	2.06	2.25	2.06	2.06	2.24
Phb30B97BR	2.18	2.08	2.22	2.10	1.83	1.63	1.26	2.20	2.34	2.03	2.56	2.00	1.97	2.04	1.97	1.83	2.01
Phb30Y79B	2.29	1.89	1.87	1.55	1.36	1.30	1.29	1.88	1.88	1.91	2.39	1.95	1.41	1.60	1.69	1.46	1.73
Phb30Y83	2.23	2.13	1.94	1.52	1.61	1.47	1.30	1.95	2.32	2.07	2.12	2.22	1.90	1.54	1.68	1.60	1.85
Phb31D48B	2.23	1.63	1.89	1.76	1.41	1.63	1.24	2.01	2.80	1.93	1.90	2.13	1.76	1.54	1.73	1.61	1.82
Phb32D95BR	1.86	1.34	1.60	1.71	1.32	1.30	1.18	1.61	2.66	1.67	1.65	1.92	1.22	1.36	1.45	1.42	1.58
Phb32W72B	2.59	1.89	2.26	1.85	1.87	1.65	1.11	2.18	2.71	1.90	2.30	2.28	1.76	1.83	1.68	1.88	1.98
QS7646	2.24	1.82	2.08	2.10	1.70	1.71	1.49	1.94	2.34	2.06	2.23	1.96	1.95	1.71	2.03	1.65	1.94
Gem/ Mean	2.25	1.91	1.94	1.82	1.71	1.60	1.34	1.98	2.49	1.95	2.13	2.30	1.80	1.77	1.75	1.75	1.91

Tabel 9 Gemiddelde graanvogpersentasie met oestyd 2009/2010 seisoen
Table 9 Mean percentage grain moisture at harvest 2009/2010 season

Genotipes Genotypes	Rus-hof	Koster NW	Wessels-bron	Ottos-dal	Delarey-ville	Nampo	Kap-steel	Botha-ville	Viljoens-kroon	Viljoens-kroon	Botha-ville	Lichten-burg
AFG4434R	10.30	14.23	9.30	12.62	12.50	10.40	9.97	14.70	10.90	13.57	10.70	11.40
AFG4479R	10.10	14.53	10.60	12.08	12.77	9.80	9.97	12.60	11.30	13.37	11.00	11.07
AFG4530	11.10	14.50	9.20	13.13	13.00	10.00	10.40	14.30	11.10	13.93	11.30	10.87
AFG4577B	8.90	15.57	9.90	13.64	13.47	10.50	10.03	15.70	10.90	13.77	11.60	11.70
CRN3505	11.60	15.40	10.30	13.47	13.63	9.90	10.90	15.50	11.20	14.43	11.00	12.27
DKC66-36R	8.90	13.53	9.30	11.53	12.23	8.30	9.53	12.50	10.20	12.27	10.70	10.50
DKC73-74BR	12.00	15.67	10.10	12.08	12.33	8.80	9.67	13.20	10.50	14.50	10.90	11.37
DKC73-76R	10.30	15.33	9.40	12.08	12.97	8.70	9.53	15.10	10.40	13.10	10.90	11.13
DKC77-61B	14.40	14.77	9.50	13.81	13.53	10.50	10.13	15.50	10.20	13.33	11.10	11.70
DKC77-71R	12.50	15.97	10.30	15.21	13.67	9.30	10.57	16.00	10.40	13.10	10.40	11.87
DKC78-15B	13.90	15.70	8.70	14.45	13.37	9.80	11.43	14.40	11.10	13.93	11.30	12.37
DKC78-35R	13.90	15.83	13.20	15.45	13.00	10.30	11.07	15.60	11.00	13.63	11.00	12.00
DKC78-45BR	12.10	15.47	11.30	14.15	13.73	11.20	11.07	16.90	10.70	14.10	11.10	11.77
DKC80-12B	10.70	14.13	10.50	12.79	12.43	9.80	9.67	12.40	10.60	12.87	11.20	10.80
DKC80-40BR	10.30	14.00	10.00	11.90	12.83	9.50	10.00	13.60	10.20	12.57	10.70	11.33
IMP51-22	9.30	13.60	9.70	10.52	12.20	9.60	9.53	11.90	10.20	12.57	10.50	10.97
IMP51-92	10.30	13.53	10.40	11.14	12.47	8.40	10.77	14.60	11.30	14.70	11.60	11.63
IMP52-11	9.90	14.83	8.40	11.53	12.30	10.20	10.40	12.90	11.00	13.93	11.10	11.77
LS8504	10.30	14.27	9.50	13.81	12.50	10.00	9.87	11.20	11.20	14.00	11.30	11.20
LS8511	17.60	18.43	11.80	18.06	15.03	12.10	11.83	17.80	12.50	18.57	12.80	13.20
LS8512	10.30	14.83	10.30	13.64	13.03	10.50	10.33	14.50	11.20	13.83	11.50	11.73
LS8513	13.90	16.60	10.50	16.89	13.43	10.30	10.23	15.70	11.70	17.00	11.40	12.80
LS8518	12.90	15.53	9.60	15.45	13.37	11.20	10.67	15.20	11.10	14.37	11.40	11.87
LS8519	11.80	16.37	10.90	15.45	13.47	11.80	11.03	15.70	11.30	15.40	11.10	13.20
LS8521B	12.40	14.93	9.00	12.26	13.23	11.00	10.27	14.80	10.40	13.23	10.70	11.50
LS8523B	11.80	13.93	9.50	12.44	12.83	9.50	9.87	12.80	9.80	13.50	9.90	11.17
NS5920	12.20	14.93	9.70	12.79	12.87	12.10	10.63	15.50	10.90	14.57	10.70	11.00
PAN4P-313B	10.20	14.33	8.70	11.90	12.63	9.10	10.40	12.40	11.10	13.30	10.90	11.53
PAN4P-316B	10.00	14.13	10.00	12.44	12.50	9.20	10.20	10.40	10.90	12.77	10.70	11.23
PAN4P-516R	10.70	13.33	9.90	11.34	12.33	9.00	10.00	10.90	10.70	13.27	10.70	10.77
PAN4P-716BR	10.60	13.87	10.40	12.26	12.33	9.40	10.23	12.20	10.70	12.53	10.90	11.03
PAN5Q-433B	10.50	14.37	9.70	14.59	13.73	9.40	10.60	13.60	11.00	14.23	11.00	11.87
PAN5Q-649R	10.90	14.50	8.10	12.26	12.80	9.20	9.97	10.90	11.00	14.07	10.70	10.93
PAN5R-541R	11.30	16.00	11.00	13.64	12.53	8.20	10.10	15.40	10.60	13.67	10.90	11.40
PAN6611	10.80	15.70	9.60	13.47	13.03	9.90	10.70	14.60	11.00	14.37	11.20	12.30
PAN6616	11.20	14.93	9.70	13.13	12.73	9.50	9.80	14.60	10.90	13.40	10.90	12.00
PAN6723	11.00	16.97	9.20	14.59	13.13	8.90	10.60	14.80	11.80	14.40	11.20	12.20
PAN6P-110	12.40	14.57	9.30	13.13	13.33	9.30	10.40	14.90	11.50	13.60	11.10	13.43
PAN6Q-308B	12.70	15.10	11.30	15.33	13.37	10.80	10.53	16.10	11.20	14.23	11.20	13.77
PAN6Q-419B	10.30	15.53	8.80	14.31	13.73	11.30	10.93	17.20	11.20	13.83	10.90	12.10
PAN6Q-445B	10.20	15.27	10.40	12.96	12.90	10.20	10.50	14.80	11.10	13.83	11.40	12.10
PAN6Q-508R	10.00	14.03	11.50	13.30	13.17	10.50	9.97	12.70	11.20	13.87	11.20	12.27
PAN6Q-708BR	12.90	14.73	8.40	14.59	13.10	10.40	9.80	14.70	11.00	13.87	11.20	12.23
Phb30B97BR	10.30	14.43	9.20	11.72	13.20	9.80	10.47	12.20	10.70	13.80	11.30	11.73
Phb30Y79B	11.40	15.33	9.50	14.45	12.77	10.20	10.43	15.20	11.10	14.87	11.20	12.30
Phb30Y83	11.70	15.40	10.60	12.79	13.00	9.10	10.30	15.20	10.90	14.30	11.10	11.87
Phb31D48B	10.40	13.83	8.10	11.72	12.30	9.80	9.77	12.80	11.20	13.47	11.00	10.83
Phb32D95BR	10.70	13.93	10.50	11.90	12.33	9.70	9.57	11.60	11.10	13.03	10.70	11.03
Phb32W72B	10.20	13.37	8.40	10.30	12.07	8.60	9.53	13.40	10.60	12.32	10.20	10.47
QS7646	11.30	14.87	9.30	13.81	12.93	11.10	9.90	13.40	11.40	14.87	10.90	12.33
Gem/ Mean	11.31	14.90	9.85	13.25	12.96	9.92	10.28	14.09	10.94	13.88	11.03	11.72

Tabel 9 Vervolg
Table 9 Continued

Genotipes Genotypes	Coligny	Coligny	Hartbees-fontein	Leeudoring-stad	Twee-buffels	Venters-dorp	Potchef-stroom	Lichten-burg	Hooge-kraal	Lichten-burg	Mean Gem
AFG4434R	13.70	9.40	11.20	10.50	10.60	10.90	9.70	10.80	16.20	15.53	11.78
AFG4479R	13.40	8.90	10.60	10.10	10.40	11.06	12.20	10.90	16.00	15.70	11.75
AFG4530	12.40	9.60	11.10	9.60	9.20	11.80	11.70	11.67	15.30	15.00	11.83
AFG4577B	12.00	8.90	10.60	8.40	11.00	12.80	11.10	11.53	19.20	16.13	12.15
CRN3505	14.40	11.30	12.30	10.60	9.10	11.90	12.50	11.40	19.70	17.43	12.74
DKC66-36R	13.00	9.40	11.70	8.80	9.00	10.10	9.50	10.43	13.90	14.17	10.89
DKC73-74BR	12.70	11.70	10.90	9.10	9.90	12.50	11.50	10.83	18.00	16.07	12.01
DKC73-76R	12.70	9.30	10.80	9.40	9.00	13.70	10.50	11.07	19.40	15.00	11.81
DKC77-61B	13.10	9.70	11.90	8.60	11.60	12.40	10.10	11.10	19.50	14.60	12.32
DKC77-71R	12.90	10.10	11.80	10.30	10.90	14.10	12.60	11.00	18.90	16.93	12.67
DKC78-15B	14.00	10.10	12.60	10.70	10.70	14.00	12.20	11.50	18.20	16.97	12.79
DKC78-35R	14.40	9.80	12.80	9.20	10.60	12.90	11.40	11.37	20.70	17.03	13.01
DKC78-45BR	12.60	10.90	12.90	10.70	11.60	12.50	12.00	11.53	19.10	16.50	12.91
DKC80-12B	12.70	9.40	10.90	10.10	10.10	10.40	11.50	10.93	16.90	14.20	11.59
DKC80-40BR	13.30	8.60	11.60	9.80	9.30	11.50	10.90	10.87	16.80	14.63	11.56
IMP51-22	12.40	8.60	11.40	9.00	9.70	10.40	10.70	10.23	13.70	13.57	10.92
IMP51-92	12.40	10.50	11.20	8.80	9.40	10.40	11.00	10.83	15.70	15.03	11.64
IMP52-11	12.20	8.60	11.60	9.30	9.40	11.00	10.70	11.23	16.10	15.47	11.54
LS8504	12.70	9.90	11.20	10.10	10.00	12.20	10.10	11.33	16.30	15.17	11.73
LS8511	15.20	13.00	12.80	12.00	15.20	17.60	15.90	13.57	19.30	19.43	15.17
LS8512	13.60	8.60	11.60	11.10	10.10	10.70	10.80	11.53	16.90	16.77	12.15
LS8513	15.00	9.90	11.90	10.10	10.90	16.20	12.50	12.40	18.60	18.27	13.46
LS8518	14.20	11.00	12.40	10.50	10.70	13.90	12.10	11.93	17.20	18.03	12.94
LS8519	14.00	10.70	12.80	10.40	9.20	16.20	10.90	11.53	17.80	18.10	13.14
LS8521B	12.20	9.50	11.50	8.80	10.90	10.90	10.50	11.33	16.50	16.03	11.90
LS8523B	13.00	10.30	10.50	9.40	10.80	10.90	9.40	11.07	15.60	15.57	11.53
NS5920	13.40	10.40	11.20	10.10	8.40	13.80	11.30	11.07	17.30	17.17	12.37
PAN4P-313B	12.90	8.30	11.40	8.40	9.90	12.00	9.80	10.43	15.20	15.03	11.36
PAN4P-316B	13.00	8.70	10.50	9.00	8.10	11.80	10.60	10.53	13.90	14.70	11.15
PAN4P-516R	12.90	8.70	10.50	9.00	10.00	10.60	9.60	10.90	14.20	13.60	11.04
PAN4P-716BR	12.10	8.60	10.70	9.90	8.80	10.50	10.30	10.67	14.50	14.07	11.21
PAN5Q-433B	12.60	10.00	11.10	10.40	9.90	10.50	11.00	11.07	17.70	14.33	11.96
PAN5Q-649R	12.80	10.30	11.40	10.10	10.20	12.00	11.30	11.07	16.70	15.27	11.66
PAN5R-541R	13.20	8.80	11.10	8.60	10.90	11.50	11.00	11.07	16.40	17.73	12.05
PAN6611	13.40	9.80	11.10	9.20	10.50	13.20	11.20	11.63	19.80	17.57	12.46
PAN6616	14.00	8.50	11.80	9.10	10.40	12.60	11.40	11.50	18.40	16.13	12.12
PAN6723	13.40	11.10	12.10	10.10	11.10	13.50	13.00	11.77	19.60	18.07	12.84
PAN6P-110	14.90	9.90	12.20	8.60	9.60	13.00	10.80	11.80	19.40	16.37	12.43
PAN6Q-308B	13.80	9.60	12.50	9.90	9.70	13.50	14.60	12.23	21.50	16.30	13.15
PAN6Q-419B	13.50	10.80	11.90	9.00	10.10	13.30	11.80	11.60	19.20	15.23	12.57
PAN6Q-445B	13.30	9.50	11.10	9.60	9.10	12.10	10.30	11.27	16.30	16.80	12.05
PAN6Q-508R	13.30	10.90	11.20	9.10	9.30	12.70	12.90	11.13	19.20	16.07	12.25
PAN6Q-708BR	16.10	9.50	11.20	11.00	10.10	13.00	12.20	11.30	19.10	17.10	12.61
Phb30B97BR	12.70	9.20	11.10	8.80	10.20	10.50	9.90	10.80	15.90	15.43	11.52
Phb30Y79B	13.70	8.70	11.00	9.10	9.90	14.50	12.40	11.17	17.10	16.70	12.41
Phb30Y83	14.30	9.20	9.70	8.60	10.10	12.50	10.20	11.10	15.60	16.03	11.98
Phb31D48B	11.60	9.60	11.60	8.60	9.30	10.90	10.30	10.70	15.40	13.93	11.23
Phb32D95BR	12.50	9.30	11.30	9.10	10.20	11.50	9.70	10.87	15.80	14.87	11.42
Phb32W72B	11.60	8.40	11.20	8.60	9.00	9.90	9.90	10.33	14.20	13.53	10.73
QS7646	13.10	9.50	11.00	10.60	9.90	12.40	14.20	11.33	18.10	16.40	12.39
Gem/ Mean	13.25	9.70	11.45	9.60	10.08	12.30	11.27	11.23	17.24	15.92	12.10

