

# Field Evaluation of Common Bean Genotypes for Reaction to Anthracnose in South Africa.

MSc in Agriculture  
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# General outline

**Introduction**  
**Objectives**  
**Methodology**  
**Results**  
**Conclusion**  
**Acknowledgements**



# Introduction

- ▶ **General background**
- ▶ Produced globally with the exception of Antarctica.
- ▶ Economic importance and challenges
- ▶ Temperatures **ranges from** 13 to 26°C & 20 to 26°C
- ▶ Symptoms



# Introduction

▶ Control measures

- ▶ Biological
- ▶ Chemical
- ▶ Resistance breeding
- ▶ Cultural practices

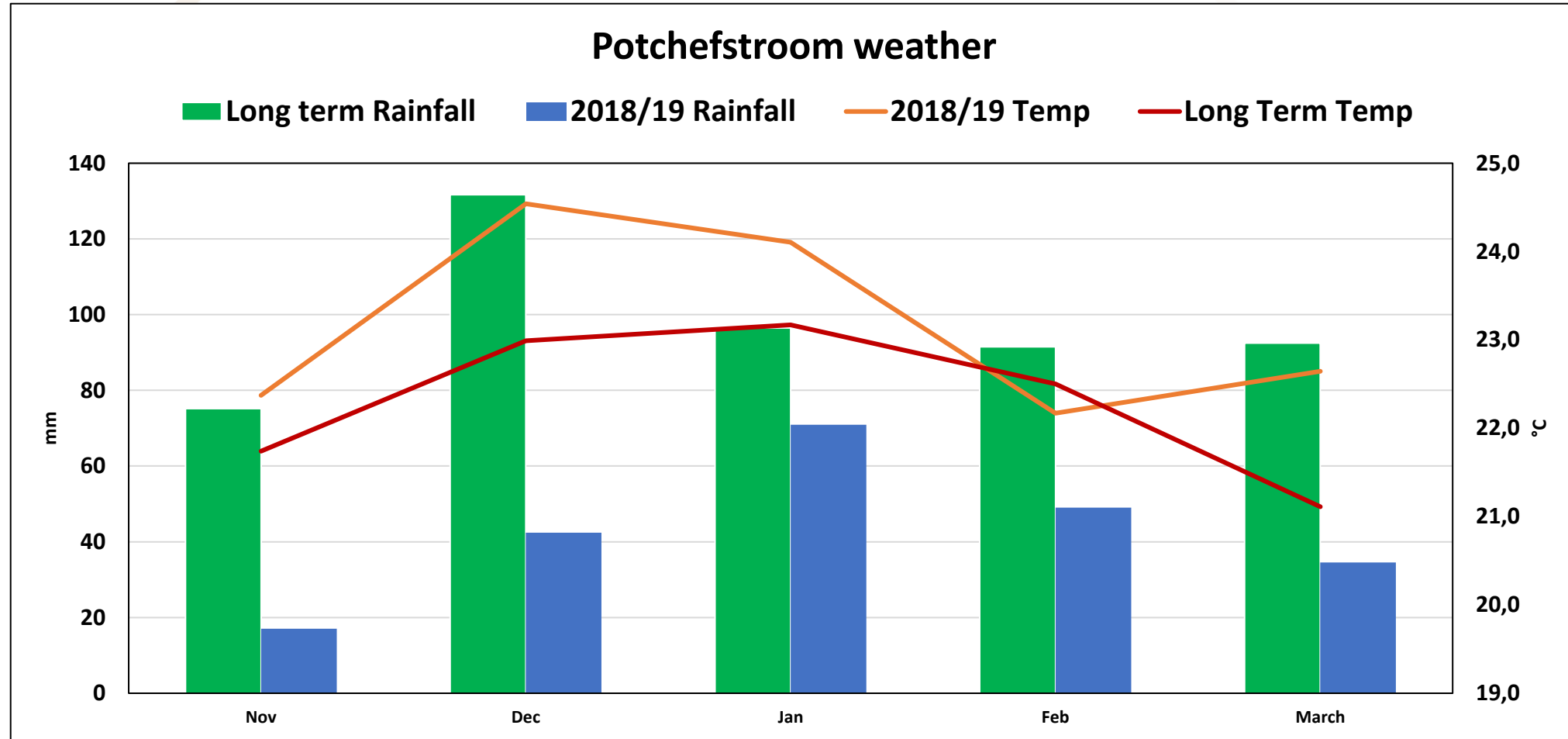
# Objectives

- ▶ The purpose of this study was to evaluate selected common bean germplasm and cultivar materials available in South Africa for anthracnose under field conditions in two localities characterized by contrasting climatic conditions.

