# Report

## Evaluation of sunflower cultivars: 2020/2021 season

ARC-Grain Crops Institute in collaboration with the following seed companies: Agricol, Pannar, Pioneer, Syngenta, Sensako and Limagrain

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## INTRODUCTION

Optimisation of crop production requires, among a number of inputs, the selection of a well performing cultivar. Sunflower cultivar trials, which are done since the nineteen seventies in South Africa, have the aim to enable farmers to optimise sunflower production through sound cultivar selection.

In this project, commercially available cultivars are evaluated in order to predict their future yield performances and to assess their seed composition. This project is the only unbiased effort in South Africa that strives to evaluate important cultivars in the main areas of production. The information generated in these field trials on grain yield and seed quality is not only available to farmers but to all interested parties.

## MATERIALS AND METHODS

This project was conducted during the 2020/2021 season with the voluntary collaboration of Agricol, Cortiva (Pannar,Pioneer), Syngenta, Sensako and Limagrain. Seed companies entered 21 cultivars for evaluation (Table 1) and supplied seed to the ARC-GC which planned the field trials with randomised complete-block design layouts with three replicates. Germination tests, according to ISTA rules, were done on the supplied seed by a service provider (Senwes Grainlink). Seed germination from all cultivars exceeded the 80% requirement except LG 5710 (Table 1). Seed from cultivars were packed according to trial plans and send to co-operators before the onset of the growing season.

Twelve of the 21 cultivars were Clearfield types on which the use of the post emergence broad leaf weed controlling herbicide mixture, imazapyr + imazamox (Euro-Lightning®), is possible. In the field trials these cultivars were treated in the same way as the regular cultivars and received no Euro-Lightning®.

Each collaborating seed company had to conduct at least one trial for each cultivar entry. Agricol was supplied with seed for 10 trials, Cortiva (Pannar & Pioneer) with 10 trials, Syngenta/Sensako with one and Limagrain with three. Five trials were planted by the ARC-GC with different planting dates. Trial sites were selected by collaborators and the co-workers involved are listed in Table 2.

Four trials of Cortiva not planted or not harvested due to bad trial quality. Six trials were not statistically successful and were not included in the results. Planting dates, amount of fertiliser applied, soil analyses and other agronomic details from some successful field

trials are reported in Table 3. Grain yields were recorded on these trials while the period from planting to 50% flowering was recorded on five trials at Potchefstroom and three trials at Boskop with different planting dates. One trial at Klipdriftdam, Bothaville, Lichtenburg, Wolmaransstad and Ventersdorp.

Yield data and seed samples were send by collaborators to ARC-GC for analyses. Seed from selected trials sent to SAGL for oil and protein content analyses. Yield data from 19 field trials were subjected to analyses of variance. The regression line technique as described by Loubser and Grimbeek (1984) was used to calculate yield probabilities for cultivars at different yield potentials from the 19 trials.

Yield probabilities were also calculated for 17 cultivars that were evaluated in 40 trials during 2019/2020 and 2021/2022.

## RESULTS

### Days from planting to flowering

The mean number of days from planting to 50% flowering of cultivars (Table 4) ranged from 67 days for LG 5710, P 65 LL14, AGSUN 5108 CLP and PAN 7102 CLP, to 71 days AGSUN 5106 CLP. Calculated across cultivars and planting dates, the average period from planting to flowering was 69 days. The longest days to flowering recorded at Potchefstroom planted on the 21 of January 2021.

### Oil and protein concentration

The moisture free oil and protein concentrations of seed from seven trial localities, as analysed by the Southern African Grain Laboratory NPC, are shown in Tables 5 and 6 respectively. The oil analyses were done with a Soxhlet apparatus while the protein analyses were done according to the Dumas method.

The oil content on “as is“ basis for cultivars at the various localities varied from 38.51 to 44.30% with an overall mean of 41.02%.

The highest mean oil concentration among localities was at Potchefstroom (planting date 30 November 2020) with 44.30%. The locality with the lowest mean oil content of 38.51% was Bothaville planting date was January 26, 2021. The highest oil concentration among cultivars and calculated across localities, was LG 710 at 47.54% followed by SY 3970 CL at 47.49%

The average protein content varied from 14.90 to 17.88% among cultivars at the different localities. Among localities, Boskop planted in October 11, 2020 had the highest and Potchefstroom planted in December 10, 2020 the lowest protein content of 20.06 and 11.38% respectively. Calculated across localities, LG 5678 CLP had the highest protein content (17.88 %) followed by AGSUN 5102 CLP (16.93) while GUARA6 the lowest (14.90%).

**Seed yield**

The mean seed yield of cultivars at the respective localities is presented in Table 7. The highest locality mean yield of 3.40 t $ha^{-1}$ was obtained at Bothaville planted on 26 of January 2021 and the lowest of 0.80 t $ha^{-1}$, at Petrusburg planted on 22 of January 2021. The five best performing cultivars, in terms of average yield calculated over localities, were AGSUN 5103 CLP, AGSUN 5270, AGSUN 8251, PAN 7180 CLP & PAN 7160 CLP. The overall mean yield for 2019/20 was 2.38 t $ha^{-1}$, 5 % lower than the mean yield of the last year.

Twelve Clearfield and Clearfield Plus cultivars, AGSUN 5101 CLP, AGSUN 5102 CLP, AGSUN 5103 CLP, AGSUN 5106 CLP, AGSUN 5108 CLP, LG 5678 CLP, P 65 LP 54, P 65 LP 65, PAN 7102 CLP, PAN 7160 CLP, PAN 7180 CLP, and SY 3970 CL were entered. Eight of these cultivars namely AGSUN 5103 CLP, PAN 7180 CLP, PAN 7160 CLP, AGSUN 5106 CLP, P 65 LP 54 , PAN 7102 CLP, AGSUN 5102 CLP and P 65 LP 65 have yields even or higher than the overall mean yield of all cultivars.

**Oil yield**

Oil yield per unit area is the product of grain yield and seed oil content and presented in Table 8. The oil yield for cultivars at the seven localities varied from 0.95 to 1.29 t $ha^{-1}$ with an overall mean of 1.08 t $ha^{-1}$. The locality with the highest mean oil yield was Botha ville planted in January 26, 2021 at 1.32 t $ha^{-1}$. LG 5710 has the highest oil yield of 1.29 t $ha^{-1}$ followed by AGSUN 5270 with 1.22 t $ha^{-1}$

**Parameters calculated from the analysis of variance**

The trial mean yield, standard error of the trial mean and other parameters, calculated for each locality, are shown in Table 9. These parameters are presented for the evaluation of individual trials.

**Regression line coordinates at different yield targets**

Regression line coordinates at different yield targets, the overall mean yield, the intercept and slope from the regression line and yield stability ($R^2$- parameter) are shown in Table 10. The coordinate values of a particular cultivar are estimates of the mean expected yield at corresponding yield potentials. These values take the cultivar X environment interaction into account but not the yield stability. These values are accordingly not reliable for cultivar selection. Individual cultivar regression lines for 2020/2021 are shown in Figure 1 and for the 17 cultivars evaluated in 2019/2020 and 2020/2021 in Figure 2.

The yield stability of cultivars varied up to 21 fold among cultivars (Table 10). Cultivars which had exceptionally high stabilities (R-parameter =1) were, AGSUN5 108 CLP, AGSUN 5102 CLP, LG 5678 CLP and AGSUN 5101 CLP

**Yield probability**

The yield probability of a cultivar, is the probability of exceeding the mean yield of all cultivars, at a particular yield potential. The yield probabilities of all 21 cultivars for 2020/2021 are shown in Table 11. It takes account of both the cultivar X environment interaction and the yield stability and is therefore a reliable measure for cultivar choice. Yield probabilities higher than or equal to 60% in Table 11 indicates which cultivars would be sensible choices at the various yield potentials

The yield probabilities of 17 cultivars evaluated in 40 trials in 2019/2020 and 2020/21, and yield probabilities for the 16 cultivars evaluated in 54 trials are shown in Tables 12 and 13 respectively. Tables 11, 12 and 13 should be used jointly for cultivar selection.

**Acknowledgements**

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**References**

LOUBSER, H.L. & GRIMBEEK, C.L., 1984. Cultivarevaluasie: ‘n vergelyking tussen verskillende tegnieke. In: Notule van vergadering gehou deur die ondersoekkomitee na cultivarprogramme by die NIGG te Potchefstroom.

**Table 1: Cultivars evaluated and seed germination rate and supplier company 2020/21**

| Cultivar's Name | Germinated (%) | | | |
|---|---|---|---|---|
| | Normal | Abnormal | Dormant/dead | Company |
| AGSUN 5101 CLP | 98 | 1 | 1 | Agricol |
| AGSUN 5102 CLP | 97 | 2 | 1 | Agricol |
| AGSUN 5103 CLP | 98 | 1 | 1 | Agricol |
| AGSUN 5106 CLP | 98 | 1 | 1 | Agricol |
| AGSUN 5108 CLP | 99 | 1 | 0 | Agricol |
| AGSUN 5270 | 98 | 2 | 0 | Agricol |
| AGSUN 8251 | 95 | 3 | 2 | Agricol |
| Aguara 6 | 95 | 4 | 1 | Lima Grain |
| LG 5678 CLP | 91 | 5 | 4 | Lima Grain |
| LG 5710 | 72 | 13 | 15 | Lima Grain |
| P 65 LL 02 | 93 | 4 | 3 | Pioneer |
| P 65 LL 14 | 96 | 1 | 3 | Pioneer |
| P 65 LP 54 | 95 | 3 | 2 | Pioneer |
| P 65 LP 65 | 98 | 1 | 1 | Pioneer |
| PAN 7080 | 93 | 4 | 3 | Pannar |
| PAN 7100 | 87 | 7 | 6 | Pannar |
| PAN 7102 CLP | 97 | 2 | 1 | Pannar |
| PAN 7160 CLP | 92 | 5 | 3 | Pannar |
| PAN 7170 | 95 | 3 | 2 | Pannar |
| PAN7180 CLP | 96 | 2 | 2 | Pannar |
| SY 3970 CL | 95 | 2 | 3 | Sensako |