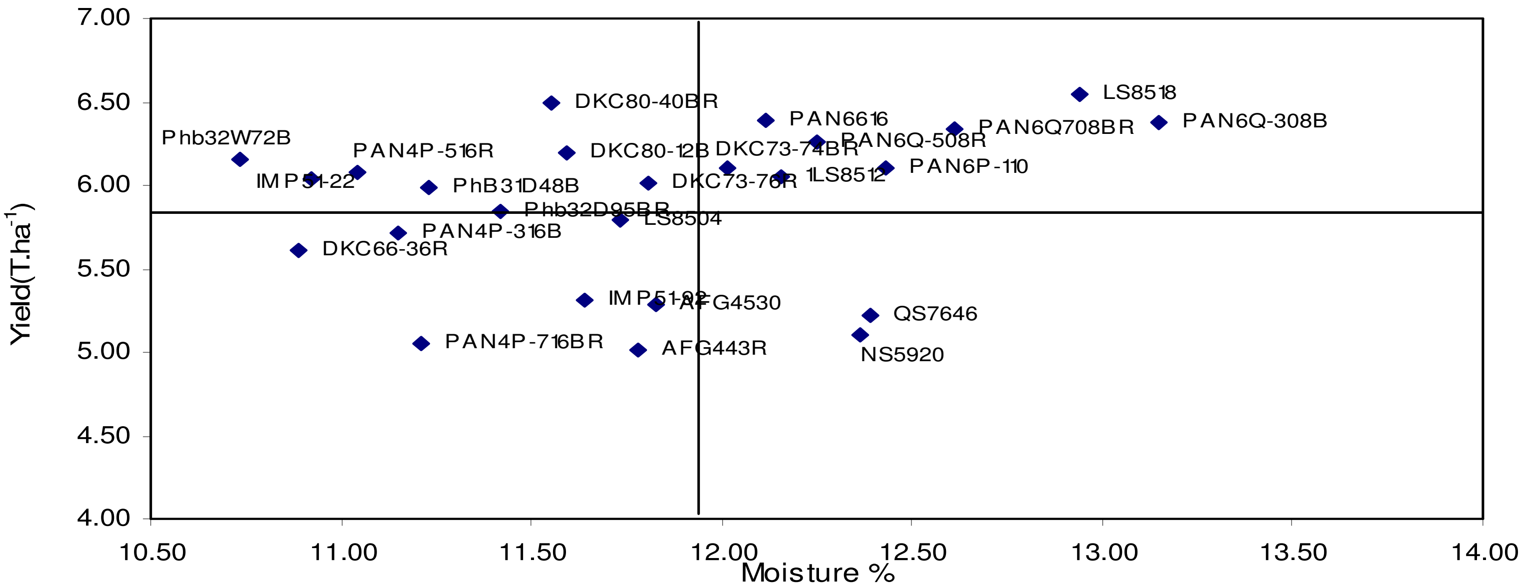


Figure 2a Moisture % and yield for differente yellow maize hybrids in the western region during the 2009/2010 season

Figuur 2a Vog % en opbrengs van verskillende geel mielie basters in die westelike gebied gedurend die 2009/2010 seisoen

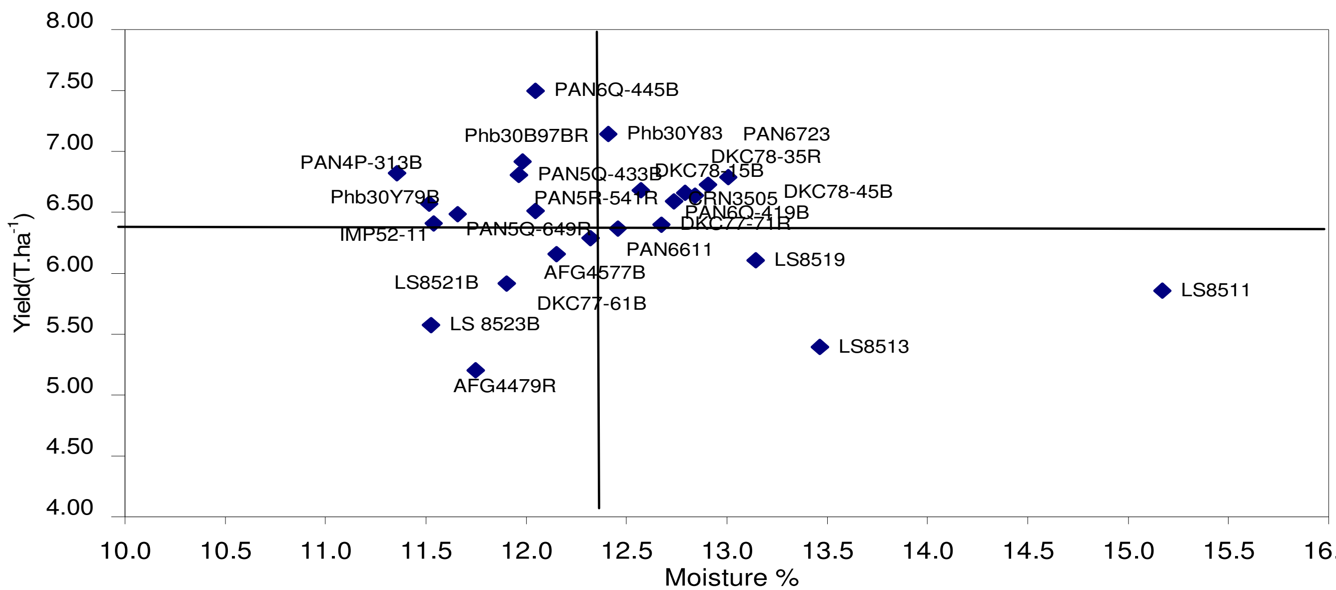


Figure 2b Moisture % and yield for differente white maize hybrids in the Western region during the 2009/2010 season

Figuur 2b Vog % en opbrengs van verskillende wit mielie basters in die westelike grbied gedurend die 2009/2010 seisoen

Tabel 10 Gemiddelde graanopbrengs ($t.ha^{-1}$) vir mielie genotipes by verskillende westelike omgewings gedurende 2009/2010 seisoen
Table10 Mean yield($t\ ha^{-1}$)for maize genotypes under different western environments during 2009/2010 season

Genotipes Genotypes	Coligny	Coligny	Rus-hof	Viljoens-kroon	Wessels-bron	Leeudoring-stad	Ottos-dal	Koster	Delarey-ville	Hooge-kraal	Hartbees-fontein	Nampo	Twee-buffels
AFG4434R	3.77	4.80	5.89	7.59	4.30	5.19	5.13	3.98	3.34	6.76	2.98	4.35	3.51
AFG4479R	5.13	5.07	5.53	6.07	5.77	5.56	5.63	4.55	3.57	7.57	3.49	5.30	3.06
AFG4530	3.80	4.93	5.68	7.87	5.98	6.61	5.95	3.75	3.60	8.00	2.85	5.52	3.14
AFG4577B	4.82	6.97	6.80	7.75	6.11	7.25	7.59	4.02	3.37	7.57	3.83	6.01	4.23
CRN3505	4.83	6.70	7.01	8.17	6.61	8.16	7.18	5.04	3.82	9.34	4.38	6.80	4.13
DKC66-36R	5.39	5.82	5.72	7.85	4.97	5.47	5.86	4.20	2.50	8.72	4.43	5.02	4.14
DKC73-74BR	4.78	7.47	6.69	6.33	7.11	6.23	6.27	4.77	3.13	7.51	4.73	6.80	4.08
DKC73-76R	5.74	6.33	6.75	7.18	7.06	6.64	5.94	4.85	2.90	8.41	3.77	6.16	4.37
DKC77-61B	4.37	7.82	6.22	6.95	6.72	7.72	6.56	5.09	3.66	9.75	4.13	5.36	4.32
DKC77-71R	5.11	7.23	6.40	7.42	5.92	7.31	7.63	5.81	3.93	10.58	3.80	6.69	3.48
DKC78-15B	5.27	6.76	6.37	7.59	6.92	8.35	7.55	5.32	4.09	11.58	4.12	6.48	3.81
DKC78-35R	5.21	6.92	7.20	8.21	7.01	8.82	8.03	5.75	3.69	9.22	5.05	6.87	4.25
DKC78-45BR	6.96	7.56	6.81	8.47	5.74	7.87	7.01	5.10	3.85	9.75	4.02	5.34	4.88
DKC80-12B	4.99	7.03	6.46	7.53	6.18	7.52	7.31	5.68	2.47	8.69	4.13	6.32	4.35
DKC80-40BR	5.87	5.98	7.28	7.81	6.08	7.67	7.45	5.15	3.89	8.64	4.11	7.24	4.23
IMP51-22	4.10	5.43	6.11	9.20	6.52	7.70	5.84	3.81	3.01	8.83	3.64	5.91	3.97
IMP51-92	4.19	5.77	5.88	7.30	4.98	6.26	5.11	3.86	2.67	7.32	3.52	5.60	3.49
IMP52-11	5.13	7.26	5.21	9.04	7.11	7.62	7.15	5.61	3.06	9.34	4.25	6.17	3.94
LS8504	5.11	6.19	6.11	9.11	6.39	6.14	5.48	4.08	3.05	6.97	3.70	5.88	4.09
LS8511	4.33	5.33	5.23	8.74	4.98	7.65	6.14	5.43	2.92	7.99	3.44	4.58	4.17
LS8512	4.30	5.82	6.87	9.05	5.89	6.29	7.28	4.49	3.43	7.69	3.65	6.65	3.87
LS8513	4.01	4.98	5.68	7.29	4.21	7.05	6.41	4.63	2.63	7.54	3.47	4.81	3.14
LS8518	4.47	7.53	7.15	9.26	6.09	7.56	7.06	5.39	3.25	8.42	3.99	6.47	3.43
LS8519	5.01	6.00	6.34	9.33	4.50	6.13	7.24	5.69	2.75	9.90	3.76	7.25	3.06
LS8521B	5.44	6.53	5.59	8.81	5.05	7.46	6.06	4.41	2.86	7.07	3.99	5.31	3.77
LS8523B	4.46	5.39	4.86	8.65	5.10	6.37	6.09	4.12	2.85	6.71	3.62	4.62	3.63
NS5920	4.16	5.85	6.30	7.09	5.70	6.04	5.59	3.90	3.18	6.45	3.51	5.66	3.79
PAN4P-313B	6.22	6.84	5.58	9.46	7.13	9.30	7.05	6.04	2.62	9.41	4.34	6.21	4.51
PAN4P-316B	4.75	5.52	6.21	7.16	6.17	6.76	5.04	4.50	3.38	8.04	3.54	5.30	3.79
PAN4P-516R	4.73	7.28	6.32	8.83	6.59	6.58	6.12	5.48	2.60	7.33	3.59	5.59	3.92
PAN4P-716BR	4.13	5.22	5.31	7.70	4.68	5.27	4.80	3.43	2.68	6.81	3.18	5.07	3.23
PAN5Q-433B	5.73	7.37	7.52	7.33	6.63	8.73	7.29	5.97	3.77	10.22	4.15	6.96	3.63
PAN5Q-649R	5.06	6.73	7.06	7.87	6.91	8.06	7.94	5.78	3.21	9.05	4.54	6.42	4.15
PAN5R-541R	4.52	4.84	6.26	9.25	6.75	7.46	6.54	6.56	2.98	9.17	4.77	5.29	3.99
PAN6611	4.88	7.87	6.97	6.79	6.55	9.19	7.82	5.64	3.35	8.30	3.96	4.87	3.73
PAN6616	3.46	7.49	6.89	9.26	6.65	7.72	7.93	4.94	3.36	9.52	3.85	5.82	3.93
PAN6723	4.60	5.76	6.37	8.50	6.43	8.36	6.57	6.56	2.88	11.09	4.22	7.03	3.72
PAN6P-110	3.86	6.46	6.39	6.96	6.81	8.11	6.17	5.18	2.50	9.64	4.03	5.63	3.31
PAN6Q-308B	4.78	7.73	6.94	7.20	5.89	8.18	7.12	5.06	3.12	9.60	3.91	7.93	3.58
PAN6Q-419B	5.45	7.23	7.65	8.15	6.81	8.98	7.88	6.41	3.72	11.27	3.98	5.88	3.95
PAN6Q-445B	5.43	6.98	8.14	10.20	6.74	10.23	9.26	6.72	3.35	10.89	4.59	6.70	4.30
PAN6Q-508R	4.31	6.21	7.08	8.07	6.77	6.57	7.29	4.72	2.95	9.95	4.07	6.20	3.50
PAN6Q-708BR	5.16	7.58	5.75	8.12	6.80	8.35	6.71	4.28	3.06	9.91	3.91	6.49	3.55
Phb30B97BR	5.42	5.45	6.89	9.07	6.38	6.99	6.18	6.35	3.64	8.63	4.52	6.98	4.41
Phb30Y79B	6.37	7.87	7.27	10.09	6.96	8.64	6.86	5.66	3.78	8.16	4.51	7.02	5.56
Phb30Y83	5.09	7.96	6.38	10.20	6.80	8.36	7.40	6.14	2.98	8.69	5.04	7.04	5.00
Phb31D48B	3.78	6.52	6.33	7.92	6.49	6.33	6.59	4.57	3.19	8.87	4.18	6.43	3.15
Phb32D95BR	4.24	6.07	6.42	8.74	5.29	6.91	5.44	4.29	3.28	9.02	3.82	6.15	4.12
Phb32W72B	4.77	6.60	6.31	10.14	7.09	6.48	5.52	4.44	2.62	9.12	3.75	7.13	3.12
QS7646	3.81	4.95	6.22	7.36	5.75	5.35	5.58	4.38	3.19	7.38	2.89	6.24	3.21
Gem/ Mean	4.83	6.44	6.41	8.20	6.16	7.31	6.63	5.03	3.19	8.73	3.95	6.07	3.87
Cv%	6.20	16.30	10.80	12.40	15.60	10.60	11.60	9.10	12.50	7.90	11.90	19.40	20.20
$LSD_{(0.05)}$	0.486	2.091	1.234	1.642	1.560	1.252	1.246	0.743	0.647	1.123	0.760	1.908	1.267

