The Southern African Grain Laboratory NPC

FEEDBACK - EVALUATION OF SAMPLING DEVICE

AGBIZ GRAIN MINI SYMPOSIUM

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Outline

- ✓ Background
- ✓ Experimental design
- ✓ Results summary
- ✓ Statistical evaluation of results
- ✓ Discussion – question and answer session
- ✓ Acknowledgements

Background

- Initial experimental work – GTI during 2015
- Promising – need for statistical confirmation
- Request to design experiment to enable statistical evaluation of data
- Proposals for funding
- Decision by Agbiz Grain members to provide funding
- Experimental work conducted at SAGL during June – August 2017

EXPERIMENTAL DESIGN

- ✓ High intrinsic or natural biological variability in grain and oilseed
- ✓ Five repetitions of every test sample and test factor setting for a representative standard deviation and error calculation per cluster of sample and probe combination
- ✓ Accuracy and precision of each probe determined
- ✓ Analysis of variance (ANOVA) was done with the Tukey HSD comparative test for the 95% confidence levels

EXPERIMENTAL DESIGN

- ✓ Four commodities – wheat, maize, sunflower and soybeans
- ✓ Difference between sampling devices:

Double tube probe with multiple apertures	
Double pneumatic suction probe (VAC-A-Pneumatic sampler, imported - USA)	

VAC-A PNEUMATIC SAMPLER

VAC-A Pneumatic sampler

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VAC-A PNEUMATIC SAMPLER

Sample preparation process

Cleaning

- Grain/oilseed sample cleaned
- Cleaned sample divided into two separate samples

Screenings

- A known mass of screenings prepared for each commodity

Sample preparation

- Screenings added to two cleaned samples
- Per commodity: one with high % screenings and one with low % screenings

Mixing of samples

- All eight samples mixed
- Divided using Boerner divider
- % screenings determined to confirm homogeneity

