APPSA 2nd SCIENTIFIC CONFERENCE

2 - 4 April 2025 | Manthabiseng Convention Centre
Maseru, Kingdom of Lesotho

ASSESSMENT OF BRUCHID INFESTATION PREVALENCE AND SEVERITY IN COMMON BEANS IN LESOTHO

Mpho W. Phoofolo, Department of Biology, National University of Lesotho
Mpinane Sefooko, Department of Agricultural Research, MAFSN
'Manthele Rampai, Department of Crop Science, National University of Lesotho

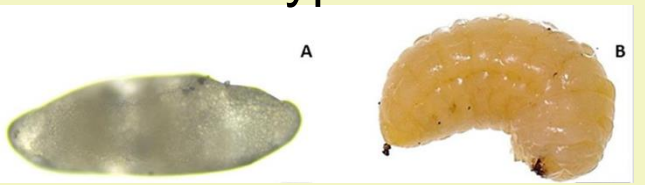
CCARDESA
Centre for Coordination of Agricultural Research and Development for Southern Africa

GOVERNO DE ANGOLA

THE WORLD BANK
IBRD · IDA | THE WORLD BANK GROUP

INTRODUCTION

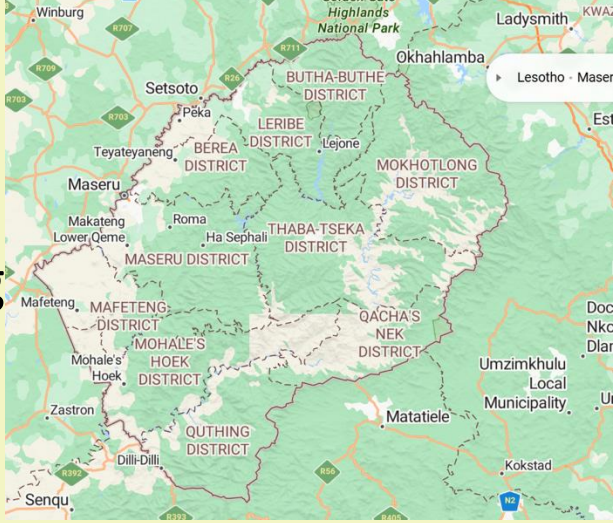
- The major post-harvest insect pests that are responsible for bean storage losses are *Acanthoscelides obtectus* and *Zabrotes subfasciatus* (Chrysomelidae; Bruchinae)
- One of the outputs of the 1st phase of APPSA was the development of bruchid-resistant varieties (Chitedze 1, Chitedze 2, Chitedze 3, Chitedze 4, Chitedze 5, Namunamtupa and Mnyambitila)
- As part of the 2nd phase of APPSA, Angola and Lesotho took on the sub-project "Adaptation and promotion of Bruchid-resistant bean varieties in Lesotho and Angola"
- One of the objectives of the sub-project was:
  - ✓ To establish the prevalence and distribution of bruchid species (across different districts and bean types



Egg Larva Adult

A. obtectus *Z. subfasciatus*

METHODOLOGY



- 134 and 148 bean samples (1 kg) were collected from bean farming households in 2022 and 2023, respectively
  - Collections sites in 2022 were in Leribe, Maseru, Mohale's Hoek and Mokhotlong
  - Collections sites in 2023 were in Leribe, Maseru, Mohale's Hoek, Mokhotlong, Qacha's Nek, Quthing and Thaba Tseka
- Collections were made during:
  - 4^{th} – 7^{th} week after harvest period (to estimate infestation levels that most likely occurred in the field) in 2022
  - 16^{th} – 19^{th} week after harvest (to estimate infestation levels that cumulatively occurred both in the field and storage) in 2023
- Samples of different types of beans were placed in zip-lock bags and brought back to the laboratory for assessment

Methodology Contd.