Tabel 10 Vervolg
Table 10 Continued

Genotipes Genotypes	Lichten-burg	Botha-ville	Botha-ville	Viljoens-kroon	Wessels-bron	Kap-steel	Kap-steel	Viljoens-kroon	Potchef-stroom	Lichten-burg	Lichten-burg	Venters-dorp	Mean Gem
AFG4434R	5.00	6.03	6.66	7.64	3.98	3.39	4.97	3.46	5.50	4.66	5.15	3.28	4.85
AFG4479R	4.61	6.65	7.95	7.61	4.41	2.84	5.23	3.50	5.77	4.46	4.69	3.47	5.10
AFG4530	4.82	7.56	5.19	7.75	3.67	3.12	5.44	3.89	5.43	3.98	5.53	4.00	5.12
AFG4577B	5.98	5.93	9.17	9.86	5.22	4.28	7.38	3.98	6.81	5.15	5.96	4.11	6.01
CRN3505	6.25	7.23	9.66	9.89	6.86	4.14	5.28	3.76	7.25	5.90	7.18	4.75	6.41
DKC66-36R	4.60	7.10	8.37	8.90	4.16	3.25	5.60	3.31	5.45	4.56	6.38	3.85	5.42
DKC73-74BR	5.33	8.70	10.21	9.16	4.90	4.04	6.01	4.25	6.35	5.61	5.98	4.00	6.02
DKC73-76R	4.89	8.08	7.45	8.98	5.03	4.29	5.10	3.58	5.93	6.01	6.67	4.58	5.87
DKC77-61B	5.88	8.91	10.98	9.38	4.25	3.98	5.59	4.68	7.45	6.09	4.42	4.67	6.20
DKC77-71R	5.89	7.37	8.93	9.27	5.68	3.86	6.85	4.11	7.35	5.62	6.40	3.99	6.27
DKC78-15B	5.81	8.94	9.34	9.81	5.71	3.85	6.60	4.31	7.96	5.80	5.90	5.01	6.53
DKC78-35R	6.17	8.11	8.93	9.44	6.55	4.47	6.30	3.77	7.59	5.72	7.70	4.32	6.61
DKC78-45BR	6.02	7.45	9.23	10.96	6.81	4.26	6.33	4.11	7.60	6.18	7.21	4.30	6.55
DKC80-12B	6.31	6.68	8.38	9.08	4.25	3.36	6.00	4.95	7.26	6.75	6.27	4.50	6.10
DKC80-40BR	5.86	7.52	9.16	9.52	5.41	3.54	7.28	4.36	7.45	6.10	6.77	4.48	6.35
IMP51-22	4.92	7.43	7.98	10.67	5.66	3.42	3.95	3.38	6.06	5.11	8.53	3.93	5.80
IMP51-92	4.52	6.30	7.54	9.27	3.46	3.40	5.75	3.33	5.55	4.55	6.28	3.02	5.16
IMP52-11	5.22	8.24	8.59	11.40	5.16	2.92	3.85	3.62	6.81	6.02	6.71	5.39	6.19
LS8504	4.92	8.43	8.18	8.75	4.19	3.27	5.21	3.85	6.24	4.58	5.14	4.41	5.58
LS8511	5.96	8.39	8.27	9.75	5.13	2.93	5.60	3.57	5.82	4.94	6.08	3.87	5.65
LS8512	5.68	8.99	7.55	9.90	4.45	2.85	5.52	3.43	6.26	5.42	6.02	4.36	5.83
LS8513	5.88	7.07	9.15	8.36	4.10	2.83	4.57	2.88	5.26	5.22	4.73	4.59	5.22
LS8518	4.89	9.37	10.04	10.26	5.70	4.04	5.57	4.54	7.48	5.42	7.00	4.69	6.36
LS8519	6.05	8.94	8.21	9.42	4.85	3.29	4.86	3.00	6.31	5.09	5.47	3.94	5.85
LS8521B	4.86	8.77	8.53	8.77	5.22	3.46	5.17	4.09	6.47	5.54	5.25	4.70	5.73
LS8523B	5.25	8.29	8.06	8.39	5.47	3.55	4.85	3.53	5.68	4.75	5.60	4.33	5.37
NS5920	4.26	6.04	6.71	7.20	3.52	3.19	3.87	2.78	5.61	4.75	4.36	3.93	4.94
PAN4P-313B	5.82	8.99	10.81	10.47	5.95	3.05	5.77	4.10	7.92	5.68	7.09	4.81	6.61
PAN4P-316B	4.19	7.85	8.69	8.59	5.75	3.92	5.48	3.94	7.50	4.89	5.50	3.13	5.58
PAN4P-516R	4.96	8.87	9.33	8.53	5.23	3.75	5.53	3.94	7.07	4.90	6.28	3.65	5.88
PAN4P-716BR	2.73	7.82	7.38	8.09	4.03	3.41	3.66	3.38	6.51	4.42	6.05	3.08	4.88
PAN5Q-433B	5.90	8.03	11.15	10.90	4.72	3.47	6.80	4.39	7.75	6.55	6.47	5.78	6.69
PAN5Q-649R	5.65	7.52	9.66	8.81	5.17	3.38	5.57	4.03	8.37	5.64	6.94	4.81	6.33
PAN5R-541R	5.75	8.52	9.37	10.63	5.80	3.97	6.94	3.26	6.78	5.97	6.59	4.88	6.27
PAN6611	5.63	7.27	9.26	9.87	5.29	3.54	6.64	3.94	7.94	5.83	6.53	4.72	6.25
PAN6616	5.41	8.33	8.47	9.46	5.04	3.29	6.03	3.78	7.26	6.12	5.70	4.73	6.18
PAN6723	6.38	8.83	7.31	11.42	6.15	3.43	6.11	3.65	7.69	7.15	6.48	4.37	6.44
PAN6P-110	6.85	6.69	9.27	8.74	5.90	3.66	5.08	4.02	7.47	6.27	5.84	4.78	5.98
PAN6Q-308B	5.22	7.27	8.96	8.75	6.00	2.79	6.54	4.29	7.87	6.10	7.39	4.22	6.26
PAN6Q-419B	5.53	7.38	9.58	10.07	5.27	3.75	5.62	4.97	8.12	5.67	5.54	4.99	6.55
PAN6Q-445B	6.74	9.16	10.83	12.41	5.13	3.10	7.23	3.92	9.15	6.53	8.24	5.22	7.25
PAN6Q-508R	5.17	7.24	9.61	9.69	6.02	3.66	4.96	4.46	6.83	6.16	6.42	4.93	6.11
PAN6Q-708BR	4.98	7.88	9.78	8.92	5.52	3.96	5.67	3.76	7.72	5.63	6.37	4.13	6.16
Phb30B97BR	6.34	8.91	10.28	11.37	5.55	3.82	5.47	4.09	6.78	4.47	7.16	4.14	6.37
Phb30Y79B	5.11	9.47	10.18	11.75	5.66	3.90	7.03	4.56	7.43	6.60	8.09	4.50	6.92
Phb30Y83	5.63	9.01	9.89	11.60	5.09	3.75	5.31	3.74	7.74	5.69	7.46	4.44	6.66
Phb31D48B	4.62	8.59	9.19	9.52	4.60	3.15	5.99	3.80	6.29	5.66	5.01	4.76	5.82
Phb32D95BR	5.08	6.15	8.37	8.97	4.93	3.76	5.71	4.03	6.57	4.57	5.96	3.43	5.65
Phb32W72B	4.94	7.78	8.99	8.83	5.69	3.01	4.87	3.93	7.22	4.56	6.83	4.11	5.91
QS7646	4.54	6.99	7.74	8.57	3.97	3.14	4.27	3.43	5.55	4.36	4.43	3.18	5.06
Gem/ Mean	5.38	7.86	8.85	9.51	5.12	3.53	5.62	3.87	6.88	5.47	6.23	4.31	5.98
Cv%	8.10	11.80	6.00	8.50	17.30	13.20	16.70	17.70	7.50	12.30	19.70	13.70	13.4
$LSD_{(0.05)}$	0.706	1.498	0.861	1.313	1.433	1.123	1.522	1.109	0.840	1.088	1.985	0.954	1.280

Table 11 Die IPCA 1 en IPCA 2- waardes vir 25 omgewings
Table11 The IPCA 1 and IPCA 2 scores for 25 enviroments

Omgewing Environment	Omg /Env. .No	Gem Mean	IPCA1 Waarde Score	IPCA2 Waarde Score
Bothaville	1	7.86	0.8951	-0.7576
Bothaville	2	8.85	-0.6456	-0.1637
Coligny	3	6.44	-0.3294	0.4414
Coligny	4	4.83	0.4637	0.3159
Delareyville	5	3.19	0.4920	0.8341
Hartbeesfontein	6	3.95	0.3587	0.2094
Hoogekraal	7	8.73	-1.4812	-0.4356
Kapsteel	8	3.53	0.6501	0.8085
Kapsteel	9	5.62	-0.2269	0.6796
Koster	10	5.03	-0.3007	-0.3581
Leeudoringstad	11	7.31	-1.0709	-0.5676
Lichtenburg	12	5.47	-0.3335	0.2224
Lichtenburg	13	5.38	-0.2198	0.1522
Lichtenburg	14	6.23	0.4215	-0.7125
Nampo	15	6.07	0.2615	0.1679
Ottosdal	16	6.63	-0.7093	-0.0156
Potchefstroom	17	6.88	-0.6981	-0.0282
Rushof	18	6.41	0.0178	0.5783
Tweebuffels	19	3.87	0.7686	0.3024
Ventersdorp	20	4.31	-0.0052	0.1612
Viljoenskroon	21	9.51	-0.0384	-1.4106
Viljoenskroon	22	8.20	1.3368	-1.3560
Viljoenskroon	23	3.87	0.2706	0.7413
Wesselsbron	24	6.16	0.0311	0.2400
Wesselsbron	25	5.13	0.0913	-0.0490

Tabel 12 Gemiddelde opbrengs(t.ha^{-1}), orde,IPCA1 en IPCA2- waardes en AMMI stabiliteits-waarde(ASW)vir mielie genotipes geanaliseer volgens die AMMI model oor 25 westelike omgewings vir die 2009/2010 seisoen

Table12 Mean yield (t.ha^{-1}),rank, IPCA1 and IPCA2 scores and AMMI stability value (ASV) of maize genotypes analysed according to the AMMI model over 25 western environments during the 2009/2010 season