SAMPLING PROCESS

MEASUREMENT – 2 PHASES: JUNE AND JULY 2017

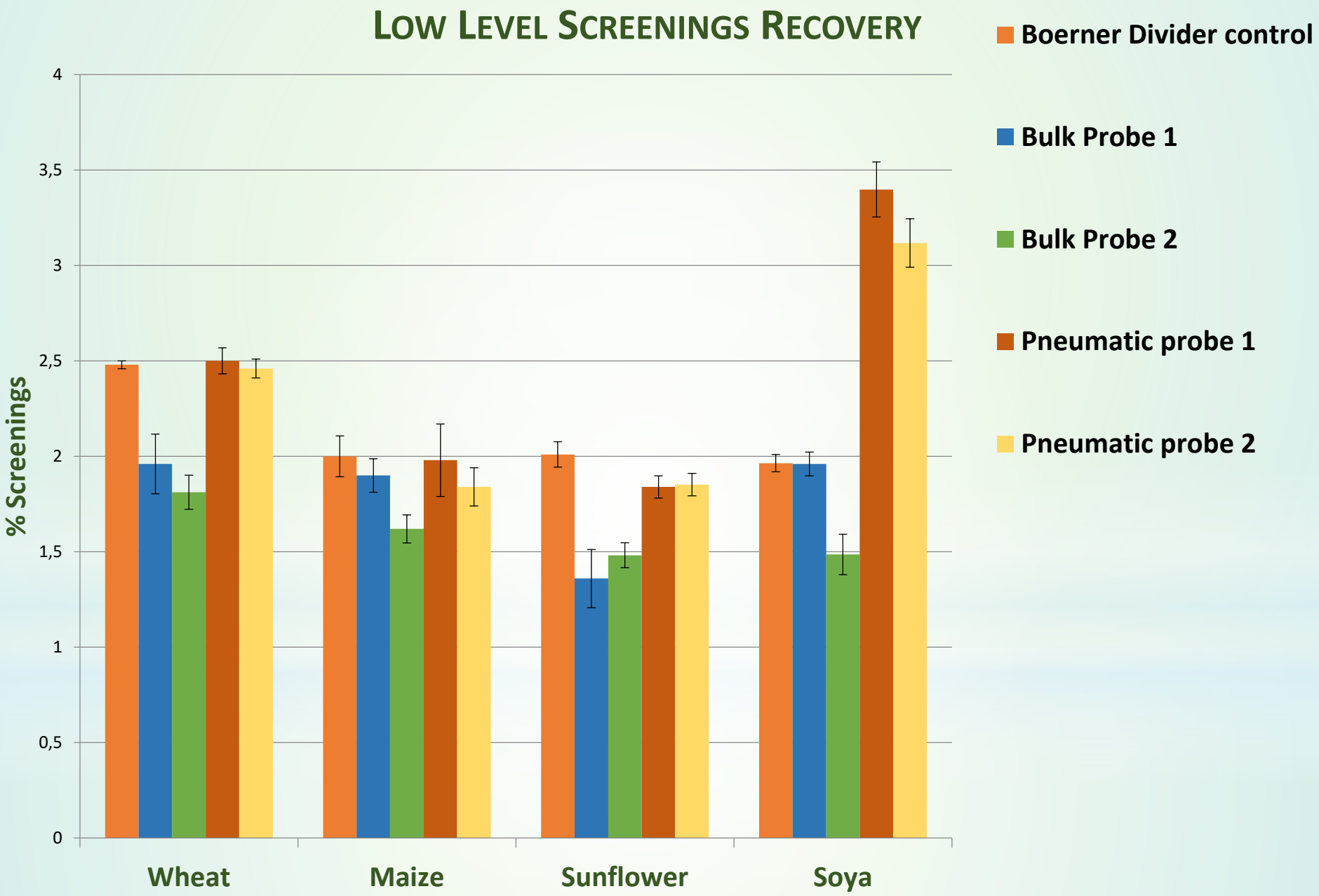
LOW VALUE

Actual sample particulars	Wheat (12300g)			Sreenings (2.44%)		
Sample device	Commodity	Probe Ø mm	Wind Speed	Mass of sample (g)	Below 1.8mm (g)	Below 1.8mm (%)
Pneumatic suction probe	Wheat	Standard 30 mm	63,38 m/sec	751,43	19,70	2,62
				744,49	17,98	2,42
				753,34	18,03	2,39
				760,00	18,87	2,48
				747,44	19,34	2,59
Average				751,34	18,78	2,50

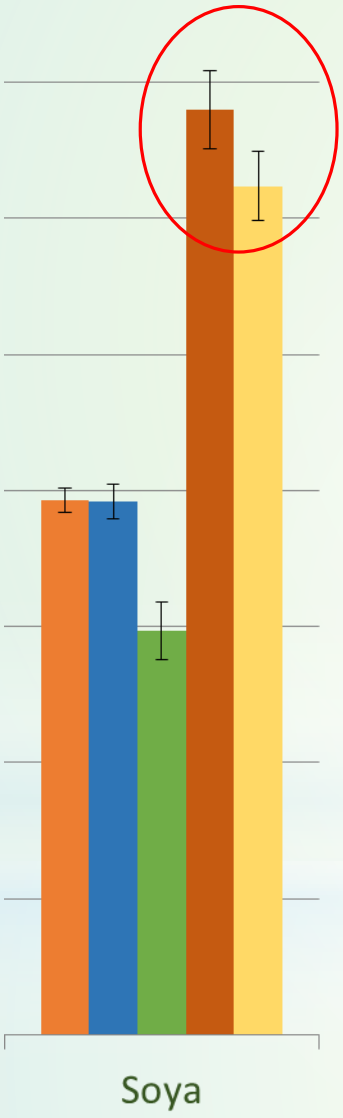
HIGH VALUE

Actual sample particulars	Wheat (12840g)			Sreenings (6.54%)		
Sample device	Commodity	Probe Ø mm	Wind Speed	Mass of sample (g)	Below 1.8mm (g)	Below 1.8mm (%)
Pneumatic suction probe	Wheat	Standard 30 mm	63,38 m/sec	762,27	50,88	6,67
				769,78	48,09	6,25
				743,04	49,20	6,62
				741,09	48,90	6,60
				797,42	49,29	6,18
Average				762,72	49,27	6,46