- Determination of storage pests and assessment of infestation prevalence, severity and intensity was done on 200 seeds randomly selected from each sample
- Infestation prevalence was determined as the percentage of samples with bruchid infestation for each district and bean type
- Infestation severity was determined as the percentage of infected bean seeds per 200 assessed seeds
- Infestation intensity was determined as the number of bruchid emergence holes in damaged seeds

RESULTS AND DISCUSSION

- The bruchid species found in all common bean samples belonged to *Acanthoscelides obtectus*
- Pscocids were also found in few samples

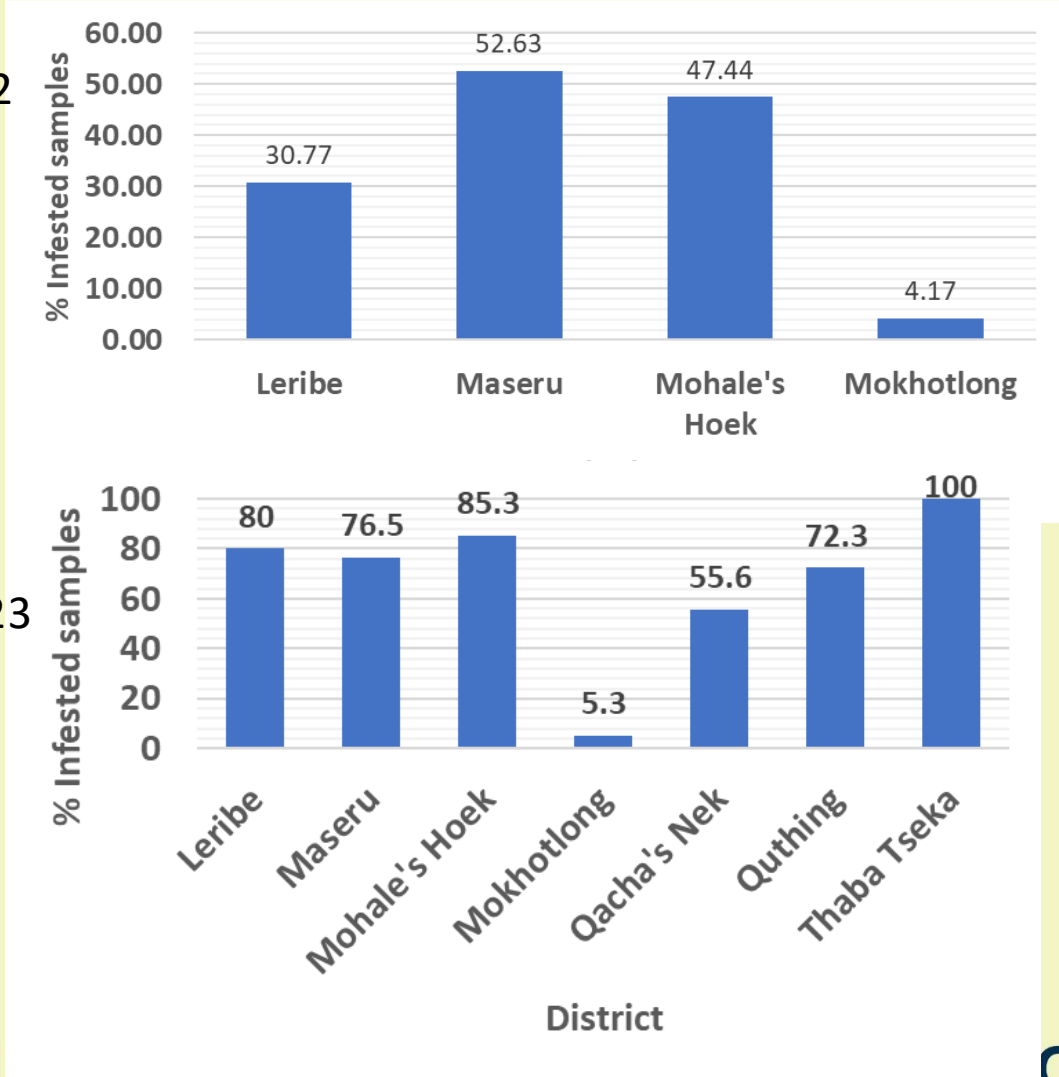
Percentage of bean samples from different districts infested by *A. obtectus*