Genotipes Genotypes	Gen.No. Gen.No.	Gem/Mean Opb./yield	Orde Rank	IPCA1 Score	IPCA2 Score	ASW ASV	Orde Rank
AFG4434R	1	4.85	50	0.5474	0.5622	0.818	29
AFG4479R	2	5.10	46	0.1073	0.7479	0.757	33
AFG4530	3	5.12	45	0.4660	0.3359	0.607	19
AFG4577B	4	6.01	27	-0.1033	0.5784	0.589	21
CRN3505	5	6.41	11	-0.2226	0.0211	0.242	6
DKC66-36R	6	5.42	41	0.3354	0.1060	0.379	10
DKC73-74BR	7	6.02	26	0.1548	0.6379	0.660	37
DKC73-76R	8	5.87	31	0.3587	0.3580	0.529	16
DKC77-61B	9	6.20	20	-0.5441	0.3935	0.709	44
DKC77-71R	10	6.27	17	-0.5714	0.3122	0.694	36
DKC78-15B	11	6.53	9	-0.6732	0.0568	0.732	39
DKC78-35R	12	6.61	5	-0.1807	0.0688	0.208	9
DKC78-45BR	13	6.55	8	-0.1149	-0.0230	0.127	3
DKC80-12B	14	6.10	25	-0.3412	0.3929	0.540	23
DKC80-40BR	15	6.35	14	-0.0997	0.3766	0.392	15
IMP51-22	16	5.80	35	0.3765	-0.7606	0.863	45
IMP51-92	17	5.16	44	0.3089	0.2165	0.399	8
IMP52-11	18	6.19	21	-0.0197	-0.7493	0.750	28
LS8504	19	5.58	40	0.7801	0.1262	0.855	46
LS8511	20	5.65	38	0.2444	-0.4690	0.539	26
LS8512	21	5.83	33	0.5286	-0.2051	0.609	32
LS8513	22	5.22	43	-0.1225	0.0716	0.151	2
LS8518	23	6.36	13	0.1709	-0.3318	0.380	14
LS8519	24	5.85	32	0.1208	-0.4561	0.475	27
LS8521B	25	5.73	36	0.4772	0.0026	0.517	24
LS8523B	26	5.37	42	0.6636	-0.0412	0.721	38
NS5920	27	4.94	48	0.4162	0.7401	0.867	31
PAN4P-313B	28	6.61	6	-0.2243	-0.7243	0.764	25
PAN4P-316B	29	5.58	39	0.1721	0.3586	0.404	11
PAN4P-516R	30	5.88	30	0.4241	0.0157	0.460	18
PAN4P-716BR	31	4.88	49	0.7338	0.0472	0.797	35
PAN5Q-433B	32	6.69	3	-0.7928	0.0550	0.861	49
PAN5Q-649R	33	6.33	15	-0.4133	0.1478	0.472	20
PAN5R-541R	34	6.27	16	0.0746	-0.5060	0.512	17
PAN6611	35	6.25	19	-0.7098	0.2585	0.812	50
PAN6616	36	6.18	22	-0.2431	-0.1241	0.291	4
PAN6723	37	6.44	10	-0.4160	-0.6521	0.793	22
PAN6P-110	38	5.98	28	-0.7246	0.2547	0.826	47
PAN6Q-308B	39	6.26	18	-0.5767	0.2769	0.684	40
PAN6Q-419B	40	6.55	7	-0.8574	0.0481	0.931	43
PAN6Q-445B	41	7.25	1	-0.7593	-1.0570	1.340	48
PAN6Q-508R	42	6.11	24	-0.2761	0.0452	0.303	7
PAN6Q-708BR	43	6.16	23	-0.4159	0.0326	0.452	13
Phb30B97BR	44	6.37	12	0.4258	-0.5258	0.700	30
Phb30Y79B	45	6.92	2	0.4802	-0.4691	0.701	34
Phb30Y83	46	6.66	4	0.2086	-0.8064	0.838	41
Phb31D48B	47	5.82	34	-0.0222	0.0978	0.101	1
Phb32D95BR	48	5.65	37	0.1303	0.1764	0.226	5
Phb32W72B	49	5.91	29	0.3468	-0.3487	0.513	42
QS7646	50	5.06	47	0.3715	0.3299	0.521	12

Table 13 Die AMMI model seleksie vir die beste vier genotipes se gemiddelde opbrengste in verhouding tot die omgewings geëvalueer gedurende 2009/2010 seisoen

Table 13 The AMMI modal's best four gentotype selection for mean yield in relation to the environments evaluted during the 2009/2010 season

Omgewings Environments	Gem Mean	IPCA 1 waarde Score	AMMI seleksies/selection			
Bothaville	7.86	0.895	Phb30Y79B	Phb30Y83	PAN6Q-445B	Phb30B97BR
Bothaville	8.85	-0.646	PAN6Q-445B	PAN5Q-433B	PAN6Q-419B	DKC78-15B
Coligny	6.44	-0.329	PAN6Q-445B	PAN5Q-433B	PAN6Q-419B	DKC78-15B
Coligny	4.83	0.464	Phb30Y79B	PAN6Q-445B	DKC78-35R	Phb30Y83
Delareyville	3.19	0.492	Phb30Y79B	DKC73-74BR	DKC80-40BR	DKC78-35R
Hartbeesfontein	3.95	0.359	Phb30Y79B	PAN6Q-445B	Phb30Y83	DKC78-35R
Hoogekraal	8.73	-1.481	PAN6Q-445B	PAN5Q-433B	PAN6Q-419B	DKC78-15B
Kapsteel	3.53	0.650	Phb30Y79B	DKC73-74BR	DKC80-40BR	DKC78-35R
Kapsteel	5.62	-0.227	PAN5Q-433B	PAN6Q-419B	DKC78-15B	PAN6Q-445B
Koster	5.03	-0.301	PAN6Q-445B	Phb30Y79B	PAN4P-313B	PAN5Q-433B
Leeudoringstad	7.31	-1.071	PAN6Q-445B	PAN5Q-433B	PAN6Q-419B	PAN6723
Lichtenburg	5.47	-0.334	PAN6Q-445B	PAN5Q-433B	PAN6Q-419B	DKC78-15B
Lichtenburg	5.38	-0.220	PAN6Q-445B	PAN5Q-433B	PAN6Q-419B	Phb30Y79B
Lichtenburg	6.23	0.422	PAN6Q-445B	Phb30Y79B	Phb30Y83	PAN4P-313B
Nampo	6.07	0.262	Phb30Y79B	PAN6Q-445B	Phb30Y83	DKC78-35R
Ottosdal	6.63	-0.709	PAN6Q-445B	PAN5Q-433B	PAN6Q-419B	DKC78-15B
Potchefstroom	6.88	-0.698	PAN6Q-445B	PAN5Q-433B	PAN6Q-419B	DKC78-15B
Rushof	6.41	0.018	PAN5Q-433B	Phb30Y79B	DKC78-35R	PAN6Q-445B
Tweebuffels	3.87	0.769	Phb30Y79B	Phb30Y83	Phb30B97BR	DKC78-35R
Ventersdorp	4.31	-0.005	PAN6Q-445B	Phb30Y79B	PAN5Q-433B	DKC78-35R
Viljoenskroon	9.51	-0.038	PAN6Q-445B	Phb30Y83	PAN4P-313B	Phb30Y79B
Viljoenskroon	8.20	1.337	Phb30Y79B	Phb30Y83	PAN6Q-445B	Phb30B97BR
Viljoenskroon	3.87	0.271	Phb30Y79B	DKC78-35R	DKC80-40BR	DKC73-74BR
Wesselsbron	6.16	0.031	PAN6Q-445B	Phb30Y79B	PAN5Q-433B	DKC78-35R
Wesselsbron	5.13	0.091	PAN6Q-445B	Phb30Y79B	Phb30Y83	PAN4P-313B

Tabel 14 Opsomming van alle eienskappe vir 2009/2010 seisoen
Table 14 Summary of mean values for all characteristics for 2009/2010 season

Genotipes Genotypes	Omval % Logded	Spruite % Tillering	Koppe plant^{-1} Ears plant^{-1}	Graan vog% Grain moist.%	Graan opbrengs Grain yield (t.ha^{-1})
AFG4434R	0.14	29.85	1.42	11.78	4.85
AFG4479R	0.59	12.27	1.59	11.75	5.10
AFG4530	0.42	12.99	1.50	11.83	5.12
AFG4577B	0.15	24.86	1.86	12.15	6.01
CRN3505	0.15	31.35	2.16	12.74	6.41
DKC66-36R	0.00	27.79	1.73	10.89	5.42
DKC73-74BR	0.00	20.57	1.43	12.01	6.02
DKC73-76R	0.00	22.12	1.39	11.81	5.87
DKC77-61B	0.85	22.64	1.79	12.32	6.20
DKC77-71R	0.69	25.22	1.87	12.67	6.27
DKC78-15B	0.20	32.37	2.16	12.79	6.53
DKC78-35R	0.87	38.52	2.16	13.01	6.61
DKC78-45BR	0.14	37.86	2.14	12.91	6.55
DKC80-12B	1.00	21.50	2.03	11.59	6.10
DKC80-40BR	0.62	17.74	2.08	11.56	6.35
IMP51-22	1.29	53.55	1.99	10.92	5.80
IMP51-92	0.25	24.78	1.54	11.64	5.16
IMP52-11	0.00	61.54	1.76	11.54	6.19
LS8504	0.95	23.68	1.73	11.73	5.58
LS8511	0.88	37.53	1.69	15.17	5.65
LS8512	0.14	36.31	1.83	12.15	5.83
LS8513	0.59	33.91	1.68	13.46	5.22
LS8518	0.29	36.49	1.72	12.94	6.36
LS8519	0.34	30.52	1.78	13.14	5.85
LS8521B	0.77	21.20	1.71	11.90	5.73
LS8523B	0.17	24.05	1.59	11.53	5.37
NS5920	0.48	32.86	1.56	12.37	4.94
PAN4P-313B	0.21	45.29	2.13	11.36	6.61
PAN4P-316B	0.15	16.42	1.98	11.15	5.58
PAN4P-516R	0.45	18.36	2.09	11.04	5.88
PAN4P-716BR	0.19	18.47	2.00	11.21	4.88
PAN5Q-433B	0.47	30.77	2.11	11.96	6.69
PAN5Q-649R	0.18	14.35	2.06	11.66	6.33
PAN5R-541R	0.40	43.39	2.07	12.05	6.27
PAN6611	0.12	45.24	1.95	12.46	6.25
PAN6616	0.30	35.48	2.00	12.12	6.18
PAN6723	0.14	47.72	2.28	12.84	6.44
PAN6P-110	1.18	29.45	2.11	12.43	5.98
PAN6Q-308B	0.41	37.04	2.20	13.15	6.26
PAN6Q-419B	0.98	45.05	2.47	12.57	6.55
PAN6Q-445B	0.27	59.41	2.59	12.05	7.25
PAN6Q-508R	0.14	31.76	2.22	12.25	6.11
PAN6Q-708BR	0.35	32.11	2.24	12.61	6.16
Phb30B97BR	1.43	27.31	2.01	11.52	6.37
Phb30Y79B	0.49	46.50	1.73	12.41	6.92
Phb30Y83	0.00	54.93	1.85	11.98	6.66
Phb31D48B	0.56	21.10	1.82	11.23	5.82
Phb32D95BR	1.71	22.85	1.58	11.42	5.65
Phb32W72B	0.49	28.52	1.98	10.73	5.91
QS7646	0.68	16.23	1.94	12.39	5.06
Gem/ Mean	0.47	31.24	1.91	12.10	5.98

Tabel 15 ANOVA analise van die AMMI 2 model vir die westelike gebiede gedurende die 2007/08, 2008/09 & 2009/2010 seisoene

Table 15 ANOVA analysis according to the AMMI 2 model of maize genotypes evaluated in the western areas during the 2007/08, 2008/09 & 2009/2010 seasons

Bron/Source	df	SS	MS	F	F_prob
Totaal / Total	4409	22056	5	*	*
Behandeling /Treatment	1469	20115	13.69	22.67	0
Genotipe / Genotype	20	501	25.07	41.51	0
Omgewing /Environment	69	17276	250.38	140.43	0
Blok/ Block	140	250	1.78	2.95	0
Interaksie / Interaction	1380	2337	1.69	2.8	0
IPCA 1	88	619	7.03	11.64	0
IPCA 2	86	331	3.85	6.37	0
Res / Residual	1206	1388	1.15	1.9	0
Fout /Error	2800	1691	0.6	*	*

Table 16 Meerjarige gemiddeldes ten opsigte van plante omval gedurende 2007/08, 2008/09 & 2009/2010 seisoene

Table 16 Multi-seasonal means in respect of total percentage lodged plants during the 2007/08, 2008/09 & 2009/2010 seasons

Genotipe Genotype	2007/08	2008/09	2009/2010	Gem Mean
CRN3505	3.27	0.49	0.28	1.35
DKC77-61B	1.45	0.13	1.58	1.05
DKC78-15B	3.38	0.49	0.50	1.46
DKC78-35R	1.40	0.46	1.02	0.96
DKC78-45BR	1.78	0.34	0.66	0.93
DKC80-12B	0.92	0.73	2.02	1.22
DKC80-40BR	1.96	0.68	1.87	1.50
LS8504	1.39	1.17	3.56	2.04
LS8511	6.15	2.02	1.52	3.23
LS8512	2.51	1.54	0.77	1.61
LS8519	9.38	1.51	1.31	4.07
LS8521B	4.79	0.88	1.12	2.26
LS8523B	6.04	1.44	0.62	2.70
PAN6611	1.94	1.63	2.16	1.91
PAN6616	3.88	1.04	0.65	1.86
PAN6723	3.73	0.78	0.11	1.54
PAN6P-110	2.42	0.34	1.24	1.33
PAN6Q-308B	1.79	0.81	1.10	1.23
Phb30Y79B	5.13	1.67	1.09	2.63
Phb30Y83	3.40	2.80	0.86	2.35
Phb32D95BR	0.99	1.14	1.58	1.24
Gem/Mean	3.22	1.05	1.22	1.83

Tabel 17 Meerjarige gemiddeldes ten opsigte van persentasie spruitvorming gedurende 2007/08, 2008/09 & 2009/2010 seisoene

Table 17 Multi-seasonal means in respect of percentage tillering during the 2007/08, 2008/09 & 2009/2010 seasons

Genotipe Genotype	2007/08	2008/09	2009/2010	Gem Mean
CRN3505	31.12	26.26	27.28	28.22
DKC77-61B	23.95	15.91	19.71	19.86
DKC78-15B	29.82	24.49	28.13	27.48
DKC78-35R	39.93	25.63	33.44	33.00
DKC78-45BR	32.56	25.78	32.96	30.43
DKC80-12B	23.02	5.84	18.74	15.87
DKC80-40BR	19.11	10.23	15.76	15.03
LS8504	19.86	14.26	28.13	20.75
LS8511	36.74	25.30	33.44	31.83
LS8512	21.82	16.19	32.96	23.66
LS8519	33.25	21.15	18.74	24.38
LS8521B	21.62	12.18	15.76	16.52
LS8523B	23.09	14.73	20.89	19.57
PAN6611	42.95	40.78	39.38	41.04
PAN6616	40.03	27.29	31.00	32.77
PAN6723	48.40	33.59	41.43	41.14
PAN6P-110	26.59	19.19	25.59	23.79
PAN6Q-308B	31.00	21.74	32.16	28.30
Phb30Y79B	38.81	37.78	40.44	39.01
Phb30Y83	42.08	34.19	47.66	41.31
Phb32D95BR	22.82	10.50	19.83	17.72
Gem/Mean	30.88	22.05	28.73	27.22