RESULTS

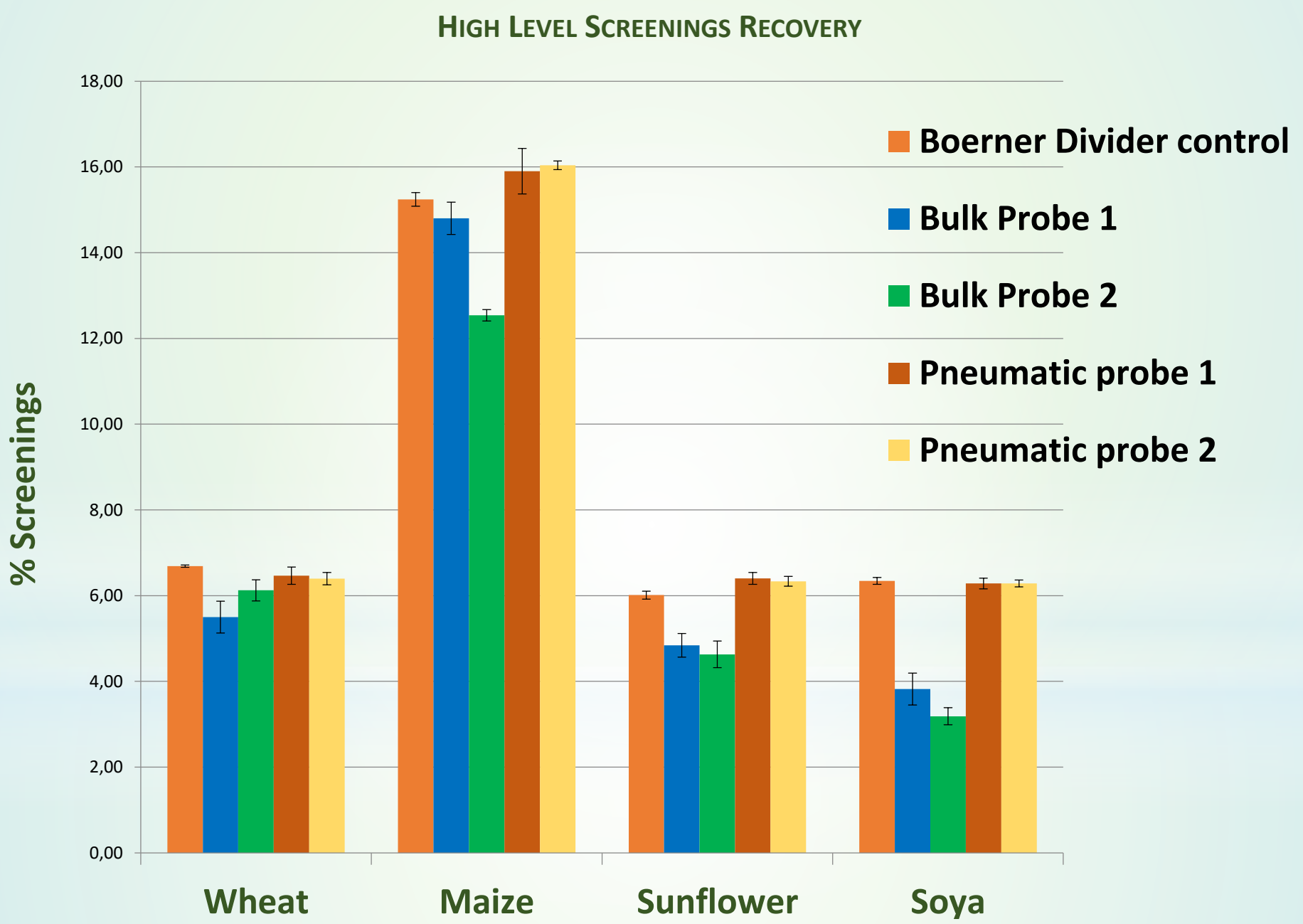

LOW LEVEL SCREENINGS RECOVERY
% Screenings
4
3,5
3
2,5
2
1,5
1
0,5
0
Wheat
Maize
Sunflower
Soya
Boerner Divider control
Bulk Probe 1
Bulk Probe 2
Pneumatic probe 1
Pneumatic probe 2