2022

District	No of bean samples
Leribe	13
Maseru	19
Mohale's Hoek	78
Mokhotlong	24

2023

District	No of bean samples
Leribe	15
Maseru	17
Mohale's Hoek	68
Mokhotlong	19
Qacha's Nek	13
Quthing	9
Thaba Tseka	13

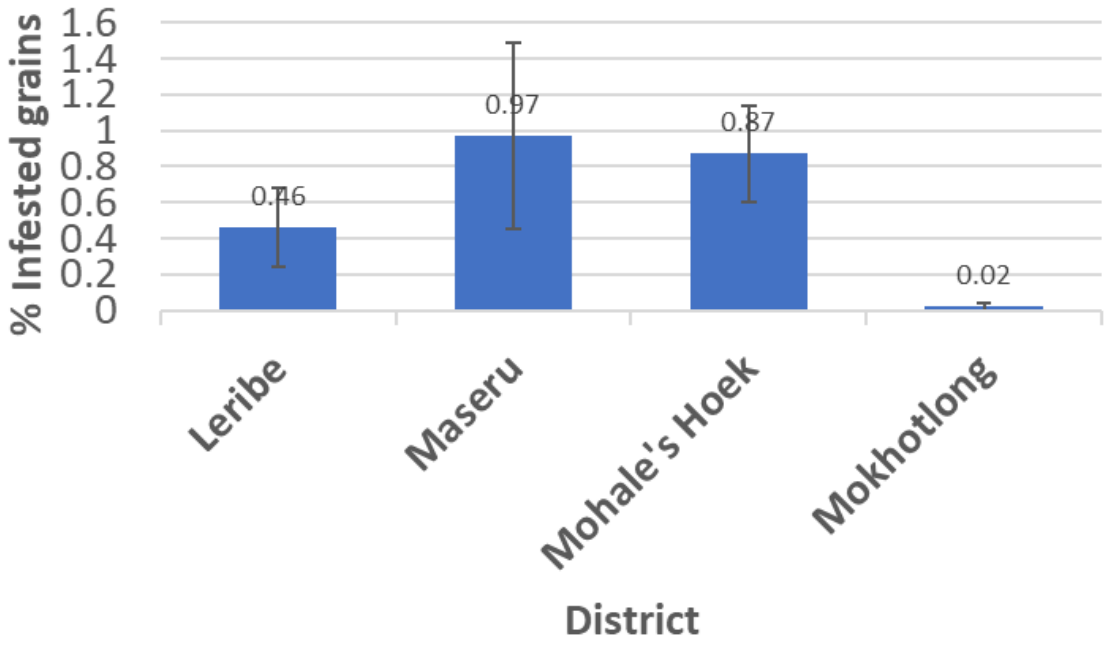


Chi square = 16.46; df = 3; p = 0.001

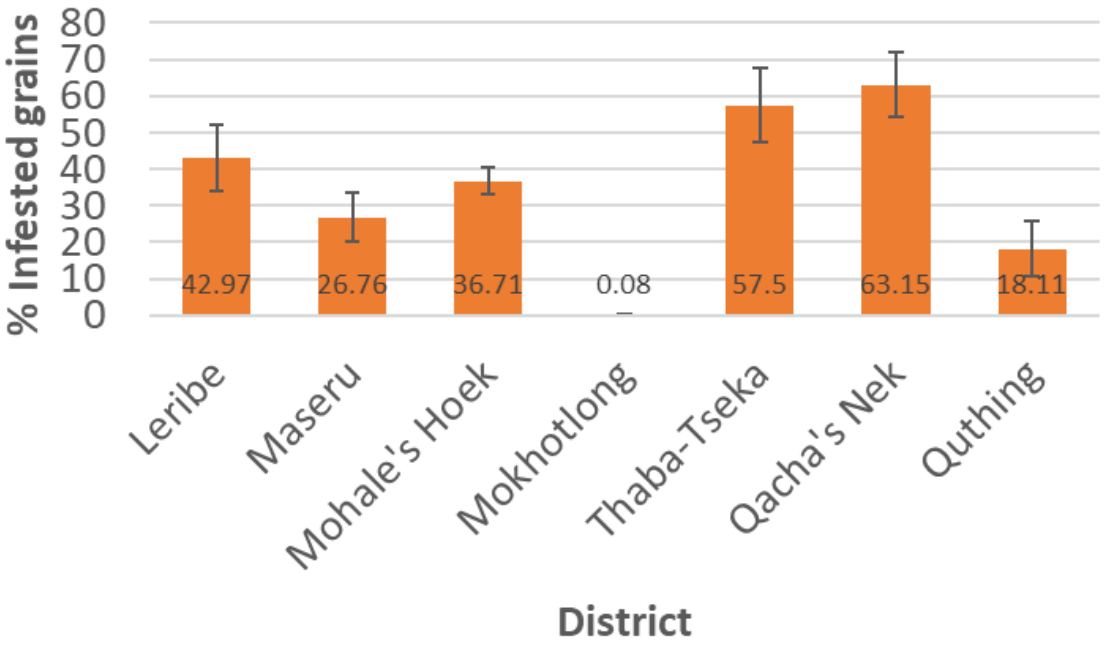
Chi square = 48.79; df= 6; p < 0.001

Acanthoscelides obtectus infestation severity

2022



2023