Tabel 18 Meerjarige gemiddeldes ten opsigte van aantal koppe per plant gedurende 2007/08, 2008/09 & 2009/2010 seisoene
Table 18 Multi-seasonal means in respect of number of ears per plant during the 2007/08, 2008/09 & 2009/2010 seasons

Genotipe Genotype	2007/08	2008/09	2009/2010	Gem Mean
CRN3505	1.79	1.94	2.16	1.96
DKC77-61B	1.64	1.67	1.79	1.70
DKC78-15B	1.66	2.05	2.16	1.96
DKC78-35R	1.79	1.91	2.16	1.95
DKC78-45BR	1.78	1.89	2.14	1.94
DKC80-12B	1.67	1.86	2.03	1.85
DKC80-40BR	1.67	2.30	2.08	2.02
LS8504	1.52	1.62	2.16	1.77
LS8511	1.48	1.55	2.16	1.73
LS8512	1.50	1.66	2.14	1.77
LS8519	1.51	1.60	2.03	1.71
LS8521B	1.50	1.60	2.08	1.73
LS8523B	1.46	1.49	1.71	1.55
PAN6611	1.68	1.98	1.95	1.87
PAN6616	1.80	1.85	2.00	1.88
PAN6723	1.84	2.06	2.28	2.06
PAN6P-110	1.76	1.96	2.11	1.94
PAN6Q-308B	1.76	1.98	2.20	1.98
Phb30Y79B	1.46	1.70	1.73	1.63
Phb30Y83	1.62	1.72	1.85	1.73
Phb32D95BR	1.39	1.36	1.58	1.44
Gem/Mean	1.63	1.80	2.02	1.82

Tabel 19 Meerjarige gemiddeldes ten opsigte van persentasie graanvog gedurende 2007/08, 2008/09 & 2009/2010 seisoene
Table 19 Multi-seasonal means in respect of percentage grain moisture during the 2007/08, 2008/09 & 2009/2010 seasons

Genotipe Genotype	2007/08	2008/09	2009/2010	Gem Mean
CRN3505	13.63	14.75	12.87	13.75
DKC77-61B	13.51	14.79	12.45	13.58
DKC78-15B	13.84	15.03	12.91	13.93
DKC78-35R	13.77	15.31	13.13	14.07
DKC78-45BR	13.47	15.06	13.03	13.85
DKC80-12B	12.84	13.8	11.74	12.79
DKC80-40BR	12.37	13.53	11.71	12.54
LS8504	12.84	13.84	11.90	12.86
LS8511	15.28	17.01	15.24	15.84
LS8512	14.11	14.89	12.29	13.76
LS8519	14.53	15.35	13.25	14.38
LS8521B	12.91	14.31	12.06	13.09
LS8523B	12.74	13.43	11.68	12.62
PAN6611	14.35	14.72	12.59	13.89
PAN6616	13.80	14.43	12.26	13.50
PAN6723	14.25	15.35	12.95	14.18
PAN6P-110	14.27	14.58	12.57	13.81
PAN6Q-308B	14.34	15.31	13.27	14.31
Phb30Y79B	13.55	14.72	12.55	13.61
Phb30Y83	13.24	13.95	12.13	13.11
Phb32D95BR	12.64	13.24	11.59	12.49
Gem/Mean	13.63	14.64	12.58	13.62

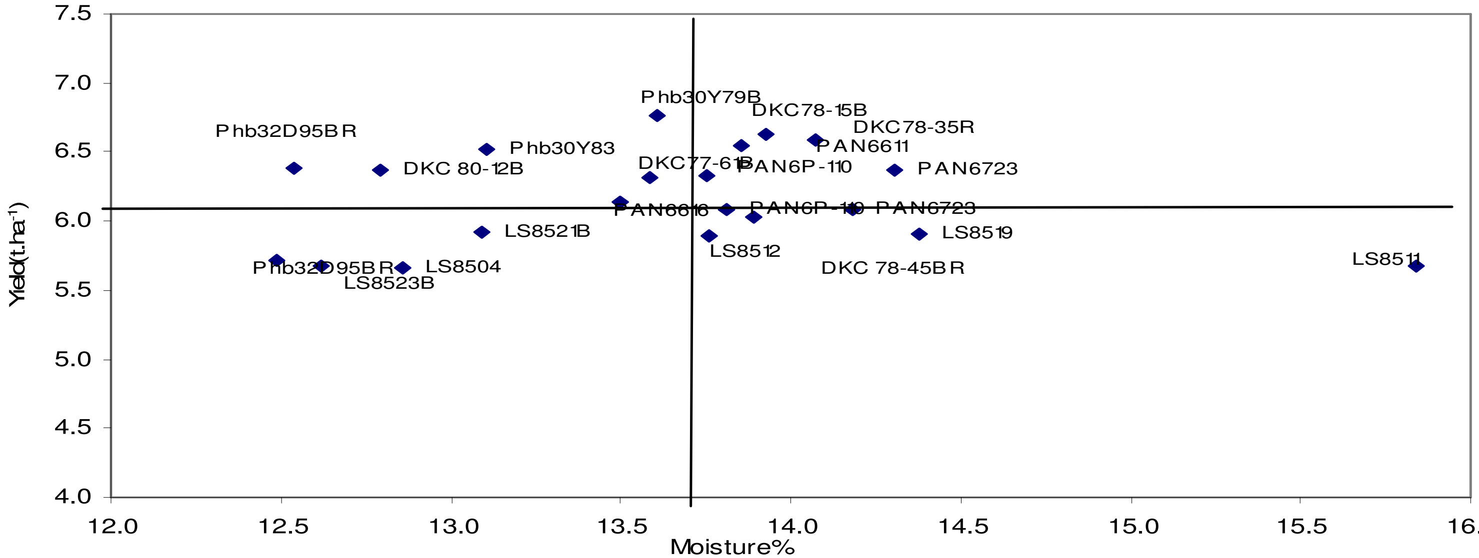


Figure 3 Moisture % and yield for different maize hybrids under Western region during the 2007/08 to 2009/2010 season

Figuur 3 Vog % en opbrengs van verskikkende basters mielie gedurende die 2007/08 tot 2009/2010 seisoen

Tabel 20 Gemiddelde graanopbrengs (t ha^{-1}) vir mielie genotipes by 70 westelike omgewings gedurende die 2007/08, 2008/09 & 2009/2010 seisoene
Table 20 Mean grain yield (t ha^{-1}) for different maize genotypes under 70 western environments during the 2007/08, 2008/09 & 2009/2010 seasons

Omgewing Environment	CRN-3505	DKC-77-61B	DKC-78-15B	DKC-78-35R	DKC-78-45BR	DKC-80-12B	DKC-80-40BR	LS-8504	LS-8511	LS-8512	LS-8519	LS-8521B	LS-8523B	PAN-6611	PAN-6616	PAN-6723	PAN-6P-110	PAN-6Q-308B	Phb-30Y79B	Phb-30Y83	Phb-32D95BR	Gem Mean
Bothaville10	7.23	8.91	8.94	8.11	7.45	6.68	7.52	8.43	8.39	8.99	8.94	8.77	8.29	7.27	8.33	8.83	6.69	7.27	9.47	9.01	6.15	8.08
Bothaville09	8.63	7.38	9.53	8.67	9.54	8.38	8.51	6.00	5.06	6.32	5.81	6.39	6.28	3.30	5.89	3.74	5.06	8.23	6.98	5.26	6.11	6.72
Bothaville09	7.54	9.51	9.58	8.62	8.10	9.43	8.47	6.63	9.55	7.86	7.80	9.13	9.06	7.91	7.30	8.92	9.48	8.81	10.00	8.66	8.05	8.59
Bothaville10	9.66	10.98	9.34	8.93	9.23	8.38	9.16	8.18	8.27	7.55	8.21	8.53	8.06	9.26	8.47	7.31	9.27	8.96	10.18	9.89	8.37	8.87
Bultfontein09	5.77	5.87	7.56	7.01	6.94	5.74	6.64	5.63	6.02	7.05	6.70	6.55	6.91	6.13	5.25	5.41	4.90	5.78	6.22	6.58	5.21	6.18
Coligny10	6.70	7.82	6.76	6.92	7.56	7.03	5.98	6.19	5.33	5.82	6.00	6.53	5.39	7.87	7.49	5.76	6.46	7.73	7.87	7.96	6.07	6.72
Coligny10	4.83	4.37	5.27	5.21	6.96	4.99	5.87	5.11	4.33	4.30	5.01	5.44	4.46	4.88	3.46	4.60	3.86	4.78	6.37	5.09	4.24	4.92
Coligny09	4.89	4.09	5.22	4.91	5.08	5.09	5.09	3.94	4.42	4.66	4.45	4.55	3.98	5.35	5.19	5.43	4.07	4.65	5.57	5.64	3.50	4.75
Colingy08	5.56	5.97	4.14	6.62	4.85	6.26	5.87	5.49	6.34	4.95	6.70	6.68	5.19	5.23	5.43	5.46	5.40	5.63	6.08	6.31	6.21	5.73
Colingy08	4.63	4.35	4.36	4.83	4.07	4.81	4.86	4.09	3.31	3.81	3.70	3.60	3.91	4.62	4.85	3.36	4.30	4.46	4.21	4.54	3.53	4.20
Delareville08	4.61	3.93	4.25	4.48	4.23	3.15	2.96	3.89	3.85	2.90	4.32	2.96	3.69	3.55	4.44	3.69	3.76	3.74	4.69	4.15	2.83	3.81
Delareyville10	3.82	3.66	4.09	3.69	3.85	2.47	3.89	3.05	2.92	3.43	2.75	2.86	2.85	3.35	3.36	2.88	2.50	3.12	3.78	2.98	3.28	3.27
Delareyville09	2.86	3.44	4.17	3.47	3.21	4.05	4.25	2.74	2.44	3.10	2.69	2.66	2.63	3.04	1.96	2.94	2.74	2.87	3.67	2.95	2.80	3.08
Gerdau08	4.82	5.56	5.98	5.39	5.18	5.12	4.96	4.74	4.79	5.32	4.66	4.78	5.04	5.66	5.81	5.23	4.84	5.19	5.85	5.39	4.17	5.16
Glaudina08	5.92	5.28	5.82	6.24	5.75	6.41	6.58	5.23	4.22	5.77	5.64	6.24	5.16	5.25	5.81	5.08	6.10	5.93	6.34	5.42	5.07	5.68
Glaudina09	6.39	5.72	5.94	5.69	5.49	6.12	5.35	5.06	4.64	5.68	4.56	4.91	4.94	4.85	5.52	5.53	5.57	5.08	4.74	4.99	4.92	5.32
Grootpan08	9.84	11.25	10.42	10.28	11.34	12.37	12.20	11.13	10.29	10.47	10.36	11.10	11.28	11.25	12.38	11.35	10.67	8.36	9.74	11.01	8.56	10.74
Hartbeesfontein10	4.38	4.13	4.12	5.05	4.02	4.13	4.11	3.70	3.44	3.65	3.76	3.99	3.62	3.96	3.85	4.22	4.03	3.91	4.51	5.04	3.82	4.07
Hartbeesfontein08	4.89	4.78	4.45	4.77	4.21	5.27	4.57	4.40	3.44	4.27	4.59	4.42	3.96	5.03	4.09	4.13	5.07	4.18	4.72	4.42	4.74	4.50
Hoogekraal10	9.34	9.75	11.58	9.22	9.75	8.69	8.64	6.97	7.99	7.69	9.90	7.07	6.71	8.30	9.52	11.09	9.64	9.60	8.16	8.69	9.02	8.92
Hoogekraal08	9.32	12.25	12.67	12.12	12.89	11.86	10.54	10.18	11.29	12.51	12.17	11.23	9.23	12.22	10.19	12.21	13.01	13.85	12.69	12.29	11.35	11.72
Kapsteel08	3.75	4.55	4.55	4.37	4.35	5.28	5.42	4.00	3.91	4.51	3.13	4.41	4.38	4.33	4.28	3.87	4.57	4.94	3.46	4.66	4.28	4.33
Kapsteel09	5.95	4.98	5.26	5.39	5.10	5.93	5.12	3.91	4.14	5.44	4.90	4.38	5.06	3.73	4.56	4.38	4.65	5.26	4.09	4.05	4.82	4.81
Kapsteel10	4.14	3.98	3.85	4.47	4.26	3.36	3.54	3.27	2.93	2.85	3.29	3.46	3.55	3.54	3.29	3.43	3.66	2.79	3.90	3.75	3.76	3.57
Kapsteel10	5.28	5.59	6.60	6.30	6.33	6.00	7.28	5.21	5.60	5.52	4.86	5.17	4.85	6.64	6.03	6.11	5.08	6.54	7.03	5.31	5.71	5.86
Kapsteel09	4.04	4.82	4.85	5.00	4.09	4.07	4.52	3.69	3.71	3.78	3.35	3.94	4.26	4.26	3.36	3.32	3.51	3.81	4.40	4.32	3.63	4.03
Koster10	5.04	5.09	5.32	5.75	5.10	5.68	5.15	4.08	5.43	4.49	5.69	4.41	4.12	5.64	4.94	6.56	5.18	5.06	5.66	6.14	4.29	5.18
Koster08	4.93	5.13	5.23	6.00	4.88	5.59	4.84	4.66	3.95	4.42	4.88	4.86	4.28	4.71	5.90	5.10	5.60	6.97	5.86	7.32	3.98	5.20
Koster09	2.73	2.50	2.58	2.16	3.02	2.79	2.39	3.10	2.44	2.54	3.43	2.90	2.89	3.36	3.10	3.14	3.24	2.16	3.14	2.78	2.06	2.78
Koster08	4.96	5.16	4.62	5.05	5.55	5.82	5.83	5.35	4.45	4.26	5.98	3.47	5.67	3.23	4.52	2.64	6.40	6.86	5.16	6.21	6.10	5.11
Leeudoringstad10	8.16	7.72	8.35	8.82	7.87	7.52	7.67	6.14	7.65	6.29	6.13	7.46	6.37	9.19	7.72	8.36	8.11	8.18	8.64	8.36	6.91	7.70
Leeudoringstad08	7.36	7.50	7.31	8.30	8.39	6.33	7.22	6.65	6.72	5.79	6.66	6.65	4.70	6.13	7.19	6.48	7.44	8.08	7.45	7.27	5.60	6.91
Leeudoringstad09	5.82	6.35	7.91	7.05	7.77	5.71	5.77	5.48	5.83	6.66	5.63	6.36	5.11	7.08	6.74	7.41	7.38	7.49	7.01	6.59	6.75	6.57