**Table 2: Collaborating company, trial localities and responsible co-workers 2020/2021**

| Company | Localities | Planting dates | Co-workers | E-mail address of co-worker |
|---|---|---|---|---|
| Agricol | Boskop 1 | 11/10/2020 | Joubert Swanepoel | Jouberts@agricol.co.za |
| | Boskop 2 | 30/11/2020 | | |
| | Boskop 3 | 14/01/2021 | | |
| | Fochville | Not planted | | |
| | Klipdriftdam | 22/12/2020 | | |
| | Bothaville | 26/01/2021 | | |
| | Lichtenburg | 25/11/2020 | | |
| | Wolmaranstad | 08/01/2021 | | |
| | Ventersdorp 2 | 19/01/2021 | | |
| | Ventersdorp 1 | 12/10/2020 | | |
| | Sannieshof | 18/01/2021 | | |
| ARC-GCI | Potchefstroom | 23/11/2020 | William Makgoga & Jan Erasmus | Makgogamw@arc.agric.za Erasmusj@arc.agric.za |
| | | 30/11/2020 | | |
| | | 10/12/2020 | | |
| | | 04/01/2021 | | |
| | | 21/01/2021 | | |
| Corteva | Putfontein | 24/11/2020 | Abre Pretorius & Louis Schoonraad Phillip Fourie | abre.pretorius@pannar.co.za louis.schoonraad@corteva.com philip.fourie@pioneer.com |
| | Coligny | 30/11/2020 | | |
| | Coligny | 01/12/2020 | | |
| | Gerdau | 02/12/2020 | | |
| | Gerdau | 02/12/2020 | | |
| | Lusthoff | 03/12/2020 | | |
| | Lusthoff | 03/12/2020 | | |
| | Petrusburg | 21/01/2021 | | |
| | Kroonstad | 29/12/2020 | | |
| | Senekal | 03/12/2020 | | |
| | Hennenman | 15/12/2020 | | |
| | Bethlehem | 26/11/2020 | | |
| | Kroonstad | 02/12/2020 | | |
| | Senekal | 03/12/2020 | | |
| | Kroonstad | 02/12/2020 | | |
| Lima grain | Potchefstroom | 04/12/2020 | Anita Janeke | anita.janeke@limagrain.com |
| | Fauresmith | 23/01/2021 | | |
| | Petrusburg | 22/01/2021 | | |
| Syngenta | Kroonstad | 28/12/2020 | PieterTaljaard | Pieter.Taljaard@syngenta.com |

## Table 3:Trial successful site information 2020/2021season

| | | | Top soil analysis (mg /kg) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Locality | Planting date | Plant /ha | soil texture | pH (KCl) | P | K | Ca | Mg | Fertiliser applied | Raw width (m) | Weed control | Net Plot (m2) |
| Boskop 1 | 11/10/2020 | 40000 | | | | | | | | 0,91 | Alanex and Karate | 11,83 |
| Boskop 2 | 30/11/2020 | 40000 | | | | | | | | 0,91 | Alanex and Karate | 11,83 |
| Boskop 3 | 14/01/2021 | 40000 | | | | | | | | 0,91 | Alanex and Karate | 11,83 |
| Bothaville | 26/01/2021 | 40000 | | | | | | | | 0,91 | Mechanical weeding | 11,83 |
| Klipdriftdam | 22/12/2020 | 40000 | | | | | | | | 0,91 | Mechanical weeding | 11,83 |
| Lichtenburg | 25/11/2020 | 40000 | | | | | | | | 0,91 | Mechanical weeding | 11,83 |
| Wolmaranstad | 08/01/2021 | 40000 | | | | | | | | 0,91 | Mechanical weeding | 11,83 |
| Ventersdorp | 12/10/2020 | 40000 | | | | | | | | 0,91 | Mechanical weeding | 11,83 |
| Sannieshof | 18/01/2021 | 40000 | | | | | | | | 0,91 | Mechanical weeding | 11,83 |
| Potchefstroom | 23/11/2020 | 40000 | Sandy Clay | 5,85 | 21 | 183 | 868 | 403 | 3:2:1(32) @100 kg/ha UAN (28) @ 146 Kg/ha | 0,90 | Frontier Optima, Mechanical | 12,6 |
| Potchefstroom | 30/11/2020 | 40000 | Sandy Clay | 6,05 | 31 | 380 | 860 | 420 | 3:2:1(32) @100 kg/ha UAN (28) @ 171 Kg/ha | 0,90 | Frontier Optima, Mechanical | 12,6 |
| Potchefstroom | 10/12/2020 | 40000 | Sandy Clay | 6,05 | 31 | 380 | 860 | 420 | 3:2:1(32) @100 kg/ha UAN (28) @ 171 Kg/ha | 0,90 | Frontier Optima, Mechanical | 12,6 |
| Potchefstroom | 04/01/2021 | 40000 | Sandy Clay | 6,05 | 31 | 380 | 860 | 420 | 3:2:1(32) @100 kg/ha UAN (28) @ 171 Kg/ha | 0,90 | Frontier Optima, Mechanical | 12,6 |
| Potchefstroom | 21/01/2021 | 40000 | Sandy Clay | 6,06 | 65 | 390 | 733 | 418 | 3:2:1(32) @100 kg/ha UAN (28) @ 160 Kg/ha | 0,90 | Frontier Optima, Mechanical | 12,6 |
| Coligny | 30/11/2020 | | | | | | | | 4:2:1(34) x 200kg | 0,91 | | 32,76 |
| Gerdau | 02/12/2020 | | | | | | | | | 0,91 | | 32,76 |
| Kroonstad | 02/12/2020 | | | | | | | | | 0,91 | | 14,56 |
| Fauresm | 23/01/2021 | 35-40000 | Red Sand | | | | | | 7:2:1(29)ZnS @130 kg/ha | 1,2 | None | 14,4 |
| Petrusburg | 22/01/2021 | 35-40000 | Red Sand | | | | | | 6:2:1(36) 96kg/ha | 1,2 | None | 28,8 |

**Table 4: Number of days from planting to 50 percent flowering of cultivars at selected localities and planting dates 2020/2021**

| Cultivar | Boskop 11/10/2020 | Boskop 30/11/2020 | Boskop 14/01/2021 | Bothaville 26/01/2021 | Klipdriftdam 22/12/2020 | Lichtenburg 25/11/2020 | Wolmaransstad 08/01/2021 | Ventersdorp 12/10/2020 | Potchefstroom 23/11/2020 | Potchefstroom 30/11/2020 | Potchefstroom 01/12/2020 | Potchefstroom 04/01/2021 | Potchefstroom 20/01/2021 | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGSUN5101CLP | 67 | 68 | 67 | 75 | 69 | 66 | 66 | 67 | 68 | 68 | 68 | 71 | 79 | 69 |
| AGSUN5102CLP | 69 | 65 | 67 | 73 | 68 | 66 | 67 | 68 | 68 | 70 | 67 | 78 | 78 | 70 |
| AGSUN5103CLP | 70 | 70 | 68 | 75 | 69 | 67 | 67 | 69 | 64 | 71 | 67 | 78 | 79 | 70 |
| AGSUN5106CLP | 69 | 69 | 69 | 76 | 72 | 69 | 67 | 69 | 66 | 71 | 68 | 79 | 80 | 71 |
| AGSUN5108CLP | 65 | 67 | 65 | 69 | 68 | 68 | 66 | 65 | 66 | 66 | 66 | 70 | 75 | 67 |
| AGSUN5270 | 64 | 61 | 68 | 68 | 72 | 66 | 69 | 64 | 60 | 70 | 66 | 78 | 74 | 68 |
| AGSUN8251 | 68 | 65 | 67 | 73 | 69 | 67 | 67 | 67 | 66 | 67 | 66 | 70 | 78 | 68 |
| Aguara6 | 68 | 68 | 67 | 72 | 73 | 69 | 67 | 67 | 66 | 70 | 66 | 73 | 75 | 69 |
| LG5678CLP | 66 | 67 | 66 | 75 | 69 | 68 | 61 | 61 | 67 | 70 | 67 | 73 | 78 | 68 |
| LG5710 | 67 | 63 | 66 | 72 | 67 | 68 | 66 | 66 | 61 | 66 | 65 | 69 | 75 | 67 |
| P65LL02 | 70 | 68 | 68 | 75 | 74 | 66 | 66 | 66 | 64 | 72 | 68 | 73 | 78 | 70 |
| P65LL14 | 69 | 64 | 60 | 73 | 67 | 68 | 61 | 67 | 62 | 67 | 65 | 74 | 77 | 67 |
| P65LP54 | 65 | 62 | 64 | 75 | 69 | 65 | 68 | 65 | 60 | 68 | 67 | 78 | 78 | 68 |
| P65LP65 | 64 | 65 | 67 | 75 | 73 | 66 | 67 | 67 | 67 | 72 | 68 | 82 | 81 | 70 |
| PAN7080 | 66 | 67 | 64 | 71 | 69 | 68 | 66 | 62 | 66 | 73 | 68 | 81 | 78 | 69 |
| PAN7100 | 66 | 66 | 67 | 72 | 68 | 67 | 69 | 67 | 62 | 68 | 67 | 82 | 74 | 69 |
| PAN7102CLP | 64 | 61 | 69 | 73 | 67 | 65 | 66 | 69 | 60 | 66 | 65 | 73 | 79 | 67 |
| PAN7160CLP | 68 | 63 | 67 | 73 | 68 | 67 | 66 | 67 | 66 | 69 | 66 | 81 | 81 | 69 |
| PAN7170 | 66 | 62 | 68 | 71 | 69 | 64 | 67 | 67 | 64 | 70 | 66 | 78 | 77 | 68 |
| PAN7180CLP | 68 | 67 | 69 | 70 | 72 | 66 | 66 | 66 | 66 | 71 | 66 | 82 | 82 | 70 |
| SY3970CL | 71 | 69 | 68 | 70 | 73 | 67 | 66 | 65 | 66 | 71 | 69 | 79 | 78 | 70 |
| Mean | 67 | 66 | 67 | 73 | 70 | 67 | 66 | 66 | 65 | 69 | 67 | 76 | 78 | 69 |