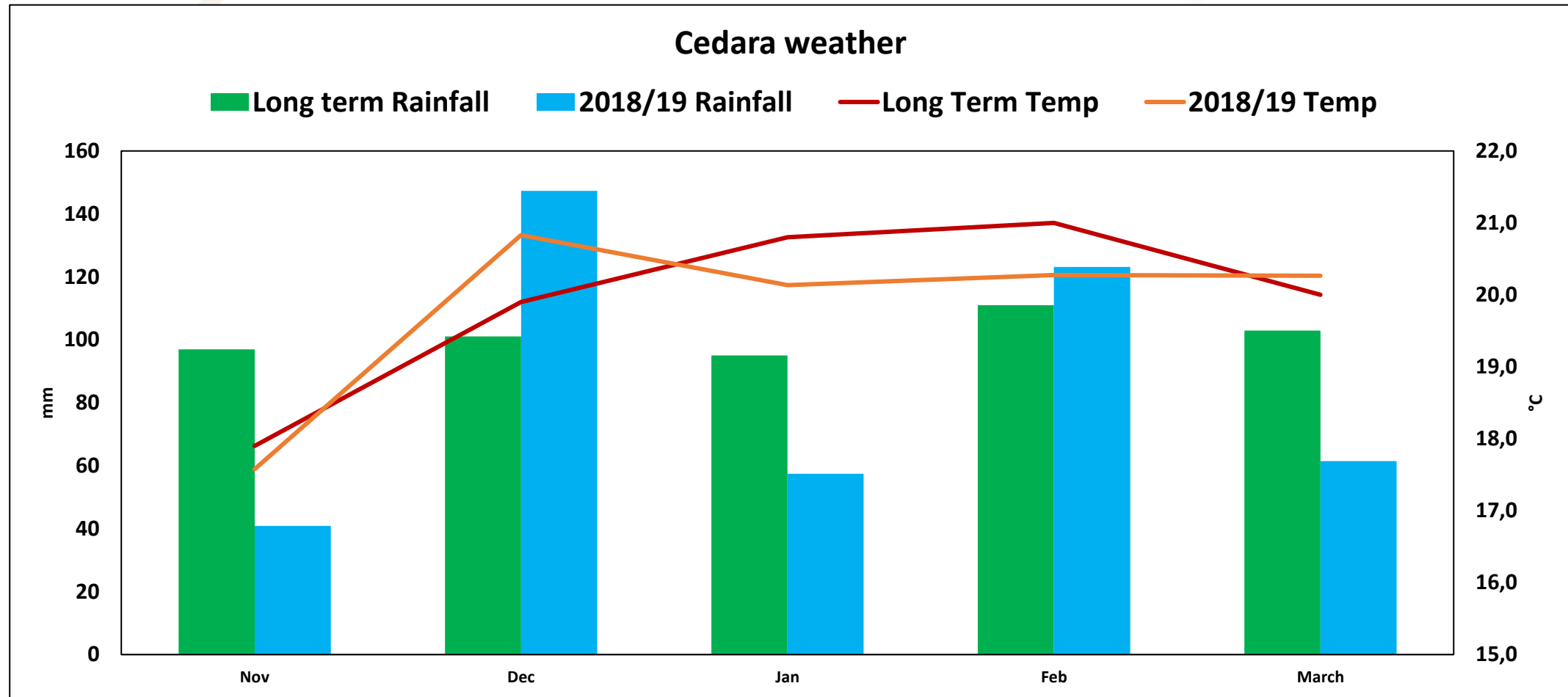
# Methodology

- ▶ Plant material
  - ▶ Sites
- ▶ Inoculum and inoculation
  - ▶ Races identification
  - ▶ Trial design
- ▶ Data collection and analysis