Table 20 Vervolg
Table 20 Continued

Omgewing Environment	CRN-3505	DKC-77-61B	DKC-78-15B	DKC-78-35R	DKC-78-45BR	DKC-80-12B	DKC-80-40BR	LS-8504	LS-8511	LS-8512	LS-8519	LS-8521B	LS-8523B	PAN-6611	PAN-6616	PAN-6723	PAN-6P-110	PAN-6Q-308B	Phb-30Y79B	Phb-30Y83	Phb-32D95BR	Gem Mean
Lichtenburg10	5.90	6.09	5.80	5.72	6.18	6.75	6.10	4.58	4.94	5.42	5.09	5.54	4.75	5.83	6.12	7.15	6.27	6.10	6.60	5.69	4.57	5.77
Lichtenburg10	6.25	5.88	5.81	6.17	6.02	6.31	5.86	4.92	5.96	5.68	6.05	4.86	5.25	5.63	5.41	6.38	6.85	5.22	5.11	5.63	5.08	5.73
Lichtenburg10	7.18	4.42	5.90	7.70	7.21	6.27	6.77	5.14	6.08	6.02	5.47	5.25	5.60	6.53	5.70	6.48	5.84	7.39	8.09	7.46	5.96	6.31
Lichtenburg08	2.58	2.96	3.43	2.55	2.19	3.03	2.92	2.47	2.16	2.60	1.89	2.16	2.09	2.37	2.36	1.97	2.72	2.55	2.51	2.46	2.72	2.51
Nampo10	6.80	5.36	6.48	6.87	5.34	6.32	7.24	5.88	4.58	6.65	7.25	5.31	4.62	4.87	5.82	7.03	5.63	7.93	7.02	7.04	6.15	6.20
Nampo09	6.98	6.66	7.58	7.76	7.92	6.90	6.20	4.89	5.57	5.51	5.82	5.56	5.66	5.96	7.23	6.64	6.76	6.98	7.87	7.31	5.93	6.56
Ottosdal10	7.18	6.56	7.55	8.03	7.01	7.31	7.45	5.48	6.14	7.28	7.24	6.06	6.09	7.82	7.93	6.57	6.17	7.12	6.86	7.40	5.44	6.89
Ottosdal08	5.82	4.91	5.41	5.90	6.88	5.67	5.70	3.87	2.21	3.83	4.11	5.28	4.70	1.37	2.33	1.87	3.63	6.33	5.47	3.02	5.74	4.48
Ottosdal09	4.43	6.17	6.65	5.89	6.06	8.15	5.23	7.99	8.61	6.74	7.39	9.99	9.08	7.79	7.97	8.48	7.97	9.39	5.31	8.34	8.70	7.44
Ottosdal08	5.92	5.74	5.00	5.43	4.52	5.68	4.82	4.47	5.28	4.92	5.02	4.85	4.88	5.23	4.43	5.21	5.40	4.57	6.98	5.12	3.91	5.11
Potchefstroom09	5.52	4.74	4.66	4.80	4.50	4.86	4.64	3.77	4.38	3.55	3.97	4.26	3.66	5.36	4.62	5.05	4.35	4.46	5.82	4.70	3.73	4.54
Potchefstroom10	7.25	7.45	7.96	7.59	7.60	7.26	7.45	6.24	5.82	6.26	6.31	6.47	5.68	7.94	7.26	7.69	7.47	7.87	7.43	7.74	6.57	7.11
Lichtenburg09	5.79	4.96	5.76	5.14	4.84	4.47	4.49	5.03	3.84	4.68	4.82	4.60	4.29	4.86	4.80	4.40	4.21	4.32	4.74	4.23	3.84	4.67
Rushof10	7.01	6.22	6.37	7.20	6.81	6.46	7.28	6.11	5.23	6.87	6.34	5.59	4.86	6.97	6.89	6.37	6.39	6.94	7.27	6.38	6.42	6.47
Rushof08	7.03	7.39	7.96	6.71	6.75	7.54	7.40	6.66	7.24	5.86	7.53	6.92	6.59	7.38	6.91	6.98	6.45	6.53	8.16	6.89	6.79	7.03
Rushof09	8.83	8.70	8.88	8.13	8.51	7.91	9.15	7.76	7.92	8.50	8.21	7.81	8.16	6.89	8.45	7.78	8.22	8.12	8.90	9.25	8.29	8.30
Schweizer-Reneke09	5.93	4.97	6.20	6.17	6.47	6.14	6.00	5.33	5.23	5.70	5.16	5.69	5.28	5.82	5.66	5.44	5.57	5.85	6.11	6.06	5.27	5.72
Tweebuffels10	4.13	4.32	3.81	4.25	4.88	4.35	4.23	4.09	4.17	3.87	3.06	3.77	3.63	3.73	3.93	3.72	3.31	3.58	5.56	5.00	4.12	4.07
Tweebuffels08	4.43	4.53	4.59	4.80	4.13	4.71	5.04	4.06	4.02	3.78	4.05	4.17	3.84	4.65	4.34	3.73	4.91	5.07	4.68	5.16	3.81	4.40
Ventersdorp10	4.75	4.67	5.01	4.32	4.30	4.50	4.48	4.41	3.87	4.36	3.94	4.70	4.33	4.72	4.73	4.37	4.78	4.22	4.50	4.44	3.43	4.42
Ventersdorp08	4.73	4.55	4.27	5.42	4.61	4.23	3.67	4.49	5.68	5.45	4.19	5.11	5.02	6.13	5.93	7.38	4.56	5.31	7.22	5.77	4.61	5.16
Viljoenskoon08	10.72	10.84	10.42	10.34	10.58	9.69	10.60	8.96	8.88	8.03	8.89	8.12	8.13	9.76	9.65	8.24	10.81	10.15	10.31	9.59	9.28	9.62
Viljoenskroon09	9.05	9.84	10.45	9.76	10.41	8.55	9.67	7.36	7.86	8.54	8.73	7.12	8.15	8.20	9.02	8.47	8.58	8.67	10.51	9.04	8.85	8.90
Viljoenskroon09	5.12	4.93	4.41	4.93	5.07	5.27	5.23	4.40	4.86	4.83	4.56	4.81	4.52	4.48	5.64	5.10	4.43	5.76	5.01	5.65	5.22	4.96
Viljoenskroon09	8.62	8.78	9.47	8.07	10.00	8.57	8.52	7.28	6.18	7.65	7.70	8.46	7.65	6.71	7.89	6.83	7.30	8.51	8.55	7.91	7.77	8.02
Viljoenskoonb08	7.67	7.04	7.14	7.02	6.79	5.58	6.21	7.06	6.91	7.09	7.39	7.36	6.92	7.47	7.06	7.06	6.75	6.65	6.68	7.46	5.61	6.90
Viljoenskroon10	9.89	9.38	9.81	9.44	10.96	9.08	9.52	8.75	9.75	9.90	9.42	8.77	8.39	9.87	9.46	11.42	8.74	8.75	11.75	11.60	8.97	9.70
Viljoenskroon10	8.17	6.95	7.59	8.21	8.47	7.53	7.81	9.11	8.74	9.05	9.33	8.81	8.65	6.79	9.26	8.50	6.96	7.20	10.09	10.20	8.74	8.39
Viljoenskroon10	3.76	4.68	4.31	3.77	4.11	4.95	4.36	3.85	3.57	3.43	3.00	4.09	3.53	3.94	3.78	3.65	4.02	4.29	4.56	3.74	4.03	3.97
Wesselbron08	6.98	6.44	6.59	7.08	6.83	6.84	7.22	5.17	5.05	4.72	5.50	5.34	5.34	6.29	5.33	5.54	6.23	7.30	7.88	6.95	5.99	6.22
Wesselbronb08	12.48	13.45	14.74	14.04	12.43	13.85	15.08	10.64	9.97	11.79	10.53	10.25	11.06	10.30	11.56	9.51	10.33	11.02	12.73	10.15	10.06	11.71
Wesselsbron10	6.61	6.72	6.92	7.01	5.74	6.18	6.08	6.39	4.98	5.89	4.50	5.05	5.10	6.55	6.65	6.43	6.81	5.89	6.96	6.80	5.29	6.12
Wesselsbron09	7.65	6.81	8.81	7.00	7.75	5.87	6.14	5.37	5.61	5.29	5.17	5.62	5.40	6.22	5.76	7.00	6.84	6.86	6.76	7.27	5.73	6.43
Wesselsbron10	6.86	4.25	5.71	6.55	6.81	4.25	5.41	4.19	5.13	4.45	4.85	5.22	5.47	5.29	5.04	6.15	5.90	6.00	5.66	5.09	4.93	5.39
Wesselsbron09	5.82	5.22	5.82	6.45	5.36	6.06	5.44	4.82	5.56	5.64	5.70	6.03	5.30	6.39	5.11	5.74	5.75	6.12	6.60	6.41	5.54	5.76
Wolmaranstad08	6.25	7.75	7.84	7.31	6.79	7.94	7.17	7.35	7.28	7.38	6.31	8.12	7.87	7.90	7.59	7.20	7.92	7.16	6.76	7.71	7.11	7.37
Wolmaranstad09	4.93	7.41	5.48	4.68	6.80	7.52	5.70	6.41	6.05	6.98	6.49	6.51	6.33	4.68	6.48	5.81	5.65	6.78	7.62	6.22	5.57	6.19
Gem/Mean	6.33	6.29	6.59	6.53	6.49	6.33	6.33	5.66	5.68	5.89	5.91	5.85	5.60	6.02	6.14	6.09	6.04	6.33	6.69	6.43	5.65	6.11

Tabel 21 Die IPCA 1 en IPCA 2- waardes vir 70 omgewings
Table 21 The IPCA 1 and IPCA2 scores for 70 environments

Omgewing Environment	Gem/Mean Opb/yield ($t\ ha^{-1}$)	IPCA 1waarde score	IPCA 2 waarde score
Bothaville10	8.08	0.529	0.200
Bothaville09	6.72	-1.742	0.543
Bothaville09	8.59	0.174	0.148
Bothaville10	8.87	-0.218	-0.183
Bultfontein09	6.18	-0.034	0.380
Coligny10	6.73	0.035	-0.298
Coligny10	4.92	-0.184	0.158
Coligny09	4.75	0.237	-0.251
Colingy08	5.73	0.390	0.506
Colingy08	4.20	-0.049	0.091
Delareyville08	3.81	0.139	-0.130
Delareyville10	3.27	-0.115	0.018
Delareyville09	3.08	-0.198	0.152
Gerdau08	5.16	0.201	-0.061
Glaudina08	5.68	-0.135	0.255
Glaudina09	5.32	-0.073	0.125
Grootpan08	10.74	0.379	0.407
Hartbeesfontein10	4.07	0.125	-0.011
Hartbeesfontein08	4.50	0.083	0.176
Hoogekraal10	8.92	-0.151	-0.828
Hoogekraal08	11.72	0.206	-0.457
Kapsteel08	4.33	0.040	0.423
Kapsteel09	4.81	-0.282	0.435
Kapsteel10	3.57	-0.016	0.056
Kapsteel10	5.86	-0.072	-0.216
Kapsteel09	4.03	-0.095	0.174
Koster10	5.18	0.365	-0.373
Koster08	5.20	0.162	-0.174
Koster09	2.78	0.467	0.188
Koster08	5.11	-0.314	0.735
Leeudoringstad10	7.70	0.149	-0.732
Leeudoringstad08	6.92	-0.270	-0.374
Leeudoringstad09	6.57	0.162	-0.479
Lichtenburg10	5.77	0.129	-0.307
Lichtenburg10	5.73	0.156	-0.044
Lichtenburg10	6.31	-0.028	-0.411
Lichtenburg08	2.51	-0.025	0.245
Nampo10	6.20	-0.087	-0.067
Nampo09	6.56	-0.253	-0.498
Ottosdal10	6.89	-0.002	-0.263
Ottosdal08	4.48	-1.352	0.875
Ottosdal09	7.44	1.454	1.168
Ottosdal08	5.11	0.164	-0.072
Potchefstroom09	4.54	0.138	-0.345
Potchefstroom10	7.11	-0.013	-0.490
Lichtenburg09	4.67	-0.051	0.070
Rushof10	6.47	-0.084	-0.242
Rushof08	7.03	0.123	0.071
Rushof09	8.30	-0.102	0.221
Schweizer-Reneke09	5.72	0.009	0.067
Tweebuffels10	4.07	0.069	0.112
Tweebuffels08	4.40	0.058	0.058
Ventersdorp10	4.42	0.181	0.124
Ventersdorp08	5.16	0.920	-0.404
Viljoenskoon08	9.62	-0.529	-0.388
Viljoenskroon09	8.90	-0.512	-0.388
Viljoenskroon09	4.96	0.202	0.203
Viljoenskroon09	8.02	-0.621	0.283
Viljoenskoonb08	6.90	0.445	0.051
Viljoenskroon10	9.70	0.373	-0.617
Viljoenskroon10	8.39	0.599	0.519
Viljoenskroon10	3.97	-0.011	0.245
Wesselsbron08	6.22	-0.403	-0.283
Wesselsbron08	11.71	-1.487	0.089
Wesselsbron10	6.12	0.043	-0.408
Wesselsbron09	6.43	-0.293	-0.619
Wesselsbron10	5.39	-0.036	-0.310
Wesselsbron09	5.76	0.270	-0.011
Wolmaranstad08	7.37	0.430	0.434
Wolmaranstad09	6.20	0.233	0.734