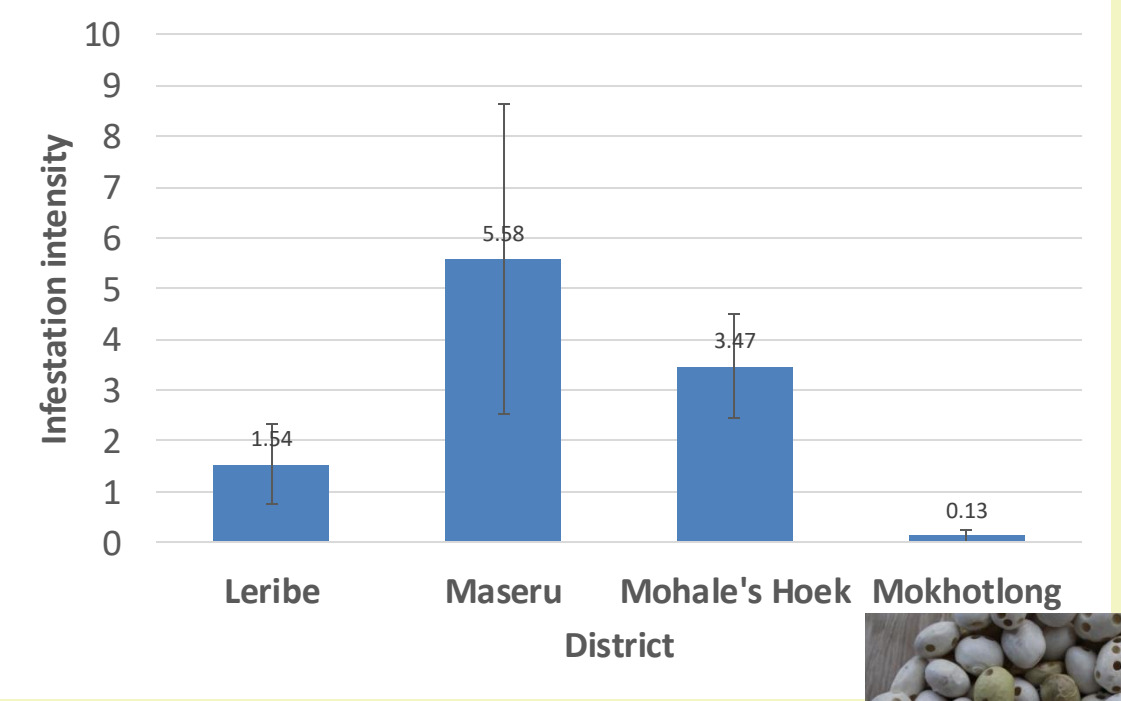


ANOVA, F (3, 130) = 1.28 ; p = 0.2842

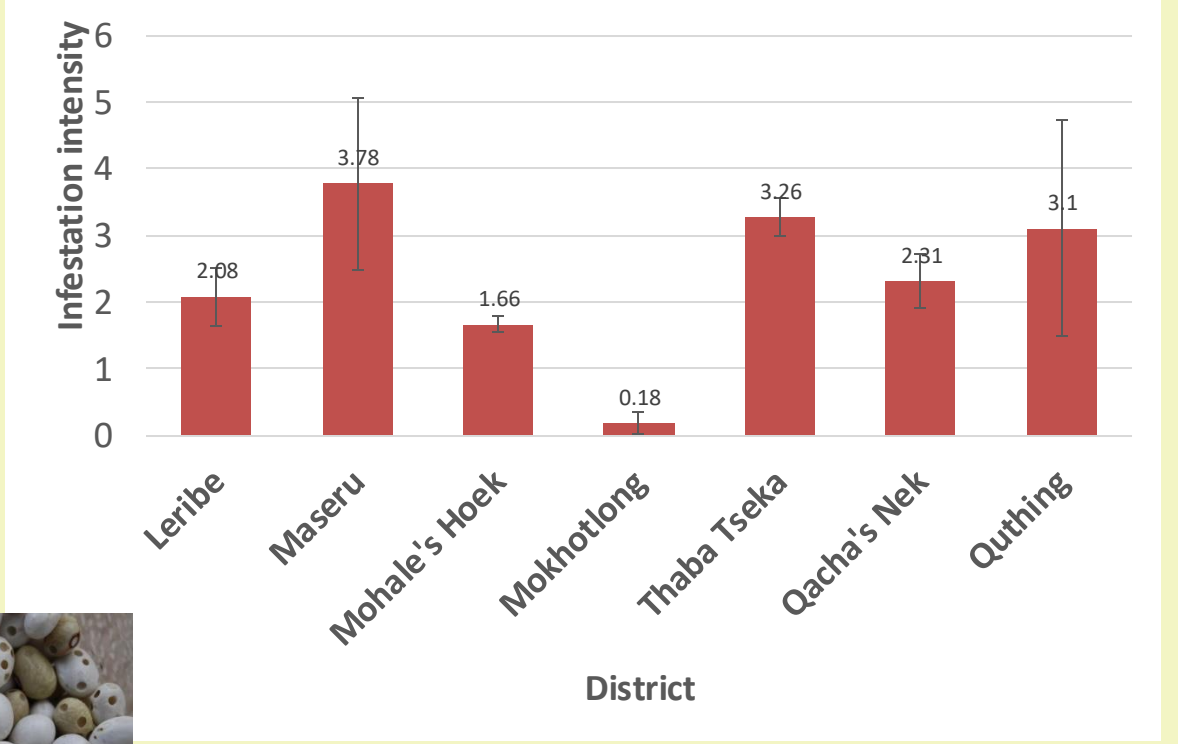
ANOVA, F (6, 141) = 8.84; p < 0.001).

The intensity of infestation (# of emergence holes/# of damaged seeds)