# Results



# Results



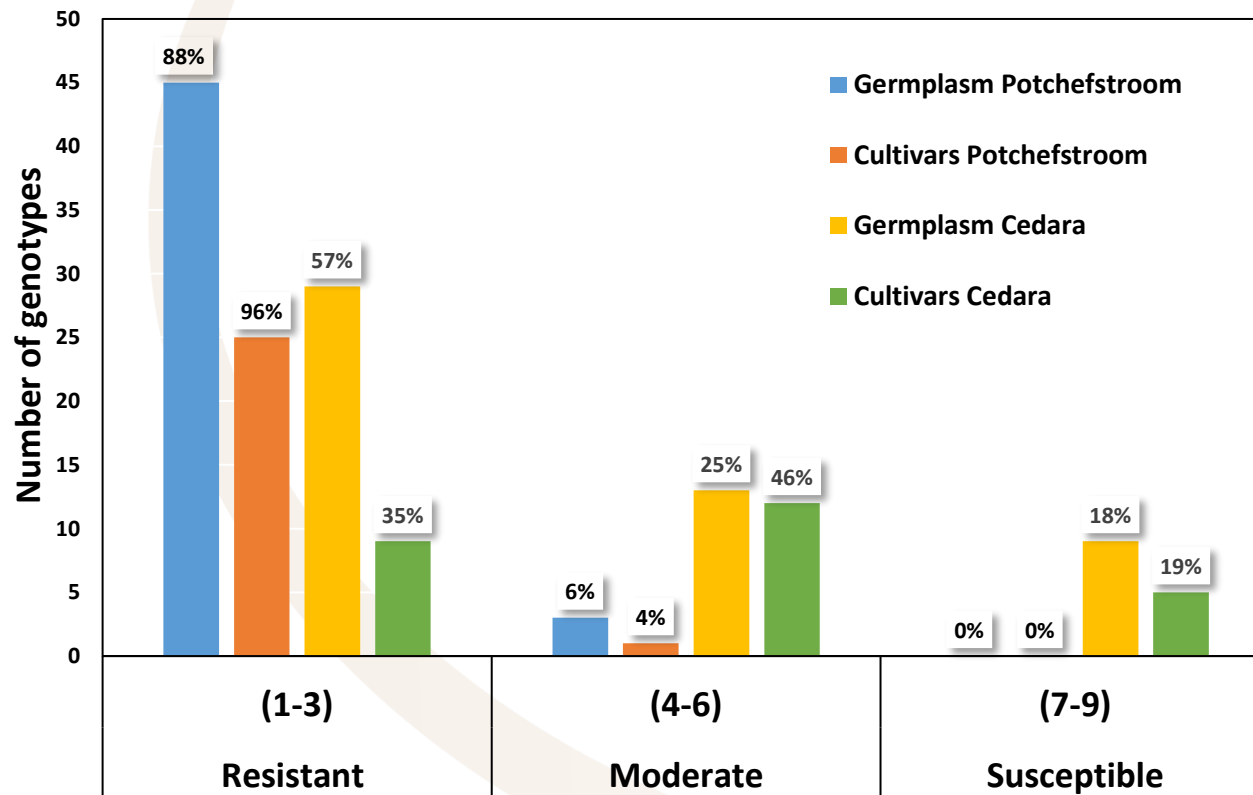
# Results

Differential cultivars	Isolates			
	CI1	CI2	CI3	CI4
AB 136	R	R	R	R
Michelite	S	S	S	S
Michigan Dark Red Kidney	S	R	S	R
Perry marrow	S	R	S	R
Cornell 49242	R	R	R	S
Widusa	R	S	S	S
Kaboon	R	R	R	R
Mexico 222	R	S	S	S
PI 207262	R	R	R	R
To	R	R	R	R
Tu	R	R	R	R
G 2333	R	R	R	R
Total binary value	7	81	83	89
No of Isolates	2	9	5	2

- ▶ Only race 6 was used in Potchefstroom.
- ▶ Four races were identified in Cedara. All four races were previously identified.