**Table 5: The moisture free seed oil concentration (%) of cultivars at selected localities 2020/2021**

| Cultivar | Boskop 11/10/2020 | Boskop 14/01/2021 | Bothaville 26/01/2021 | Lichtenburg 25/11/2020 | Potchefstroom 30/11/2020 | Potchefstroom 10/12/2020 | Potchefstroom 21/01/2021 | Mean |
|---|---|---|---|---|---|---|---|---|
| AGSUN5101CLP | 32,92 | 38,52 | 35,40 | 37,53 | 39,18 | 40,36 | 36,78 | 37,24 |
| AGSUN5102CLP | 33,15 | 37,44 | 36,25 | 38,04 | 40,34 | 41,49 | 36,27 | 37,57 |
| AGSUN5103CLP | 35,85 | 38,88 | 35,21 | 36,70 | 39,87 | 42,19 | 35,29 | 37,71 |
| AGSUN5106CLP | 30,73 | 38,49 | 32,49 | 36,70 | 41,15 | 43,32 | 36,02 | 36,99 |
| AGSUN5108CLP | 31,14 | 38,56 | 34,74 | 38,58 | 40,87 | 40,31 | 35,36 | 37,08 |
| AGSUN5270 | 33,37 | 42,94 | 38,67 | 42,75 | 45,74 | 48,01 | 41,51 | 41,85 |
| AGSUN8251 | 33,99 | 39,95 | 37,08 | 35,66 | 39,50 | 43,33 | 36,78 | 38,04 |
| AGUARA6 | 38,07 | 43,46 | 43,22 | 44,94 | 47,37 | 47,80 | 43,42 | 44,04 |
| LG5678CLP | 39,29 | 44,32 | 41,60 | 43,27 | 47,71 | 47,57 | 41,91 | 43,67 |
| LG5710 | 40,72 | 46,84 | 45,32 | 44,98 | 49,25 | 51,78 | 47,80 | 46,67 |
| P65LL02 | 38,23 | 40,76 | 42,09 | 38,96 | 44,26 | 45,98 | 42,18 | 41,78 |
| P65LL14 | 38,56 | 41,42 | 38,96 | 37,16 | 43,46 | 45,02 | 40,45 | 40,72 |
| P65LP54 | 32,96 | 37,92 | 34,56 | 33,98 | 37,44 | 36,69 | 37,42 | 35,85 |
| P65LP65 | 36,04 | 41,08 | 39,69 | 38,73 | 42,42 | 44,79 | 41,76 | 40,64 |
| PAN7080 | 36,77 | 36,36 | 37,40 | 40,78 | 42,66 | 43,58 | 38,10 | 39,38 |
| PAN7100 | 35,08 | 39,87 | 38,04 | 41,83 | 44,70 | 45,16 | 40,76 | 40,78 |
| PAN7102CLP | 35,76 | 38,86 | 38,46 | 36,99 | 39,10 | 38,61 | 37,18 | 37,85 |
| PAN7160CLP | 35,15 | 41,79 | 37,61 | 42,09 | 42,94 | 42,47 | 40,34 | 40,34 |
| PAN7170 | 39,61 | 39,44 | 40,02 | 42,42 | 45,74 | 46,71 | 42,19 | 42,30 |
| PAN7180CLP | 33,09 | 37,22 | 38,30 | 39,30 | 39,96 | 42,31 | 37,89 | 38,30 |
| SY3970CL | 42,99 | 44,65 | 43,61 | 48,28 | 51,72 | 52,73 | 46,80 | 47,25 |
| Mean | 35,88 | 40,42 | 38,51 | 39,98 | 43,11 | 44,30 | 39,82 | 40,29 |

**Table 6: The moisture free seed protein concentration (%) of cultivars at selected localities 2020/2021**

| Cultivar | Boskop 11/10/2020 | Boskop 14/01/2021 | Bothaville 26/01/2021 | Lichtenburg 25/11/2020 | Potchefstroom 30/11/2020 | Potchefstroom 10/12/2020 | Potchefstroom 20/01/2021 | Mean |
|---|---|---|---|---|---|---|---|---|
| AGSUN5101CLP | 20,66 | 18,97 | 20,27 | 13,32 | 12,05 | 12,49 | 18,27 | 16,58 |
| AGSUN5102CLP | 20,77 | 19,90 | 21,91 | 13,87 | 12,11 | 12,15 | 17,78 | 16,93 |
| AGSUN5103CLP | 20,14 | 18,57 | 20,52 | 13,36 | 11,45 | 11,91 | 17,17 | 16,16 |
| AGSUN5106CLP | 21,34 | 18,41 | 21,08 | 14,10 | 11,10 | 11,38 | 17,15 | 16,37 |
| AGSUN5108CLP | 20,85 | 19,11 | 21,01 | 14,50 | 12,70 | 11,89 | 17,18 | 16,75 |
| AGSUN5270 | 21,08 | 18,64 | 19,23 | 12,41 | 11,68 | 10,94 | 16,83 | 15,83 |
| AGSUN8251 | 18,96 | 17,92 | 19,51 | 13,09 | 12,03 | 10,86 | 15,05 | 15,35 |
| AGUARA6 | 18,48 | 18,23 | 18,64 | 10,87 | 10,36 | 11,44 | 16,30 | 14,90 |
| LG5678CLP | 21,72 | 20,23 | 20,98 | 14,23 | 14,49 | 14,27 | 19,26 | 17,88 |
| LG5710 | 20,77 | 16,59 | 20,16 | 12,19 | 12,84 | 11,42 | 15,79 | 15,68 |
| P65LL02 | 19,46 | 20,51 | 19,25 | 12,54 | 11,54 | 11,80 | 15,85 | 15,85 |
| P65LL14 | 20,68 | 19,23 | 19,71 | 12,99 | 11,61 | 10,56 | 14,96 | 15,68 |
| P65LP54 | 20,68 | 19,45 | 19,76 | 12,94 | 12,46 | 10,83 | 15,08 | 15,89 |
| P65LP65 | 20,38 | 19,47 | 17,55 | 12,61 | 11,63 | 12,21 | 14,16 | 15,43 |
| PAN7080 | 17,96 | 19,80 | 18,52 | 12,63 | 10,54 | 10,52 | 15,26 | 15,04 |
| PAN7100 | 18,78 | 18,98 | 18,27 | 13,41 | 11,38 | 10,52 | 16,04 | 15,34 |
| PAN7102CLP | 19,81 | 18,83 | 18,89 | 14,41 | 11,84 | 10,28 | 13,32 | 15,34 |
| PAN7160CLP | 20,38 | 18,47 | 18,48 | 14,92 | 11,60 | 10,26 | 13,87 | 15,43 |
| PAN7170 | 19,80 | 19,89 | 20,53 | 14,78 | 11,05 | 10,26 | 14,82 | 15,88 |
| PAN7180CLP | 20,51 | 19,72 | 19,32 | 15,58 | 11,37 | 11,12 | 14,83 | 16,06 |
| SY3970CL | 18,09 | 19,98 | 20,65 | 15,01 | 11,56 | 11,81 | 17,04 | 16,31 |
| Mean | 20,06 | 19,09 | 19,73 | 13,51 | 11,78 | 11,38 | 16,00 | 15,94 |