Tabel 22 Gemiddelde opbrengs (t ha^{-1}), orde, IPCA1 en IPCA2- waardes en AMMI model vir stabiliteits waarde (ASW) vir mielie genotipes geanaliseer volgens die AMMI 70 westelike omgewings gedurende die 2007/08, 2008/09 & 2009/2010 seisoene

Table 22 Mean yield (tha^{-1}), rank, IPCA1 And IPCA2 scores and AMMI stability value (ASV) of maize genotypes analysed according to the AMMI model over 70 western environments during the 2007/08, 2008/09 & 2009/2010 seasons

Genotipes Genotype	Gen.No. Gen.No.	Gem/Mean Opb./Yield ($t.ha^{-1}$)	Orde Rank	IPCA 1 Waarde Score	IPCA 2 Waarde Score	ASW ASV	Orde Rank
CRN3505	1	6.27	10	-1.0898	-0.5480	3.255	17
DKC77-61B	2	6.29	9	-0.6217	-0.0405	0.801	2
DKC78-15B	3	6.59	2	-1.1760	-0.5630	3.649	19
DKC78-35R	4	6.53	3	-0.9207	-0.5618	2.643	13
DKC78-45BR	5	6.49	4	-1.1542	-0.3297	3.116	16
DKC80-12B	6	6.33	7	-0.5719	0.7784	2.073	10
DKC80-40BR	7	6.33	8	-1.3074	0.2301	3.637	18
LS8504	8	5.59	21	0.3866	0.9423	2.048	9
LS8511	9	5.61	19	1.0508	0.1730	2.395	12
LS8512	10	5.81	17	0.2509	0.4720	1.003	5
LS8519	11	5.82	16	0.3408	0.4150	0.996	4
LS8521B	12	5.85	15	0.6712	1.1320	2.968	15
LS8523B	13	5.60	20	0.3608	1.4436	2.951	14
PAN6611	14	5.98	14	1.1495	-1.1129	4.565	20
PAN6616	15	6.06	11	0.5846	-0.2484	1.107	6
PAN6723	16	6.02	13	1.4985	-1.1768	6.418	21
PAN6P-110	17	6.04	12	0.3319	-0.4102	0.976	3
PAN6Q-308B	18	6.33	6	-0.3801	-0.0259	0.320	1
Phb30Y79B	19	6.69	1	-0.2286	-0.7612	1.526	8
Phb30Y83	20	6.43	5	0.8696	-0.4089	2.185	11
Phb32D95BR	21	5.65	18	-0.0449	0.6009	1.131	7

Tabel 23 Die AMMI model seleksie vir die beste vier genotipes se gemiddelde opbrengste in verhouding tot die omgewings geëvalueer gedurende die 2007/08, 2008/09 & 2009/2010 seisoene
Table 23 The AMMI model's best four maize genotype selections for mean yield in relation to the environments evaluated during the 2007/08, 2008/09 & 2009/2010 seasons

Omgewings Environment	Gem Mean	IPCA 1 waarde Score	AMMI seleksies/selection			
Bothaville10	8.08	0.529	Phb30Y83	PAN6723	LS8521B	Phb30Y79B
Bothaville09	6.72	-1.742	DKC80-40BR	DKC78-15B	DKC78-45BR	CRN3505
Bothaville09	8.59	0.174	Phb30Y79B	Phb30Y83	DKC80-12B	DKC78-15B
Bothaville10	8.87	-0.218	DKC78-15B	Phb30Y79B	DKC78-35R	DKC78-45BR
Bultfontein09	6.18	-0.034	DKC80-12B	DKC80-40BR	DKC78-15B	Phb30Y79B
Coligny10	6.73	0.035	Phb30Y79B	DKC78-15B	DKC78-35R	Phb30Y83
Coligny10	4.92	-0.184	DKC78-15B	DKC78-45BR	Phb30Y79B	DKC78-35R
Coligny09	4.75	0.237	Phb30Y79B	Phb30Y83	PAN6723	PAN6611
Colingy08	5.73	0.390	LS8521B	Phb30Y83	DKC80-12B	LS8523B
Colingy08	4.20	-0.049	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Delareyville08	3.81	0.139	Phb30Y79B	Phb30Y83	DKC78-15B	DKC78-35R
Delareyville10	3.27	-0.115	DKC78-15B	Phb30Y79B	DKC78-35R	DKC78-45BR
Delareyville09	3.08	-0.198	DKC78-15B	DKC78-45BR	DKC78-35R	DKC80-40BR
Gerdau08	5.16	0.201	Phb30Y79B	Phb30Y83	PAN6723	DKC78-15B
Glaudina08	5.68	-0.135	DKC80-12B	DKC78-15B	DKC80-40BR	DKC78-45BR
Glaudina09	5.32	-0.073	Phb30Y79B	DKC78-15B	DKC78-45BR	DKC78-35R
Grootpan08	10.74	0.379	Phb30Y83	LS8521B	DKC80-12B	LS8523B
Hartbeesfontein10	4.07	0.125	Phb30Y79B	Phb30Y83	DKC78-15B	DKC78-35R
Hartbeesfontein08	4.50	0.083	Phb30Y79B	Phb30Y83	DKC80-12B	DKC78-15B
Hoogekraal10	8.92	-0.151	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Hoogekraal08	11.72	0.206	Phb30Y79B	PAN6723	Phb30Y83	PAN6611
Kapsteel08	4.33	0.040	DKC80-12B	DKC80-40BR	Phb30Y79B	LS8521B
Kapsteel09	4.81	-0.282	DKC80-12B	DKC80-40BR	DKC78-15B	DKC78-45BR
Kapsteel10	3.57	-0.016	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Kapsteel10	5.86	-0.072	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Kapsteel09	4.03	-0.095	DKC78-15B	Phb30Y79B	DKC78-45BR	DKC78-35R
Koster10	5.18	0.365	PAN6723	Phb30Y83	Phb30Y79B	PAN6611
Koster08	5.20	0.162	Phb30Y79B	Phb30Y83	DKC78-15B	DKC78-35R
Koster09	2.78	0.467	Phb30Y83	PAN6723	Phb30Y79B	LS8521B
Koster08	5.11	-0.314	DKC80-12B	DKC80-40BR	DKC78-45BR	LS8523B
Leeudoringstad10	7.70	0.149	Phb30Y79B	PAN6723	PAN6611	Phb30Y83
Leeudoringstad08	6.92	-0.270	DKC78-15B	Phb30Y79B	DKC78-35R	DKC78-45BR
Leeudoringstad09	6.57	0.162	Phb30Y79B	PAN6723	Phb30Y83	PAN6611
Lichtenburg10	5.77	0.129	Phb30Y79B	Phb30Y83	DKC78-15B	DKC78-35R
Lichtenburg10	5.73	0.156	Phb30Y79B	Phb30Y83	DKC78-15B	DKC78-35R
Lichtenburg10	6.31	-0.028	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Lichtenburg08	2.51	-0.025	DKC80-12B	Phb30Y79B	DKC78-15B	DKC78-45BR
Nampo10	6.20	-0.087	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Nampo09	6.56	-0.253	DKC78-15B	Phb30Y79B	DKC78-35R	DKC78-45BR
Ottosdal10	6.89	-0.002	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Ottosdal08	4.48	-1.352	DKC80-40BR	DKC80-12B	DKC78-45BR	DKC78-15B
Ottosdal09	7.44	1.454	LS8521B	LS8523B	LS8511	LS8504
Ottosdal08	5.11	0.164	Phb30Y79B	Phb30Y83	DKC78-15B	DKC78-35R
Potchefstroom09	4.54	0.138	Phb30Y79B	Phb30Y83	PAN6723	DKC78-15B
Potchefstroom10	7.11	-0.013	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Lichtenburg09	4.67	-0.051	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Rushof10	6.47	-0.084	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Rushof08	7.03	0.123	Phb30Y79B	Phb30Y83	DKC78-15B	DKC78-35R
Rushof09	8.30	-0.102	DKC78-15B	DKC80-12B	Phb30Y79B	DKC78-45BR
Schweizer-Reneke09	5.72	0.010	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Tweebuffels10	4.07	0.069	Phb30Y79B	DKC78-15B	Phb30Y83	DKC78-35R
Tweebuffels08	4.40	0.058	Phb30Y79B	DKC78-15B	Phb30Y83	DKC78-35R
Ventersdorp10	4.42	0.182	Phb30Y79B	Phb30Y83	DKC80-12B	DKC78-15B
Ventersdorp08	5.16	0.920	PAN6723	PAN6611	Phb30Y83	Phb30Y79B
Viljoenskoon08	9.62	-0.529	DKC78-15B	DKC78-35R	DKC78-45BR	Phb30Y79B
Viljoenskroon09	8.90	-0.512	DKC78-15B	DKC78-35R	DKC78-45BR	Phb30Y79B
Viljoenskroon09	4.96	0.202	Phb30Y83	Phb30Y79B	DKC80-12B	PAN6Q-308B
Viljoenskroon09	8.02	-0.621	DKC80-40BR	DKC78-15B	DKC78-45BR	DKC78-35R
Viljoenskoonb08	6.90	0.445	Phb30Y83	PAN6723	Phb30Y79B	PAN6611
Viljoenskroon10	9.70	0.373	PAN6723	PAN6611	Phb30Y79B	Phb30Y83
Viljoenskroon10	8.39	0.599	LS8521B	Phb30Y83	LS8523B	DKC80-12B
Viljoenskroon10	3.97	-0.011	DKC80-12B	Phb30Y79B	DKC78-15B	DKC78-45BR
Wesselsbron08	6.22	-0.403	DKC78-15B	DKC78-35R	DKC78-45BR	Phb30Y79B
Wesselsbron08	11.71	-1.487	DKC80-40BR	DKC78-15B	DKC78-45BR	DKC78-35R
Wesselsbron10	6.12	0.043	Phb30Y79B	DKC78-15B	DKC78-35R	Phb30Y83
Wesselsbron09	6.43	-0.293	DKC78-15B	Phb30Y79B	DKC78-35R	DKC78-45BR
Wesselsbron10	5.39	-0.036	Phb30Y79B	DKC78-15B	DKC78-35R	DKC78-45BR
Wesselsbron09	5.76	0.270	Phb30Y83	Phb30Y79B	PAN6723	PAN6611
Wolmaranstad08	7.37	0.430	LS8521B	Phb30Y83	DKC80-12B	LS8523B
Wolmaranstad09	6.20	0.233	LS8521B	DKC80-12B	LS8523B	LS8504

08 =2008, 09 =2009 & 10 =2010

Tabel 24 Opsomming van alle eienskappe vir die 2007/08, 2008/09 & 2009/2010
Table 24 Summary of mean values for all characteristics for the 2007/08, 2008/09 & 2009/2010

Genotipes Genotypes	Omval % Logded	Spruite % Tillering	Koppe plant^{-1} Ears plant^{-1}	Graan vog% Grain moist.%	Graan opbrengs Grain yield (t.ha^{-1})
CRN3505	1.35	27.28	1.96	13.75	6.27
DKC77-61B	1.05	19.71	1.70	13.58	6.29
DKC78-15B	1.46	28.13	1.96	13.93	6.59
DKC78-35R	0.96	33.44	1.95	14.07	6.53
DKC78-45BR	0.93	32.96	1.94	13.85	6.49
DKC80-12B	1.22	18.74	1.85	12.79	6.33
DKC80-40BR	1.50	15.76	2.02	12.54	6.33
LS8504	2.04	28.13	1.77	12.86	5.59
LS8511	3.23	33.44	1.73	15.84	5.61
LS8512	1.61	32.96	1.77	13.76	5.81
LS8519	4.07	18.74	1.71	14.38	5.82
LS8521B	2.26	15.76	1.73	13.09	5.85
LS8523B	2.70	20.89	1.55	12.62	5.60
PAN6611	1.91	39.38	1.87	13.89	5.98
PAN6616	1.86	31.00	1.88	13.50	6.06
PAN6723	1.54	41.43	2.06	14.18	6.02
PAN6P-110	1.33	25.59	1.94	13.81	6.04
PAN6Q-308B	1.23	32.16	1.98	14.31	6.33
Phb30Y79B	2.63	40.44	1.63	13.61	6.69
Phb30Y83	2.35	47.66	1.73	13.11	6.43
Phb32D95BR	1.24	19.83	1.44	12.49	5.65
Gem/Mean	1.83	28.73	1.82	13.62	6.11

AANHANGSEL A / APPENDIX A

Die interpretasie van die " Additive Main Effects and Multiplicative Interactions (AMMI)" model en opbrengstabiliteit.

Die effek van genotipe by omgewing (G x O) interaksies in die interpretasie van resultate van opbrengste is welbekend. 'n Gekombineerde variansie-analise kan die interaksie kwantifiseer maar beskryf slegs die hoof effekte. Die klassieke ANOVA help nie veel om die interaksies te verstaan of te interpreteer nie. Dit is dan ook die rede hoekom stabiliteits-analises, verskeie vorme van liniêre regressies en afgeleide G x O prosedures tekort skiet in definiëring van hoofeffekte, betekenisvolle interaksies of te min verklaar van interaksievariasies. AMMI bied 'n baie beter alternatiewe statistiese benadering vir veldproewe waar 'n G x O interaksie relevant kan wees. Multivariasie-analises het drie hoof doelwitte:

a) Om die akkuraatheid van analises en datapatrone te verbeter
b) Om die data op te som.
c) Om die genotipe – omgewingsinteraksie te kwalifiseer.