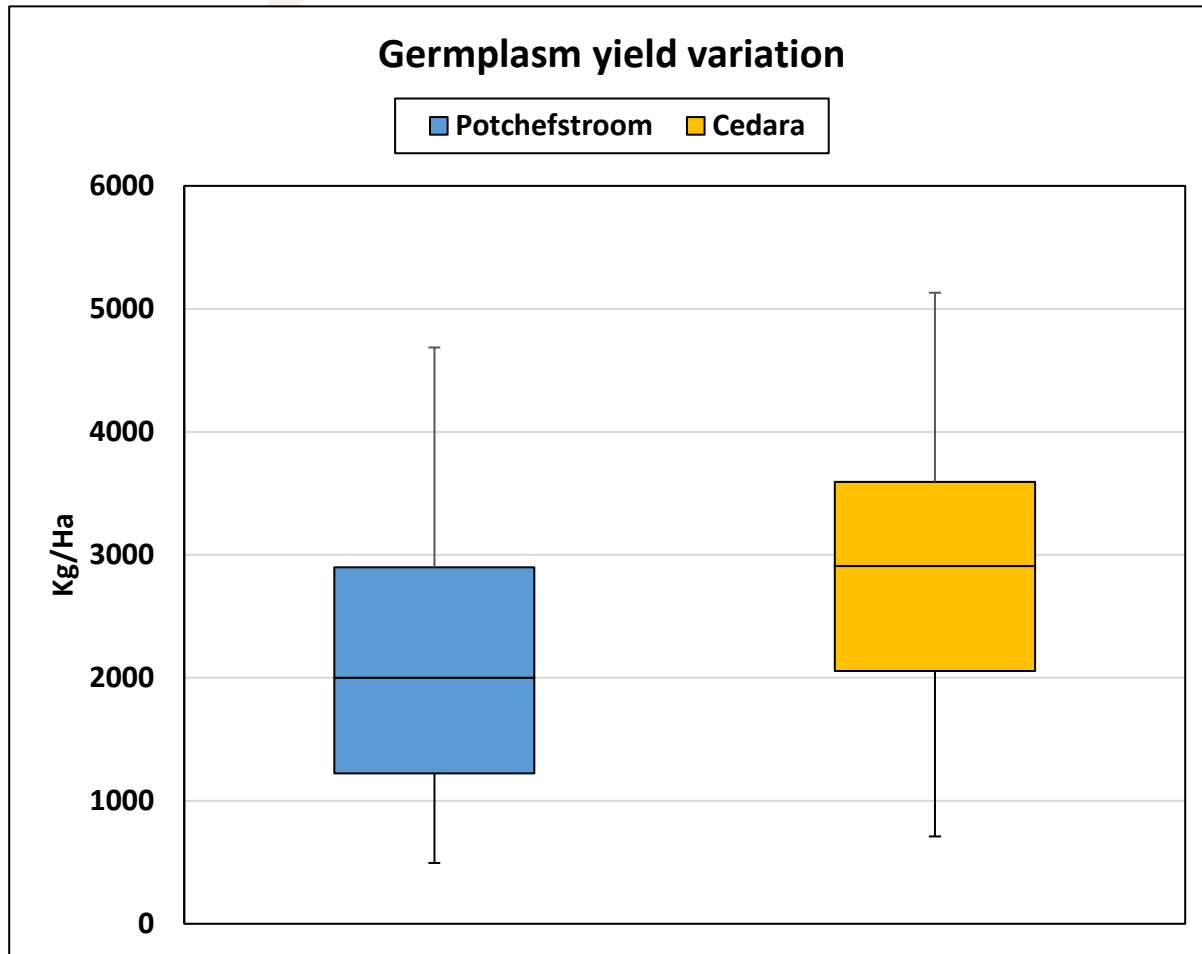
# Results

Genotypes reaction to anthracnose in Potchefstroom and Cedara  
2018/19 season



- Genotypes disease severity significantly varied within and between locations.
- Cedara had significantly high disease severity.
- The evaluated germplasms demonstrated resilience in both localities.
- Bulk of the Commercial cultivars were moderately resistant in Cedara.
- None of the genotypes evaluated were susceptible to anthracnose in Potchefstroom.