**Table 7: Mean seed yield (t ha$^{-1}$) of cultivars at each locality 2020/2021**

| Cultivar | Boskop 11/10/20 | Boskop 30/11/20 | Boskop 14/01/21 | Bothaville 26/01/21 | Coligny 30/11/20 | Fauresmith 23/01/21 | Gerdau 2/12/20 | Klipdriftdam 22/12/20 | Kroonstad 2/12/20 | Lichtenburg 25/11/20 | Petrusburg 22/01/21 | Potchefstroom 23/11/20 | Potchefstroom 30/11/20 | Potchefstroom 10/12/20 | Potchefstroom 4/01/21 | Potchefstroom 21/01/21 | Sannieshof 18/01/21 | Ventersdorp 12/10/20 | Wolmaransstad 8/01/21 | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGSUN5101CLP | 3,05 | 3,34 | 3,11 | 3,41 | 2,27 | 1,69 | 2,49 | 1,94 | 2,27 | 2,79 | 0,70 | 2,77 | 2,21 | 2,07 | 1,88 | 1,91 | 1,72 | 2,87 | 1,80 | 2,33 |
| AGSUN5102CLP | 3,08 | 3,14 | 3,04 | 3,40 | 2,77 | 1,83 | 2,69 | 1,98 | 2,36 | 2,60 | 0,74 | 2,76 | 2,37 | 2,15 | 1,97 | 1,78 | 1,98 | 2,47 | 2,07 | 2,38 |
| AGSUN5103CLP | 3,56 | 3,95 | 3,23 | 3,97 | 2,39 | 1,57 | 2,52 | 2,41 | 2,48 | 2,47 | 0,80 | 2,67 | 2,49 | 2,02 | 2,02 | 2,07 | 1,92 | 2,76 | 2,37 | 2,51 |
| AGSUN5106CLP | 2,73 | 3,75 | 3,09 | 3,59 | 2,94 | 1,88 | 2,40 | 2,34 | 1,72 | 3,13 | 0,94 | 2,87 | 2,59 | 2,02 | 2,04 | 1,78 | 1,77 | 2,56 | 2,14 | 2,44 |
| AGSUN5108CLP | 2,67 | 2,94 | 2,92 | 3,32 | 2,83 | 1,54 | 2,33 | 2,22 | 2,03 | 2,95 | 0,68 | 2,86 | 2,39 | 2,20 | 2,14 | 1,89 | 1,83 | 2,44 | 1,96 | 2,32 |
| AGSUN5270 | 2,65 | 3,58 | 3,52 | 3,61 | 2,39 | 2,02 | 2,39 | 2,65 | 1,88 | 3,03 | 0,79 | 2,73 | 2,58 | 2,37 | 2,28 | 2,14 | 2,14 | 2,78 | 1,89 | 2,50 |
| AGSUN8251 | 2,86 | 3,45 | 2,95 | 3,50 | 2,57 | 1,86 | 2,53 | 2,72 | 2,10 | 2,50 | 0,75 | 2,91 | 2,50 | 2,23 | 2,24 | 2,09 | 1,97 | 2,73 | 2,90 | 2,49 |
| AGUARA6 | 2,71 | 2,94 | 2,92 | 3,31 | 3,04 | 1,96 | 2,84 | 1,62 | 2,33 | 2,61 | 0,84 | 2,83 | 2,41 | 2,07 | 2,25 | 2,10 | 1,44 | 2,15 | 1,84 | 2,33 |
| LG5678CLP | 2,39 | 3,04 | 2,68 | 2,92 | 2,41 | 1,68 | 2,34 | 2,02 | 1,91 | 2,50 | 0,75 | 2,21 | 2,20 | 2,04 | 2,21 | 1,83 | 1,48 | 2,48 | 1,58 | 2,14 |
| LG5710 | 3,07 | 2,89 | 2,92 | 3,35 | 2,58 | 1,42 | 2,68 | 1,77 | 2,23 | 2,41 | 0,66 | 2,96 | 2,76 | 2,43 | 2,18 | 2,03 | 1,77 | 2,61 | 1,51 | 2,33 |
| P65LL02 | 3,02 | 2,79 | 3,39 | 3,79 | 2,80 | 1,62 | 2,71 | 2,03 | 2,21 | 2,03 | 0,90 | 3,10 | 2,35 | 2,47 | 2,24 | 2,16 | 1,77 | 2,04 | 1,69 | 2,37 |
| P65LL14 | 2,38 | 3,31 | 3,10 | 3,17 | 2,38 | 1,70 | 1,93 | 2,03 | 2,34 | 2,58 | 0,91 | 2,95 | 2,28 | 2,25 | 2,14 | 1,82 | 1,92 | 2,65 | 1,84 | 2,30 |
| P65LP54 | 2,11 | 3,75 | 3,13 | 3,53 | 2,14 | 2,13 | 2,54 | 2,36 | 2,06 | 2,35 | 0,86 | 2,82 | 2,55 | 2,37 | 2,26 | 2,10 | 1,77 | 2,88 | 2,41 | 2,43 |
| P65LP65 | 2,25 | 3,53 | 3,16 | 3,56 | 2,46 | 1,98 | 1,92 | 2,27 | 2,36 | 2,59 | 0,71 | 2,83 | 2,54 | 2,08 | 2,11 | 2,00 | 1,78 | 2,37 | 2,61 | 2,37 |
| PAN7080 | 2,62 | 3,23 | 3,56 | 3,83 | 2,86 | 2,03 | 1,98 | 2,25 | 2,10 | 2,87 | 0,80 | 3,28 | 2,54 | 2,18 | 1,87 | 2,14 | 1,72 | 2,43 | 1,97 | 2,43 |
| PAN7100 | 2,82 | 3,28 | 3,14 | 3,47 | 2,43 | 2,06 | 1,86 | 1,93 | 2,34 | 3,17 | 0,92 | 2,90 | 2,98 | 2,30 | 2,11 | 2,03 | 2,16 | 2,39 | 2,09 | 2,44 |
| PAN7102CLP | 2,37 | 3,35 | 3,28 | 2,95 | 2,72 | 2,26 | 2,46 | 2,34 | 2,02 | 2,45 | 0,71 | 3,10 | 2,54 | 2,27 | 2,47 | 2,28 | 1,90 | 2,21 | 1,94 | 2,40 |
| PAN7160CLP | 2,70 | 3,76 | 3,14 | 3,47 | 2,36 | 1,97 | 2,37 | 2,47 | 2,36 | 2,82 | 0,79 | 2,90 | 2,79 | 2,36 | 2,19 | 2,36 | 1,66 | 2,16 | 2,40 | 2,48 |
| PAN7170 | 2,55 | 3,22 | 2,62 | 3,73 | 2,22 | 2,35 | 2,48 | 1,84 | 1,91 | 2,67 | 0,97 | 2,96 | 2,62 | 2,25 | 2,17 | 2,21 | 1,98 | 2,83 | 1,97 | 2,40 |
| PAN7180CLP | 2,58 | 3,45 | 3,11 | 3,59 | 2,78 | 2,19 | 2,28 | 2,86 | 1,94 | 3,51 | 0,75 | 2,79 | 2,50 | 2,23 | 1,94 | 2,17 | 2,15 | 2,72 | 1,82 | 2,49 |
| SY3970CL | 2,67 | 2,21 | 2,06 | 2,63 | 3,51 | 1,48 | 2,73 | 1,80 | 1,95 | 2,29 | 0,59 | 2,67 | 2,53 | 2,16 | 1,81 | 1,79 | 1,60 | 2,00 | 1,37 | 2,10 |
| Mean | 2,71 | 3,28 | 3,05 | 3,43 | 2,61 | 1,87 | 2,40 | 2,18 | 2,14 | 2,68 | 0,79 | 2,85 | 2,51 | 2,22 | 2,12 | 2,03 | 1,83 | 2,50 | 2,01 | 2,38 |
| CV % | 14,20 | 13,10 | 8,50 | 16,50 | 10,80 | 20,00 | 12,30 | 16,00 | 14,90 | 14,00 | 19,30 | 11,50 | 7,50 | 11,10 | 9,20 | 8,50 | 15,60 | 9,70 | 19,20 | |

**Table 8: Oil yield (t ha$^{-1}$) of cultivars at selected localities 2020/2021**

| Cultivar | Boskop 11/10/2020 | Boskop 14/01/2021 | Bothaville 26/01/2021 | Lichtenburg 25/11/2020 | Potchefstroom 30/11/2020 | Potchefstroom 10/12/2020 | Potchefstroom 20/01/2021 | Mean |
|---|---|---|---|---|---|---|---|---|
| AGSUN5101CLP | 1,00 | 1,20 | 1,21 | 1,05 | 0,87 | 0,84 | 0,70 | 0,98 |
| AGSUN5102CLP | 1,02 | 1,14 | 1,23 | 0,99 | 0,96 | 0,89 | 0,65 | 0,98 |
| AGSUN5103CLP | 1,28 | 1,26 | 1,40 | 0,91 | 0,99 | 0,85 | 0,73 | 1,06 |
| AGSUN5106CLP | 0,84 | 1,19 | 1,17 | 1,15 | 1,07 | 0,88 | 0,64 | 0,99 |
| AGSUN5108CLP | 0,83 | 1,13 | 1,15 | 1,14 | 0,98 | 0,89 | 0,67 | 0,97 |
| AGSUN5270 | 0,88 | 1,51 | 1,40 | 1,30 | 1,18 | 1,14 | 0,89 | 1,18 |
| AGSUN8251 | 0,97 | 1,18 | 1,30 | 0,89 | 0,99 | 0,97 | 0,77 | 1,01 |
| AGUARA6 | 1,03 | 1,27 | 1,43 | 1,17 | 1,14 | 0,99 | 0,91 | 1,14 |
| LG5678CLP | 0,94 | 1,19 | 1,21 | 1,08 | 1,05 | 0,97 | 0,77 | 1,03 |
| LG5710 | 1,25 | 1,37 | 1,52 | 1,08 | 1,36 | 1,26 | 0,97 | 1,26 |
| P65LL02 | 1,15 | 1,38 | 1,60 | 0,79 | 1,04 | 1,14 | 0,91 | 1,14 |
| P65LL14 | 0,92 | 1,28 | 1,23 | 0,96 | 0,99 | 1,01 | 0,74 | 1,02 |
| P65LP54 | 0,70 | 1,19 | 1,22 | 0,80 | 0,95 | 0,87 | 0,79 | 0,93 |
| P65LP65 | 0,81 | 1,30 | 1,41 | 1,00 | 1,08 | 0,93 | 0,84 | 1,05 |
| PAN7080 | 0,96 | 1,29 | 1,43 | 1,17 | 1,08 | 0,95 | 0,82 | 1,10 |
| PAN7100 | 0,99 | 1,25 | 1,32 | 1,33 | 1,33 | 1,04 | 0,83 | 1,16 |
| PAN7102CLP | 0,85 | 1,27 | 1,13 | 0,91 | 0,99 | 0,88 | 0,85 | 0,98 |
| PAN7160CLP | 0,95 | 1,31 | 1,31 | 1,19 | 1,20 | 1,00 | 0,95 | 1,13 |
| PAN7170 | 1,01 | 1,03 | 1,49 | 1,13 | 1,20 | 1,05 | 0,93 | 1,12 |
| PAN7180CLP | 0,85 | 1,16 | 1,37 | 1,38 | 1,00 | 0,94 | 0,82 | 1,08 |
| SY3970CL | 1,15 | 0,92 | 1,15 | 1,11 | 1,31 | 1,14 | 0,84 | 1,09 |
| Mean | 0,97 | 1,23 | 1,32 | 1,07 | 1,08 | 0,98 | 0,81 | 1,07 |

**Table 9: Parameters calculated from the analysis of variance for yield data at each locality**

| Locality | Mean (t/ha) | SE | CV (%) | GCV | t | SE(t) | tn |
|---|---|---|---|---|---|---|---|
| Bethlehem 26/11/2020 | 0,31 | 0,30 | 39,40 | . | -0,06 | 0,12 | -0,20 |
| BOSKOP1 11/10/2020 | 2,71 | 0,22 | 14,20 | 9,10 | 0,29 | 0,15 | 0,55 |
| BOSKOP2 30/11/2020 | 3,28 | 0,25 | 13,10 | 9,50 | 0,34 | 0,14 | 0,61 |
| BOSKOP3 14/01/2021 | 3,05 | 0,15 | 8,50 | 9,40 | 0,55 | 0,12 | 0,79 |
| BOTHAVILLE 26/01/2021 | 3,43 | 0,33 | 16,50 | . | -0,02 | 0,13 | -0,06 |
| Coligny 30/11/2020 | 2,61 | 0,16 | 10,80 | 10,80 | 0,50 | 0,13 | 0,75 |
| Fauresmith 23/01/2021 | 1,87 | 0,22 | 20,60 | 7,50 | 0,12 | 0,14 | 0,29 |
| Gerdau 2020/12/02 | 2,40 | 0,17 | 12,30 | 9,20 | 0,36 | 0,14 | 0,63 |
| KLIPDRIFDAM 22/12/2020 | 2,18 | 0,20 | 16,00 | 12,00 | 0,36 | 0,14 | 0,63 |
| Kroonstad 2/12/2020 | 2,14 | 0,18 | 14,90 | 4,80 | 0,09 | 0,14 | 0,23 |
| Kroonstad 28/12/2020 | 2,33 | 0,37 | 27,30 | 25,70 | 0,47 | 0,13 | 0,73 |
| Lichtenburg 26/11/2020 | 1,73 | 0,22 | 22,50 | . | -0,03 | 0,13 | -0,10 |
| LICHTENBURG 25/11/2020 | 2,68 | 0,22 | 14,00 | 9,90 | 0,33 | 0,14 | 0,60 |
| Petrusburg 22/01/2020 | 0,79 | 0,09 | 19,30 | 6,60 | 0,10 | 0,14 | 0,25 |
| Potchefstroom 11/23/2020 | 2,85 | 0,19 | 11,50 | 3,10 | 0,07 | 0,14 | 0,18 |
| Potchefstroom 30/11/2020 | 2,51 | 0,11 | 7,50 | 6,10 | 0,40 | 0,14 | 0,67 |
| Potchefstroom 10/12/2020 | 2,22 | 0,14 | 11,10 | . | -0,03 | 0,13 | -0,10 |
| Potchefstroom 05/12/2020 | 1,46 | 0,23 | 27,20 | 4,70 | 0,03 | 0,13 | 0,08 |
| Potchestroom 04/01/2021 | 2,12 | 0,11 | 9,20 | 5,40 | 0,26 | 0,15 | 0,51 |
| Potchestroom 21/01/2021 | 2,03 | 0,10 | 8,50 | 6,70 | 0,38 | 0,14 | 0,65 |
| SANNIESHOF 18/01/2021 | 1,83 | 0,16 | 15,60 | 6,20 | 0,14 | 0,14 | 0,33 |
| Senekal 3/12/2020 | 1,72 | 0,32 | 32,00 | . | -0,02 | 0,13 | -0,06 |
| VENTERSDORP1 12/10/2020 | 2,50 | 0,14 | 9,70 | 9,40 | 0,48 | 0,13 | 0,73 |
| VENTERSDORP 19/01/2021 | 1,13 | 0,24 | 36,30 | 11,00 | 0,08 | 0,14 | 0,21 |
| WOLMARANSTAD 08/01/2021 | 2,01 | 0,22 | 19,20 | 14,70 | 0,37 | 0,14 | 0,64 |