Met behulp van multivariansie-analise kan genotipes met ooreenstemmende reaksies gekombineer word waardeur analises makliker uitgevoer kan word. Die doel van verskillende multivariansie metodes is om genotipes in te deel in kwalitatiewe homogene en stabiele subgroepe. Binne sulke subgroepe bestaan daar geen betekenisvolle G x O interaksies nie, terwyl daar wel verskille tussen subgroepe bestaan. 'n XY- grafiek help baie vir modellering of om genotipes, omgewing of die interaksie te verstaan. Die basiese prinsiep van so 'n AMMI XY – grafiek is dat die punte op die X-as die hoof effekte aandui terwyl die Y-as die interaksie aandui. 'n Genotipe en omgewingskombinasie met beide negatiewe of positiewe waardes het 'n positiewe interaksie en andersins 'n negatiewe interaksie. Genotipes naby die bopunt van 'n XY – grafiek presteer goed in dienooreenkomstige omgewings en dieselfde geld vir genotipes aan die onderkant. Genotipes of omgewings naby die nul lyn op die Y – as het klein interaksies en is dus relatief stabiel. Genotipes met hoë opbrengspotensiale lê aan die regterkant van so 'n grafiek.

DEFINISIES

Interaksie Prinsiep Komponent Analise (IPCA)

IPCA van genotipes in die AMMI analise gee ‘n aanduiding van die stabiliteit daarvan oor omgewings. Hoe groter die waarde, beide positief en negatief, hoe meer is ‘n genotipe aangepas vir ‘n spesifieke omgewing. Hoe nader die IPCA-waarde aan nul kom hoe meer stabiel is ‘n genotipe oor alle gemete omgewings.

AMMI Stabiliteits Waarde (ASW)

Figuur 1a is ‘n voorbeeld van die AMMI model se klassifikasie vir genotipes se aanpasbaarheid en stabiliteitskarakteristieke. Indien die letters A tot E verskillende genotipes verteenwoordig kan die volgende afleidings gemaak word. Genotipe A is baie goed aangepas vir hoë potensiaal toestande, maar is nie baie stabiel nie. Onder swak heersende toestande kan die genotipe swak presteer. Genotipes B en C is stabiel vir die meeste omgewings alhoewel hulle opbrengste laer kan wees as A onder hoë potensiaal kondisies. Genotipe C is meer stabiel as Genotipe B omdat dit nader aan die nul waarde van IPCA lê. Genotipe D word ook as relatief stabiel geklassifiseer, maar slegs vir lae potensiaal omgewings. Genotipe E is onstabiel en slegs aangepas vir lae potensiaal omgewings. In die algemeen word genotipes wat geleë is tussen IPCA-waardes van 1 en –1 gereken as stabiel maar hulle aanpasbaarheids-karakteristieke kan wissel tussen hoë en lae potensiaal omgewings.

The interpretation of the Additive Main Effects And Multiplicative Interactions (AMMI) model and yield stability

The effect of genotype by environment (GxE) interactions in the interpretation of results of yield trials, are well known. A combined analysis of variance can quantify the interactions, but as an additive statistical model describes only the main effects. The classical ANOVA does little to help understand or interpret the interactions.

That is why stability analysis, various forms of joint linear regression, and related GxE statistical procedures can be deficient in defining main effects, incorrectly declaring interactions insignificantly, or explaining too little of the interaction variance. AMMI offers a more appropriate first statistical analysis of yield trials that may have a GxE interaction.

Multivariate analysis has three main purposes:

a) To increase the accuracy of data pattern and analysis

b) To summarize the data

c) To clarify the genotype–environment interactions.

Through multivariate analysis, genotypes with similar responses can be clustered, and the data can be summarized and anlaysed more easily. The aim of various multivariate classification methods are therefore to allocate genotypes to qualitatively homogeneous stability subsets. Within subsets, no significant GxE interactions occur, while differences among subsets are due to GxE interactions. A bi-plot is helpful for modelling or understanding the genotypes, the environments, and the interaction. The basic interpretive principle for such bi-plots is that bi-plots points displaced along the X-axis differ in main effects, whereas points displaced along the Y-axis differ in interaction. The joint structure of genotype and environment points in a bi-plot show the interaction. A genotype and environment combination with both negative scores or both positive scores, has a positive interaction, and otherwise a negative interaction. Hence genotypes near the top of a bi-plot do especially well in environments near the top, and likewise for the bottom genotypes and environments. Genotypes or environments near zero on the Y-axis have small interactions – they are relatively stable. Genotypes with high yield over the growing region of the trial are located to the right.

DEFINITIONS

Interaction Principle Component Analysis (IPCA)

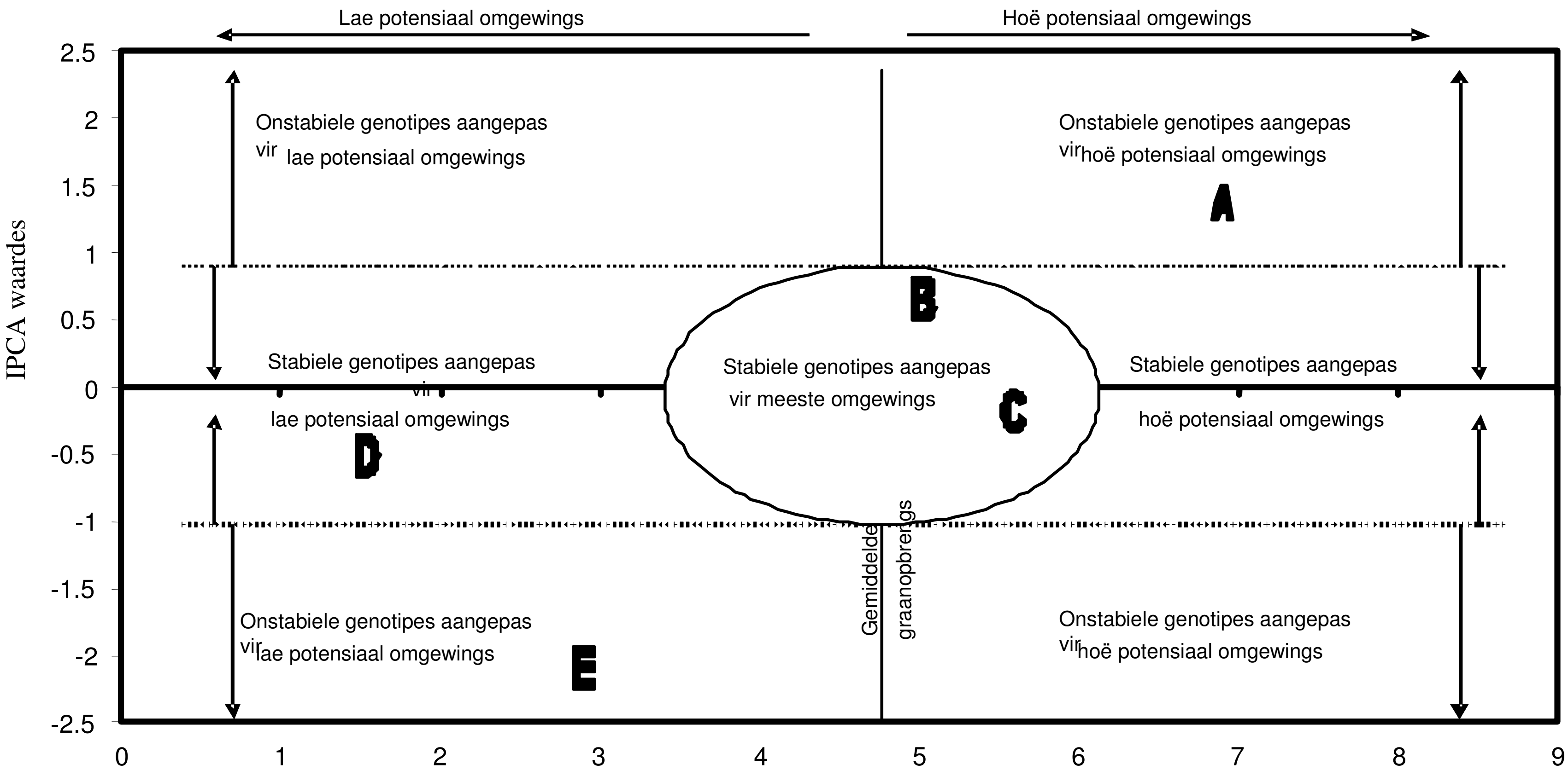
The Principle Component Interaction Analysis (IPCA) of genotypes in the AMMI analysis is an indication of the stability of a genotype over environments. The greater the IPCA scores, either negative or positive, the more specifically adapted a genotype is to a certain environment.

The closer IPCA scores approach zero the more stable the genotype is over all environments sampled.

AMMI Stability Value (ASV)

AMMI Stability Value (ASV) is the distance from zero in a two dimensional scatter gram of IPCA 1 scores against IPCA 2 scores. As the ASV nearing zero the genotype can be considered more stable for most of the environments.

Figure 1b is an example of the AMMI model's classification of genotypes adaptability and stability characteristics. If the letters A to E represent genotypes the following conclusions could be made. Genotype A is very good adapted towards high potential conditions but is not stable. Therefore, under poor prevailing conditions this genotype may yield poorly. Genotypes B and C are stable for most environmental potential conditions although their yields will be lower compared to genotype A under high potential conditions. Genotype C is more stable than genotype B because it is lying closer to the IPCA value of zero. Genotype D is also considered stable but only for low potential environments. Genotype E is unstable and only adapted to low potential environments. In general, genotypes that are falling between IPCA values of 1 and –1 are considered stable but their adaptabilities can range between low and high potential environments.



Figuur 1a. AMMI model dui die stabiliteit aan van genotipes by verskillende omgewings

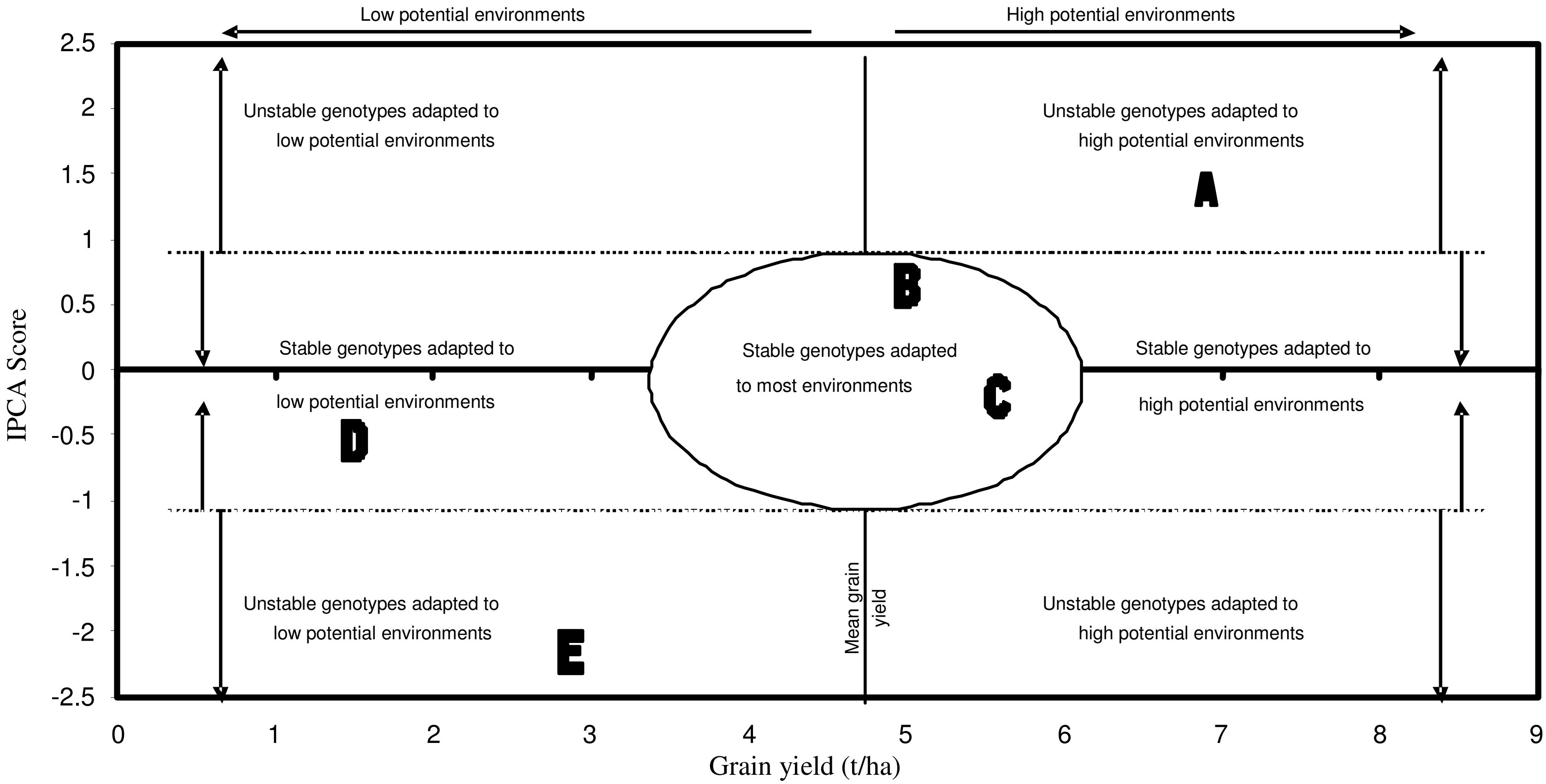


Figure 1b AMMI model indicates the stability of genotypes at different environments