# Results

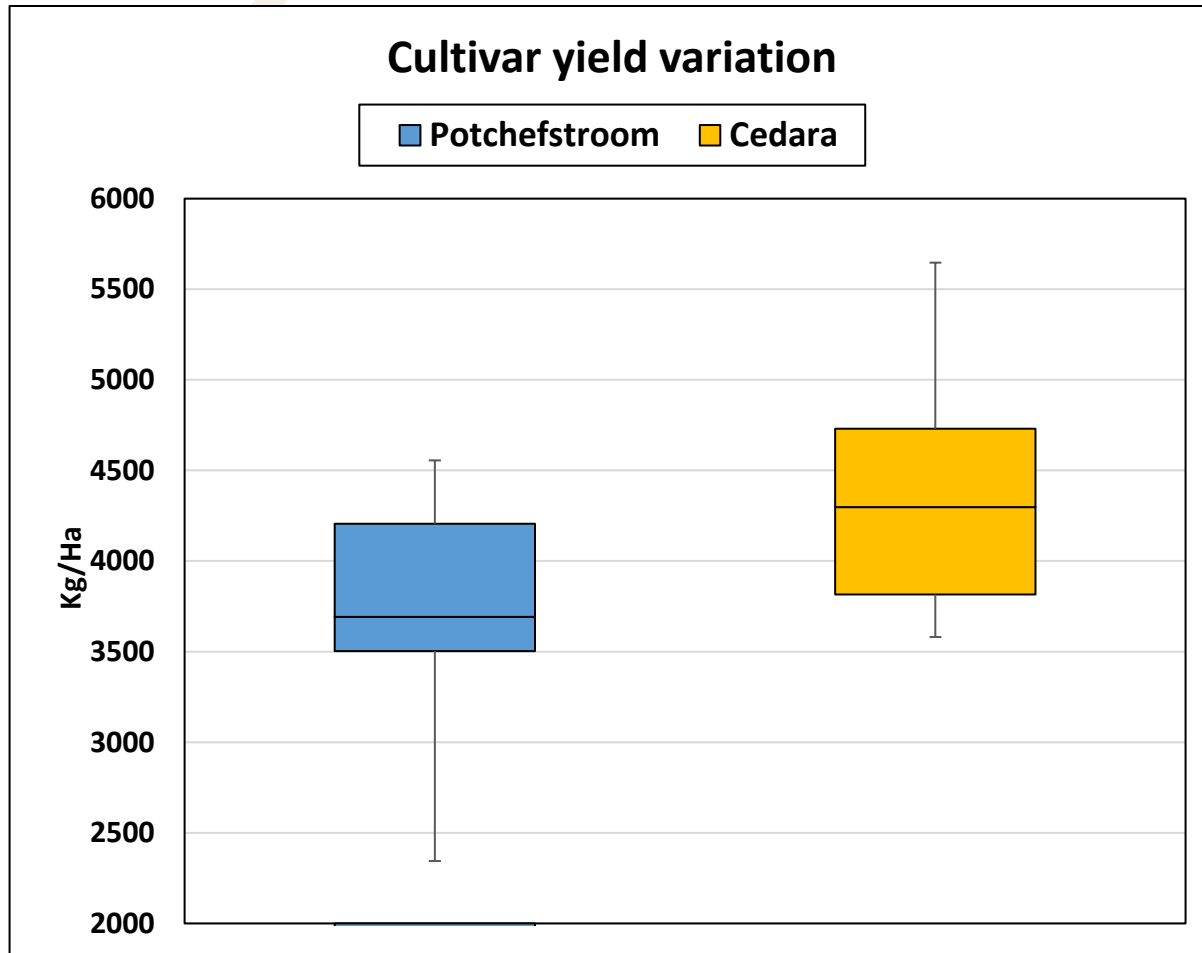


- ▶ No significant differences on yield between variety x location.
- ▶ Yield highly varied within locations and between varieties.
- ▶ Potchefstroom
  - ▶ Min – 180 kg/ha
  - ▶ Averaged 1779.17 kg/ha.
  - ▶ Max – 4372.33 kg/ha
- ▶ Cedara averaged
  - ▶ Min – 371 kg/ha
  - ▶ Average 2520.19 kg/ha.
  - ▶ Max - 4792.89 kg/ha

# Results

- ▶ Meso-American germplasm had the highest yield with the lowest resistance, while the Andean had the lowest yield with high resistance.
- ▶ Germplasm G 2858 had the highest yield in Cedara and a moderate to susceptible rating disease severity rating.
- ▶ Mexico 235 had the highest yield in Potchefstroom with no symptoms but was slightly susceptible in Cedara.
- ▶ Known Anthracnose differential germplasm such as G 2333, TO, TU, AB 136, PI 207262 were all resistant but had lower yields.
- ▶ Among the resistant germplasm evaluated are known differential cultivars to important dry bean diseases found in South Africa, such as rust (caused by *Uromyces appendiculatus*), common bacterial blight (caused by *Xanthomonas campestris pv phaseoli*) and angular leaf spot (caused by *Phaeoisariopsis griseola*).

# Results



▶ Cultivars yield significantly varied within locations and there was no significant differences in yield between cultivar x location.

▶ Potchefstroom

- ▶ Max - 4555.60 kg/ha
- ▶ Average - 3747.8 kg/ha
- ▶ Min - 2344.40 kg/ha

▶ Cedara

- ▶ Max - 5645.80 kg/ha
- ▶ Average - 4357.5 kg/ha
- ▶ Min - 3580.90 kg/ha

# Results

- ▶ Disease severity had no effect on total yield.
- ▶ Cedara yield had high seed contamination.
- ▶ Potchefstroom had good quality yield.
- ▶ Very weak correlation between yield and disease severity.

# Conclusion

- ▶ As much as anthracnose is widely distributed, there is sufficient genetic material that can be used as sources of resistance by the South African breeding programme.
- ▶ The observed damage associated with anthracnose under South African conditions causes seed contamination than significant yield losses.
- ▶ More extensive work covering the diverse South Africa's production locations would positively contribute to the understanding of anthracnose variability, distribution and management

# Acknowledgements

- ▶ National Research Foundation
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