2022



2023



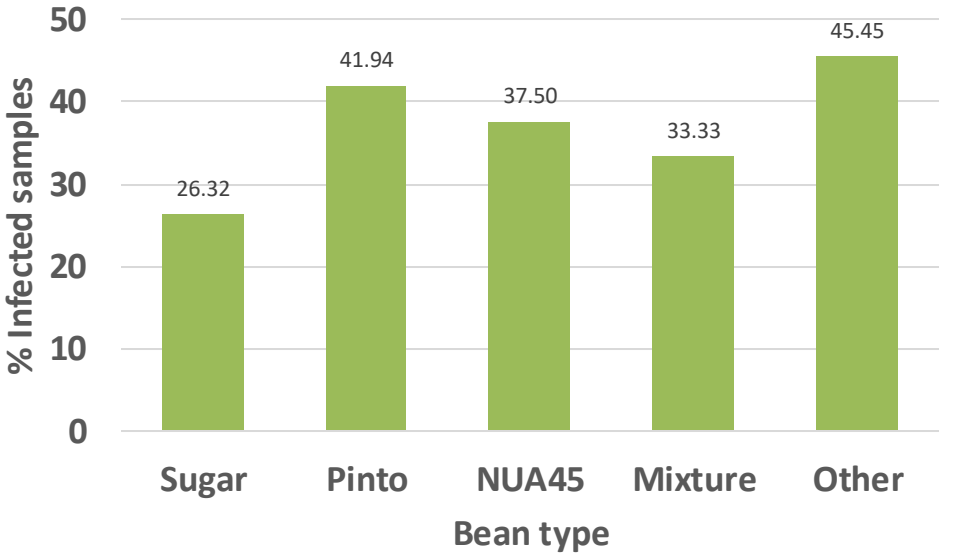
ANOVA, F (3, 130) = 3.11; p = 0.0285

ANOVA, F (6,141) = 4.36; p < 0.001

Percentage of samples of different bean types infested by *A. obtectus*

Bean type	Number of samples
Sugar	19
Pinto	62
NUA45	16
Mixture	15
Other	22

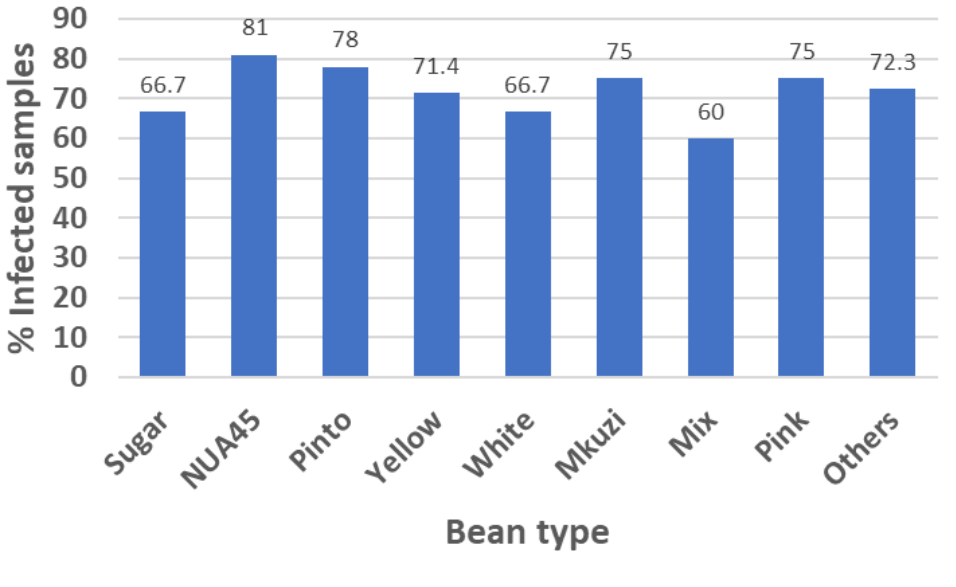
2022



Chi square= 2.11;
df = 4; p = 0.715

Bean type	No of samples
Sugar	27
Pinto	50
NUA45	21
Yellow	14
White	6
Mkuzi	4
Mix	8
Others	11