**Table 10: Regression line coordinates at different yield potentials 2020/2021**

| Cultivar | Yield potential (t ha$^{-1}$) | | | | | | Mean (t ha$^{-1}$) | Intercept | Slope | Fprob | $R^2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 1,5 | 2 | 2,5 | 3 | 3,5 | | | | | |
| AGSUN5101CLP | 0,82 | 1,37 | 1,92 | 2,47 | 3,02 | 3,57 | 2,33 | -0,28 | 1,10 | <0.001 | 0,93 |
| AGSUN5102CLP | 0,99 | 1,49 | 1,99 | 2,49 | 2,99 | 3,49 | 2,38 | -0,01 | 1,00 | <0.001 | 0,93 |
| AGSUN5103CLP | 0,86 | 1,46 | 2,06 | 2,66 | 3,26 | 3,86 | 2,51 | -0,34 | 1,20 | <0.001 | 0,85 |
| AGSUN5106CLP | 0,89 | 1,46 | 2,02 | 2,59 | 3,15 | 3,72 | 2,44 | -0,24 | 1,13 | <0.001 | 0,91 |
| AGSUN5108CLP | 0,94 | 1,44 | 1,94 | 2,44 | 2,94 | 3,44 | 2,32 | -0,06 | 1,00 | <0.001 | 0,95 |
| AGSUN5270 | 1,02 | 1,56 | 2,09 | 2,63 | 3,16 | 3,70 | 2,50 | -0,05 | 1,07 | <0.001 | 0,89 |
| AGSUN8251 | 1,17 | 1,65 | 2,12 | 2,60 | 3,07 | 3,55 | 2,49 | 0,22 | 0,95 | <0.001 | 0,84 |
| AGUARA6 | 1,02 | 1,50 | 1,97 | 2,45 | 2,92 | 3,40 | 2,33 | 0,07 | 0,95 | <0.001 | 0,83 |
| LG5678CLP | 0,95 | 1,38 | 1,81 | 2,24 | 2,67 | 3,10 | 2,14 | 0,09 | 0,86 | <0.001 | 0,93 |
| LG5710 | 0,89 | 1,41 | 1,93 | 2,45 | 2,97 | 3,49 | 2,33 | -0,15 | 1,04 | <0.001 | 0,86 |
| P65LL02 | 0,96 | 1,47 | 1,98 | 2,49 | 3,00 | 3,51 | 2,37 | -0,06 | 1,02 | <0.001 | 0,79 |
| P65LL14 | 1,01 | 1,48 | 1,94 | 2,41 | 2,87 | 3,34 | 2,30 | 0,08 | 0,93 | <0.001 | 0,92 |
| P65LP54 | 1,10 | 1,58 | 2,06 | 2,54 | 3,02 | 3,50 | 2,43 | 0,14 | 0,96 | <0.001 | 0,81 |
| P65LP65 | 0,99 | 1,49 | 1,99 | 2,49 | 2,99 | 3,49 | 2,37 | -0,01 | 1,00 | <0.001 | 0,86 |
| PAN7080 | 0,84 | 1,42 | 1,99 | 2,57 | 3,14 | 3,72 | 2,43 | -0,31 | 1,15 | <0.001 | 0,91 |
| PAN7100 | 1,11 | 1,59 | 2,07 | 2,55 | 3,03 | 3,51 | 2,44 | 0,15 | 0,96 | <0.001 | 0,85 |
| PAN7102CLP | 1,16 | 1,61 | 2,06 | 2,51 | 2,96 | 3,41 | 2,40 | 0,26 | 0,90 | <0.001 | 0,85 |
| PAN7160CLP | 1,06 | 1,57 | 2,08 | 2,59 | 3,10 | 3,61 | 2,48 | 0,04 | 1,02 | <0.001 | 0,90 |
| PAN7170 | 1,15 | 1,60 | 2,05 | 2,50 | 2,95 | 3,40 | 2,40 | 0,25 | 0,90 | <0.001 | 0,83 |
| PAN7180CLP | 1,05 | 1,58 | 2,10 | 2,63 | 3,15 | 3,68 | 2,49 | 0,00 | 1,05 | <0.001 | 0,84 |
| SY3970CL | 1,01 | 1,41 | 1,80 | 2,20 | 2,59 | 2,99 | 2,10 | 0,22 | 0,79 | <0.001 | 0,55 |

**Table 11: Yield probability (%) of cultivars for 2020/2120 at different yield potentials**

| Cultivar | Yield potential (t ha$^{-1}$) | | | | | | Regression line | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 1,5 | 2 | 2,5 | 3 | 3,5 | Fprob | R2 |
| AGSUN5101CLP | 21 | 27 | 35 | 44 | 54 | 63 | <0.001 | 0,93 |
| AGSUN5102CLP | 48 | 48 | 48 | 48 | 48 | 48 | <0.001 | 0,93 |
| AGSUN5103CLP | 35 | 45 | 58 | 70 | 79 | 85 | <0.001 | 0,85 |
| AGSUN5106CLP | 33 | 43 | 54 | 66 | 75 | 82 | <0.001 | 0,91 |
| AGSUN5108CLP | 37 | 36 | 35 | 35 | 35 | 36 | <0.001 | 0,95 |
| AGSUN5270 | 53 | 60 | 66 | 72 | 76 | 79 | <0.001 | 0,89 |
| AGSUN8251 | 72 | 71 | 68 | 65 | 61 | 57 | <0.001 | 0,84 |
| AGUARA6 | 53 | 50 | 46 | 43 | 39 | 37 | <0.001 | 0,83 |
| LG5678CLP | 39 | 24 | 13 | 6 | 3 | 1 | <0.001 | 0,93 |
| LG5710 | 36 | 38 | 40 | 43 | 46 | 49 | <0.001 | 0,86 |
| P65LL02 | 46 | 47 | 48 | 49 | 50 | 51 | <0.001 | 0,79 |
| P65LL14 | 52 | 46 | 38 | 32 | 25 | 22 | <0.001 | 0,92 |
| P65LP54 | 62 | 60 | 58 | 55 | 53 | 50 | <0.001 | 0,81 |
| P65LP65 | 49 | 49 | 48 | 48 | 48 | 49 | <0.001 | 0,86 |
| PAN7080 | 26 | 37 | 48 | 62 | 73 | 82 | <0.001 | 0,91 |
| PAN7100 | 65 | 63 | 61 | 58 | 55 | 51 | <0.001 | 0,85 |
| PAN7102CLP | 72 | 67 | 60 | 52 | 44 | 37 | <0.001 | 0,85 |
| PAN7160CLP | 59 | 62 | 64 | 66 | 67 | 67 | <0.001 | 0,90 |
| PAN7170 | 70 | 65 | 58 | 50 | 42 | 36 | <0.001 | 0,83 |
| PAN7180CLP | 56 | 60 | 63 | 67 | 69 | 71 | <0.001 | 0,84 |
| SY3970CL | 51 | 43 | 33 | 25 | 19 | 15 | <0.001 | 0,55 |

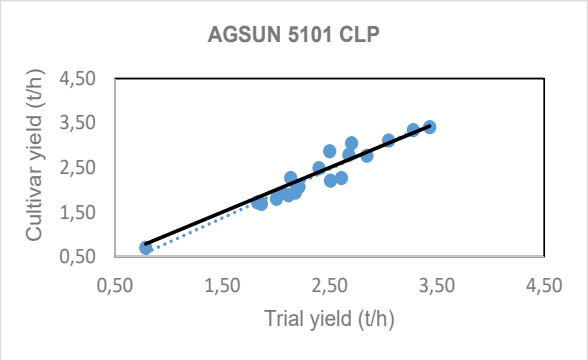
**Table 12: Yield probability (%) of cultivars 2019/2020 and 2020/2021 at different yield potentials**