CONFIRMATION OF SOYA RESULTS

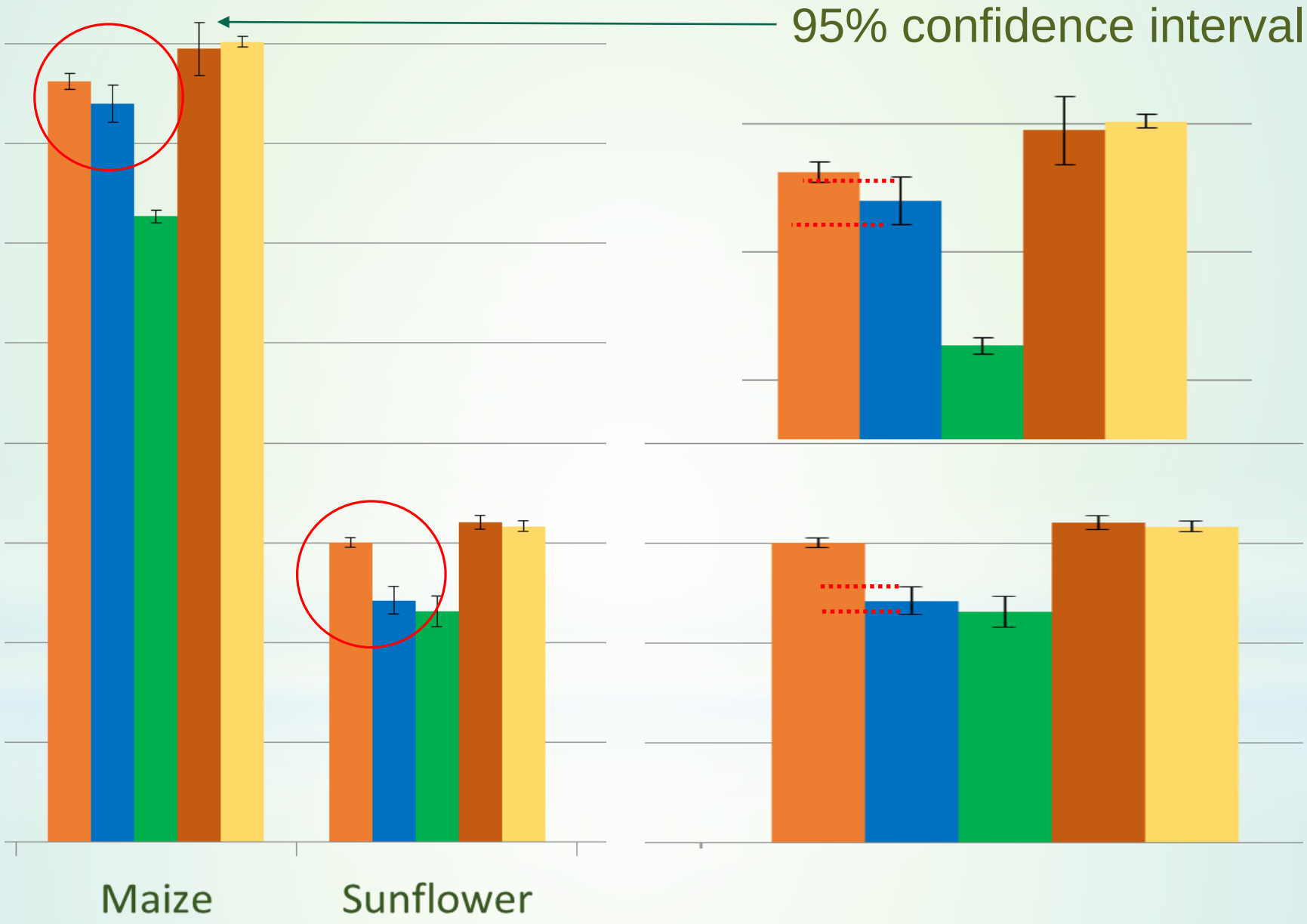


- ✓Higher than expected difference between two repeat experiments on the low level observed for soya
- ✓Decision taken to repeat low level screenings measurements
- ✓Prepare new sample with low % screenings
- ✓Initial results were confirmed

RESULTS


HIGH LEVEL SCREENINGS RECOVERY
% Screenings
18,00
16,00
14,00
12,00
10,00
8,00
6,00
4,00
2,00
0,00
Boerner Divider control
Bulk Probe 1
Bulk Probe 2
Pneumatic probe 1
Pneumatic probe 2
Wheat
Maize
Sunflower
Soya

Interpretation of Analysis of variance Results



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- ✓ Agbiz Grain – financial support