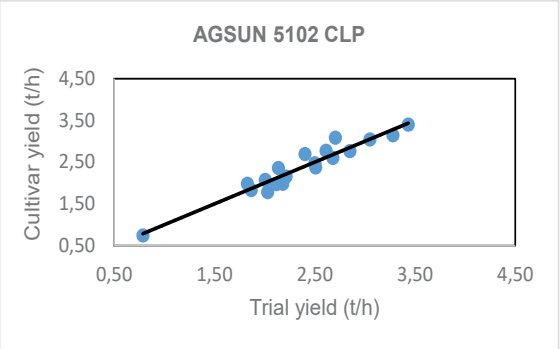
| | Yield potential (t/ha) | | | | | | Regression line | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 1,5 | 2 | 2,5 | 3 | 3,5 | Fprob | R2 |
| AGSUN5101CLP | 41 | 42 | 44 | 46 | 47 | 49 | <0.001 | 0,90 |
| AGSUN5102CLP | 47 | 49 | 50 | 52 | 53 | 54 | <0.001 | 0,90 |
| AGSUN5103CLP | 44 | 49 | 53 | 58 | 62 | 67 | <0.001 | 0,91 |
| AGSUN5106CLP | 39 | 45 | 51 | 57 | 63 | 69 | <0.001 | 0,94 |
| AGSUN5270 | 66 | 64 | 61 | 59 | 56 | 53 | <0.001 | 0,80 |
| AGSUN8251 | 51 | 52 | 54 | 56 | 57 | 59 | <0.001 | 0,83 |
| LG5678CLP | 40 | 35 | 31 | 27 | 23 | 20 | <0.001 | 0,86 |
| LG5710 | 48 | 46 | 44 | 41 | 39 | 38 | <0.001 | 0,84 |
| P65LL02 | 44 | 46 | 47 | 49 | 51 | 53 | <0.001 | 0,88 |
| P65LL14 | 48 | 48 | 48 | 48 | 48 | 48 | <0.001 | 0,80 |
| P65LP54 | 59 | 57 | 54 | 51 | 48 | 45 | <0.001 | 0,81 |
| PAN7080 | 38 | 45 | 51 | 58 | 64 | 70 | <0.001 | 0,82 |
| PAN7100 | 60 | 60 | 60 | 60 | 59 | 59 | <0.001 | 0,90 |
| PAN7102CLP | 64 | 61 | 56 | 52 | 47 | 43 | <0.001 | 0,86 |
| PAN7160CLP | 51 | 55 | 57 | 61 | 64 | 67 | <0.001 | 0,93 |
| PAN7170 | 61 | 58 | 56 | 54 | 52 | 49 | <0.001 | 0,91 |
| SY3970CL | 48 | 44 | 38 | 34 | 29 | 26 | <0.001 | 0,88 |

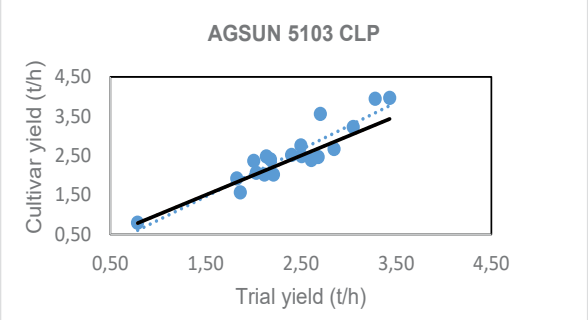
**Table 13: Yield probability (%) of cultivars for three years' data 2018/2019 to 2020/2021 at different yield potentials**

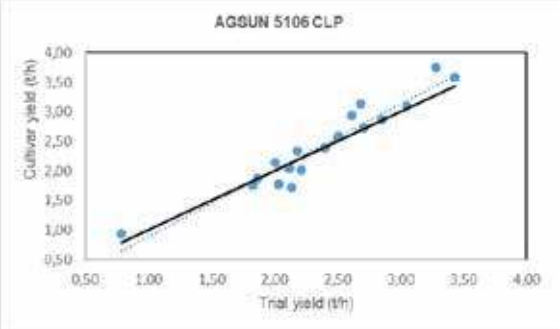
| | Yield potential (t/ha) | | | | | | Regression line | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 1,5 | 2 | 2,5 | 3 | 3,5 | Fprob | R2 |
| AGSUN5101CLP | 43 | 44 | 45 | 46 | 47 | 47 | <0.001 | 0,91 |
| AGSUN5102CLP | 50 | 50 | 49 | 49 | 48 | 48 | <0.001 | 0,92 |
| AGSUN5103CLP | 42 | 47 | 51 | 55 | 59 | 64 | <0.001 | 0,89 |
| AGSUN5106CLP | 37 | 43 | 50 | 57 | 63 | 70 | <0.001 | 0,93 |
| AGSUN5270 | 65 | 64 | 62 | 60 | 58 | 57 | <0.001 | 0,83 |
| AGSUN8251 | 56 | 57 | 57 | 58 | 58 | 58 | <0.001 | 0,90 |
| LG5678CLP | 41 | 36 | 31 | 27 | 23 | 19 | <0.001 | 0,89 |
| LG5710 | 49 | 47 | 45 | 43 | 41 | 40 | <0.001 | 0,82 |
| P65LL02 | 47 | 48 | 49 | 51 | 52 | 53 | <0.001 | 0,83 |
| P65LL14 | 50 | 50 | 50 | 50 | 50 | 50 | <0.001 | 0,89 |
| P65LP54 | 57 | 55 | 52 | 50 | 47 | 45 | <0.001 | 0,84 |
| PAN7080 | 46 | 51 | 56 | 61 | 66 | 70 | <0.001 | 0,92 |
| PAN7100 | 60 | 59 | 56 | 54 | 52 | 50 | <0.001 | 0,90 |
| PAN7102CLP | 67 | 63 | 58 | 54 | 49 | 45 | <0.001 | 0,87 |
| PAN7160CLP | 48 | 52 | 55 | 59 | 63 | 66 | <0.001 | 0,93 |
| SY3970CL | 42 | 39 | 36 | 34 | 31 | 28 | <0.001 | 0,76 |

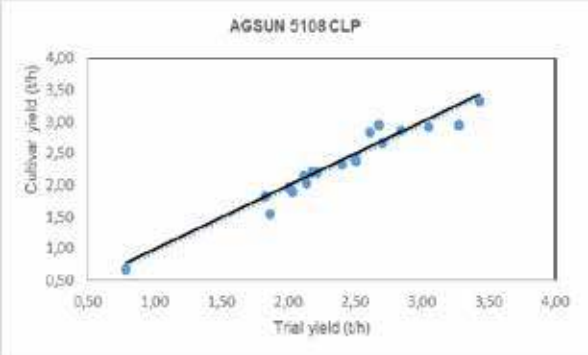
**Figure 1: Regression lines for cultivars 2020/2021**

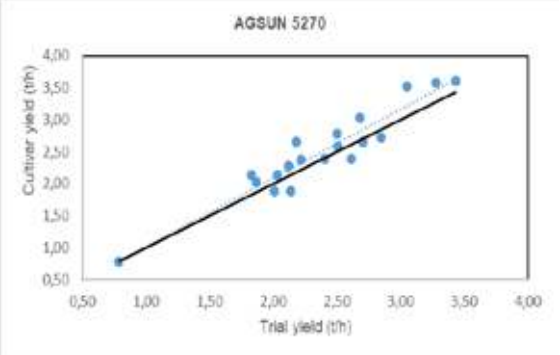


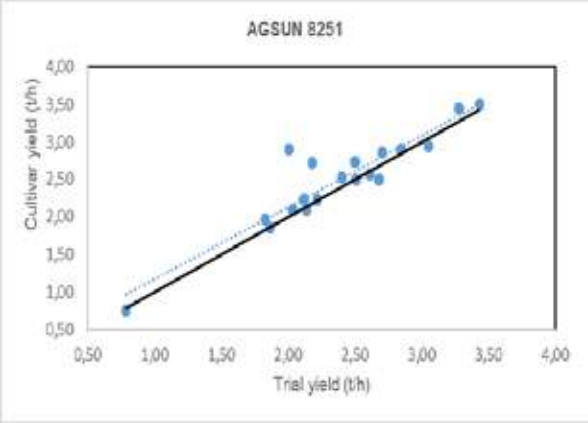



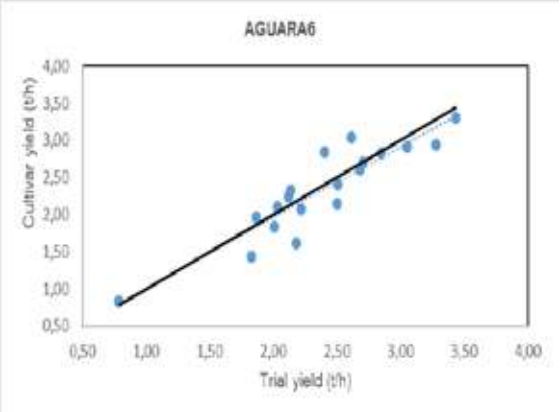



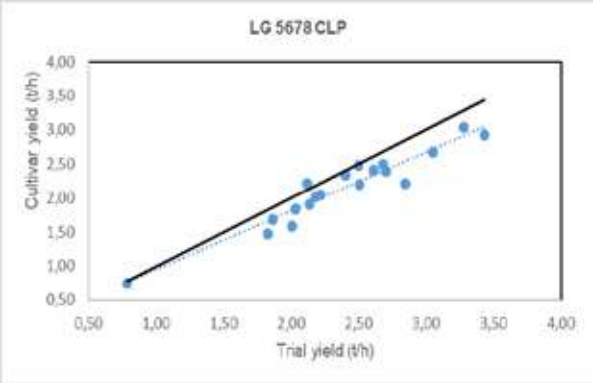



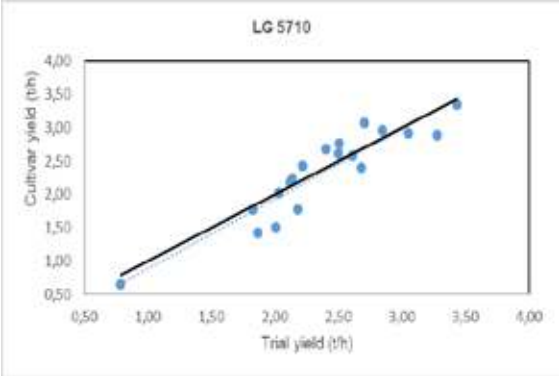



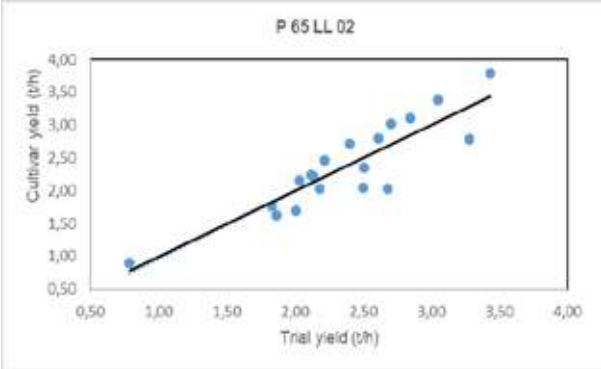



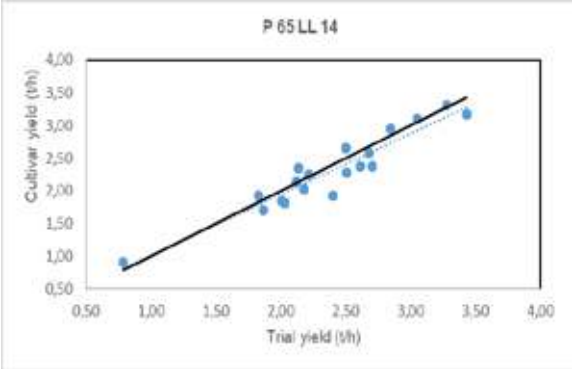



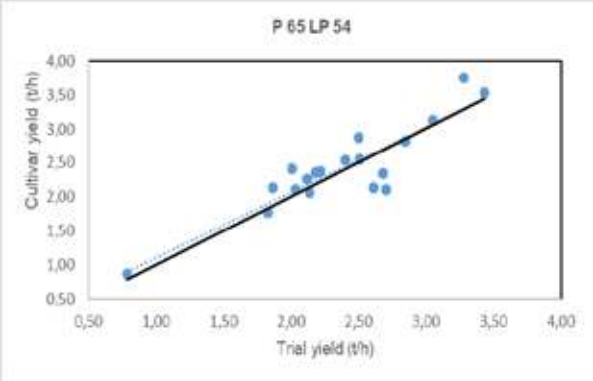



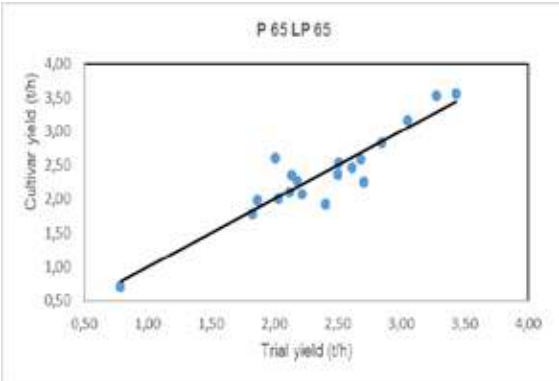

LG 5678 CLP
Cultivar yield (t/h)
Trial yield (t/h)

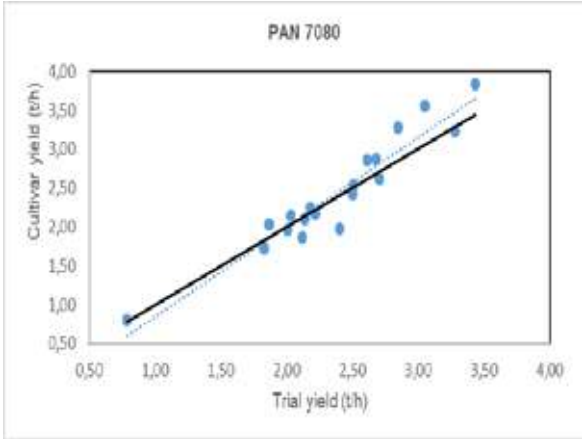

LG 5710
Cultivar yield (t/h)
Trial yield (t/h)

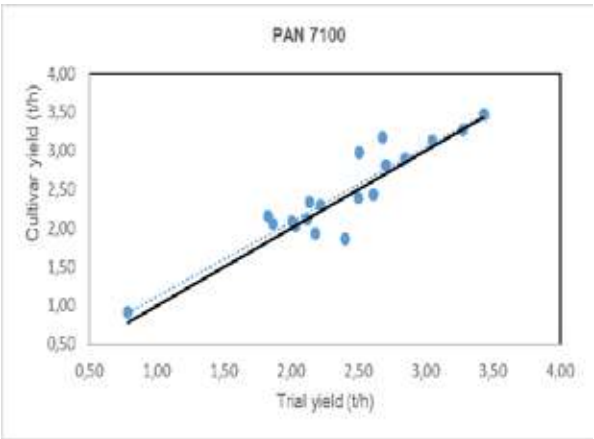

P 65 LL 02
Cultivar yield (t/h)
Trial yield (t/h)

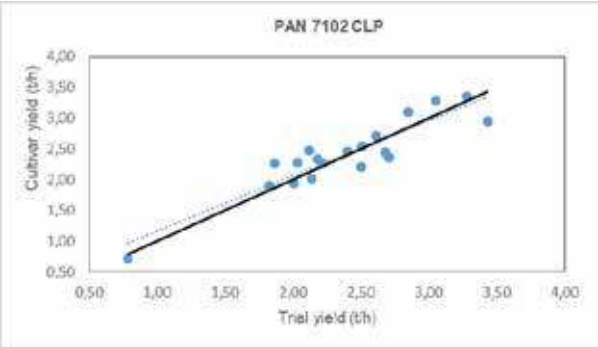

P 65 LL 14
Cultivar yield (t/h)
Trial yield (t/h)

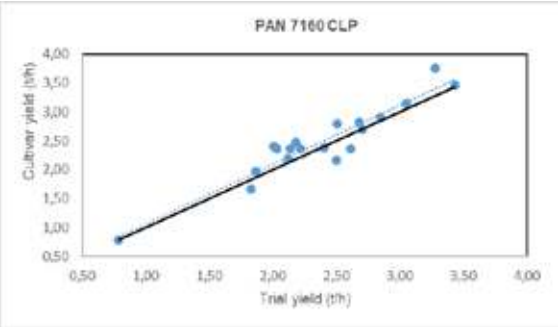

P 65 LP 54
Cultivar yield (t/h)
Trial yield (t/h)

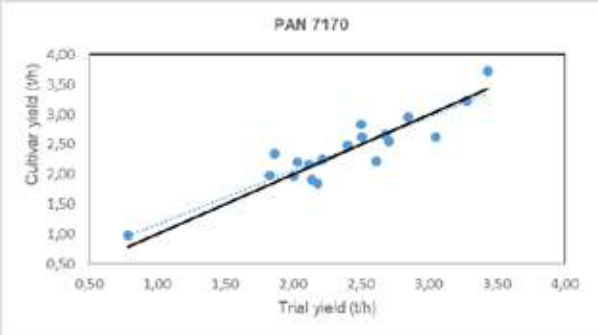

P 65 LP 65
Cultivar yield (t/h)
Trial yield (t/h)

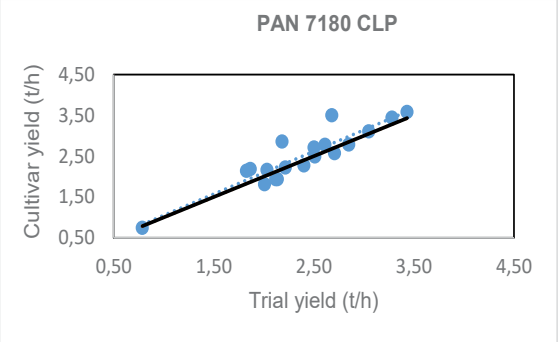

PAN 7080
Cultivar yield (t/h)
Trial yield (t/h)


PAN 7100
Cultivar yield (t/h)
Trial yield (t/h)


PAN 7102 CLP
Cultivar yield (t/h)
Trial yield (t/h)


PAN 7160 CLP
Cultivar yield (t/h)
Trial yield (t/h)


PAN 7170
Cultivar yield (t/h)
Trial yield (t/h)


PAN 7180 CLP
Cultivar yield (t/h)
Trial yield (t/h)

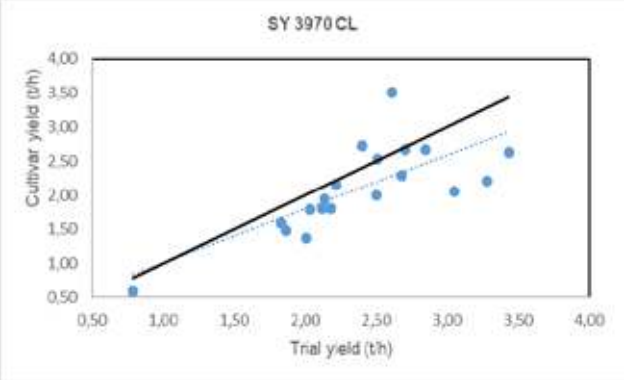
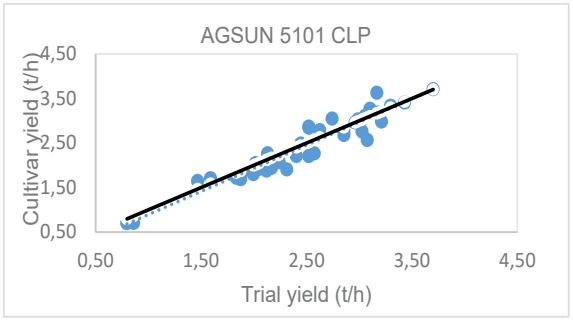
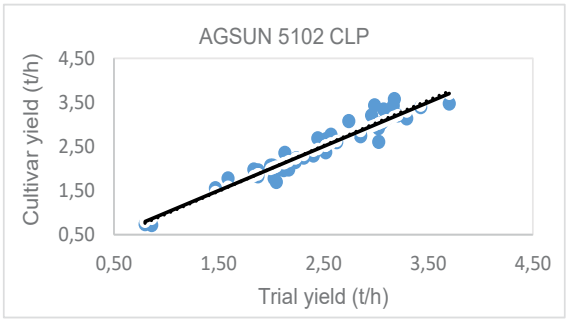
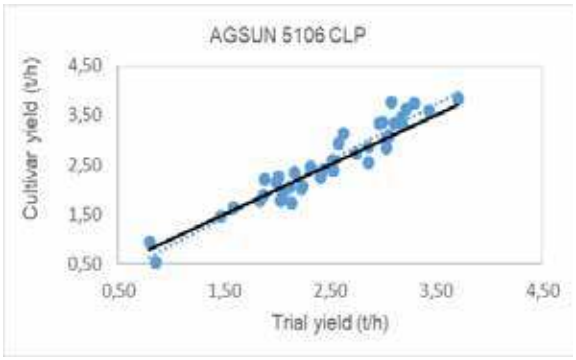
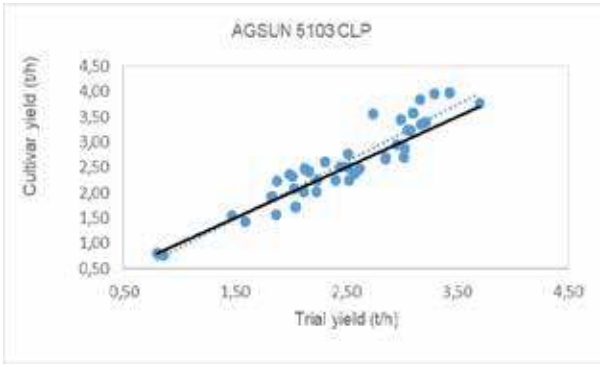

SY 3970 CL
Cultivar yield (t/h)
Trial yield (t/h)

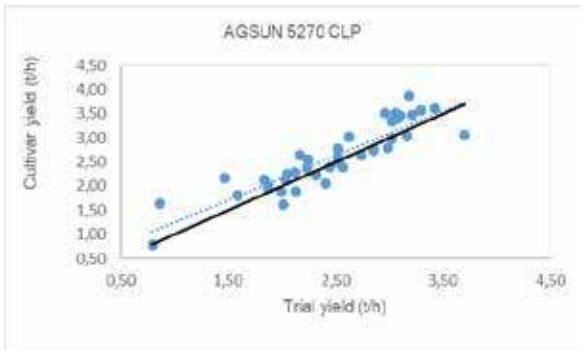
**Figure 2: Regression lines for cultivars 2019/2020 &2020/2021**

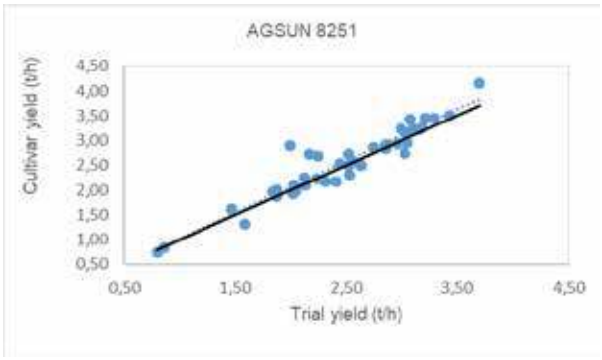


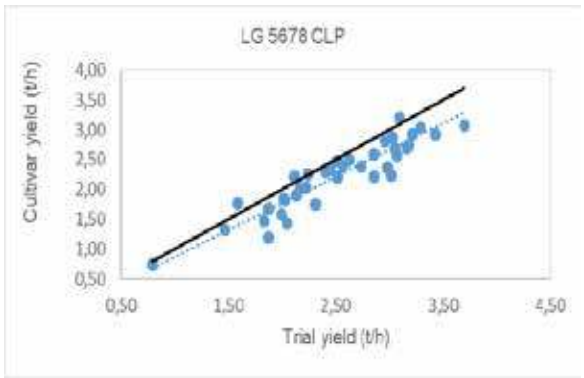



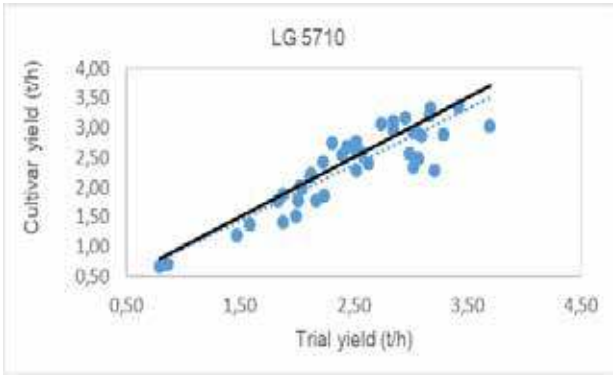



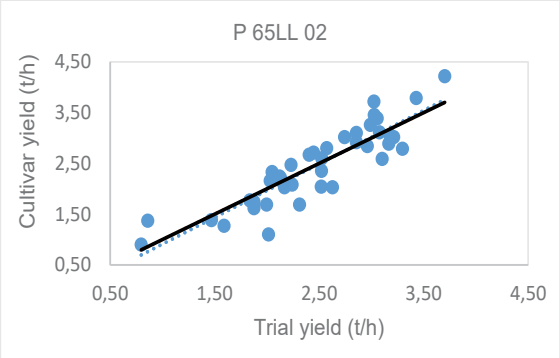



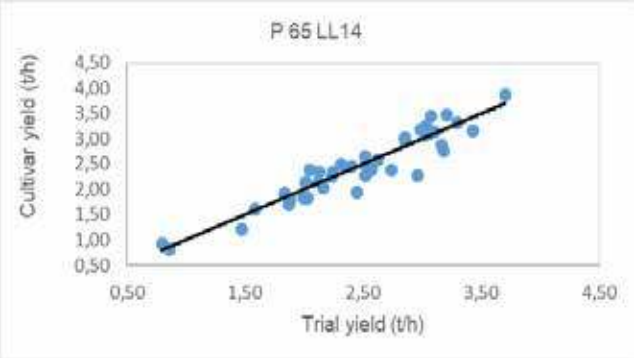



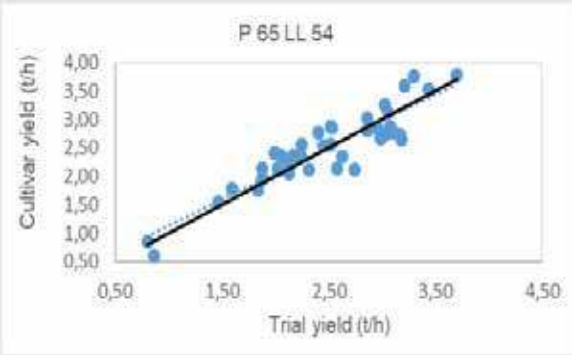



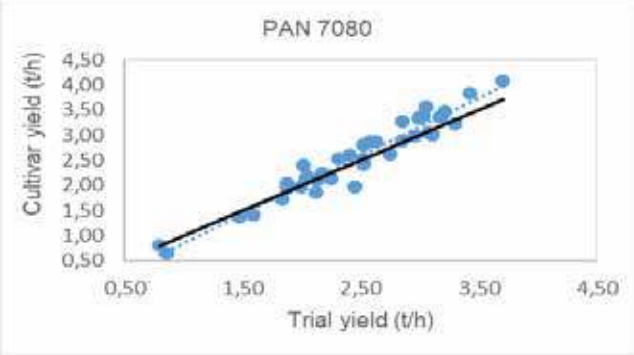



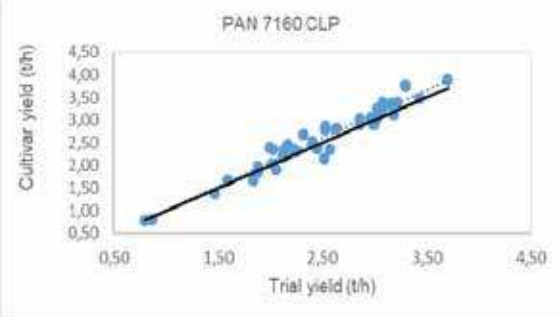



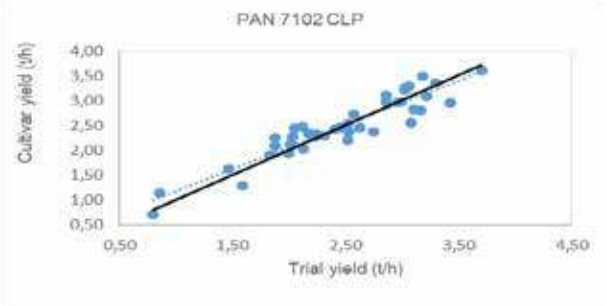

P 65LL 02
Cultivar yield (t/h)
Trial yield (t/h)

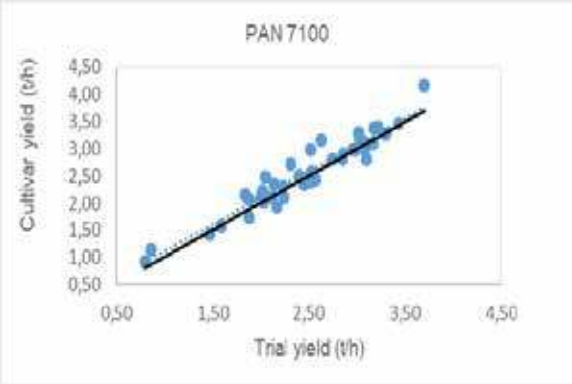

P 65 LL14
Cultivar yield (t/h)
Trial yield (t/h)

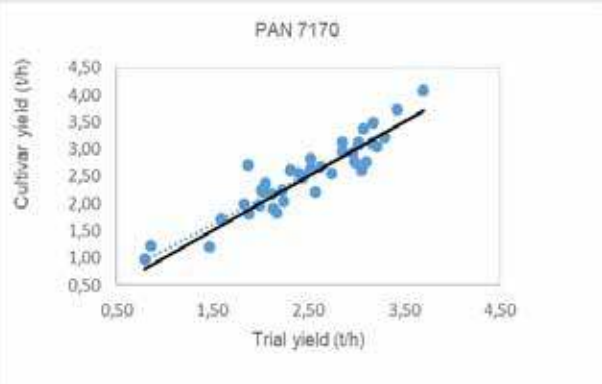

P 65 LL 54
Cultivar yield (t/h)
Trial yield (t/h)

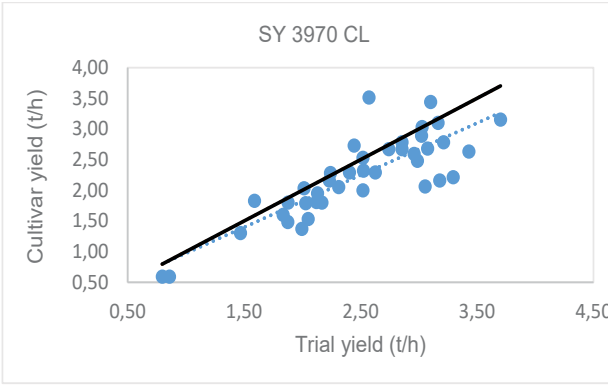

PAN 7080
Cultivar yield (t/h)
Trial yield (t/h)


PAN 7160 CLP
Cultivar yield (t/h)
Trial yield (t/h)


PAN 7102 CLP
Cultivar yield (t/h)
Trial yield (t/h)


PAN 7100
Cultivar yield (t/h)
Trial yield (t/h)


PAN 7170
Cultivar yield (t/h)
Trial yield (t/h)


SY 3970 CL
Cultivar yield (t/h)
4,00
3,50
3,00
2,50
2,00
1,50
1,00
0,50
0,50
1,50
2,50
3,50
Trial yield (t/h)