2023



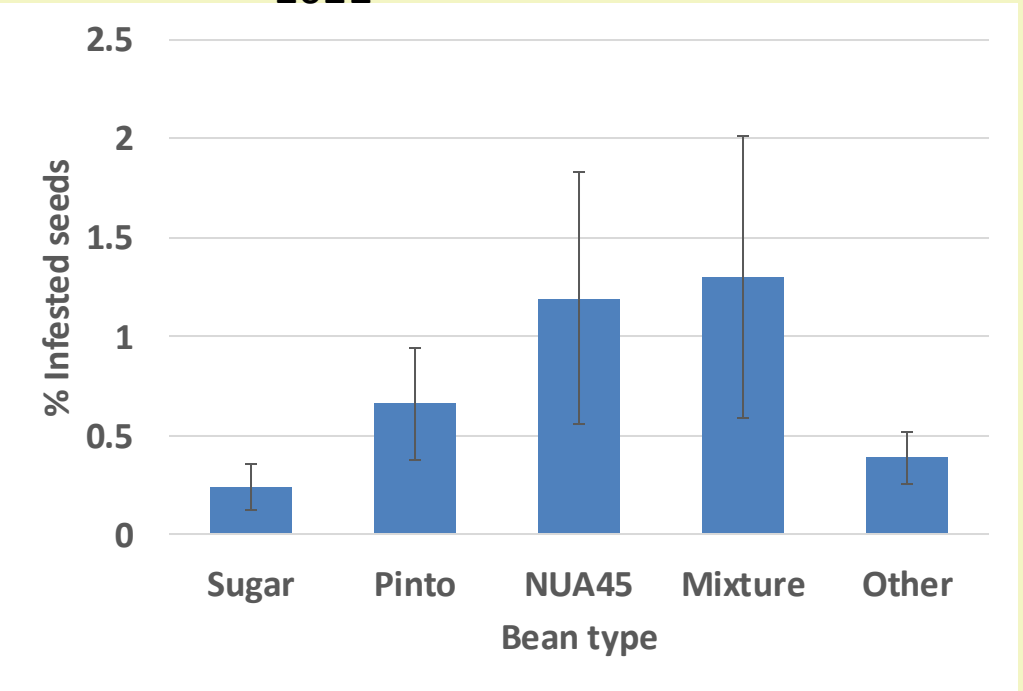
Chi square = 5.07;
df = 9; p = 0.85

CARDESA
Association for Agricultural Research and Development for Southern Africa

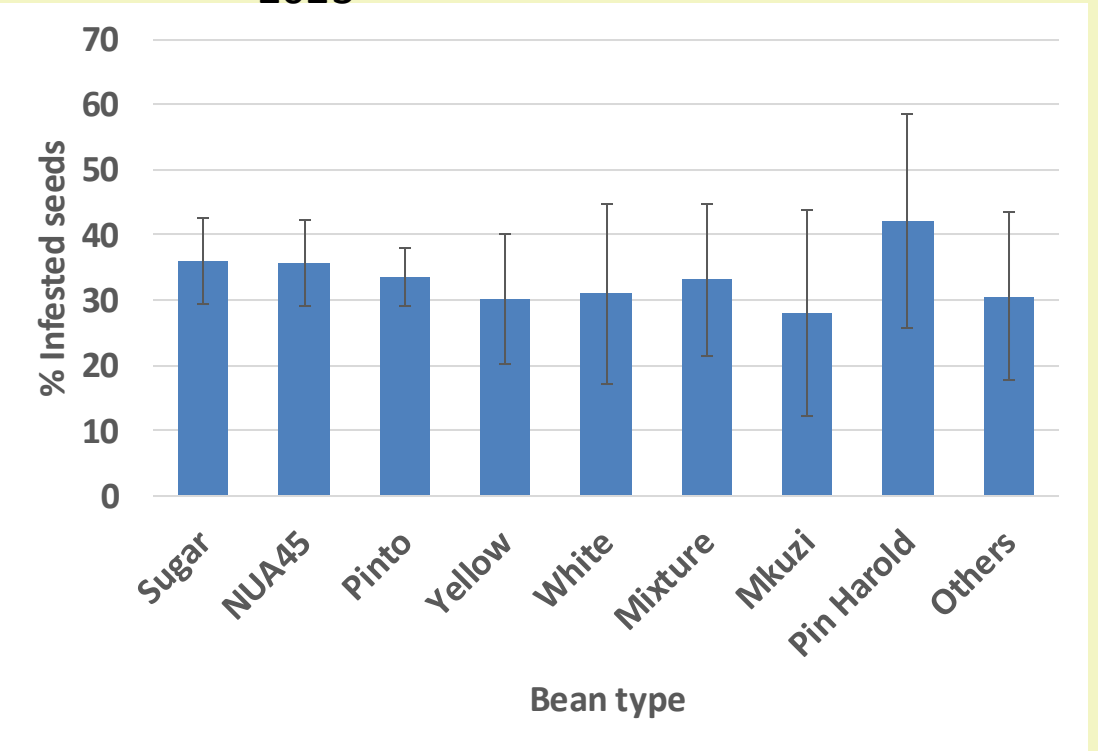
RLD BANK
ORLD BANK GROUP

Acanthoscelides obtectus infestation prevalence among different types of beans

2022



2023

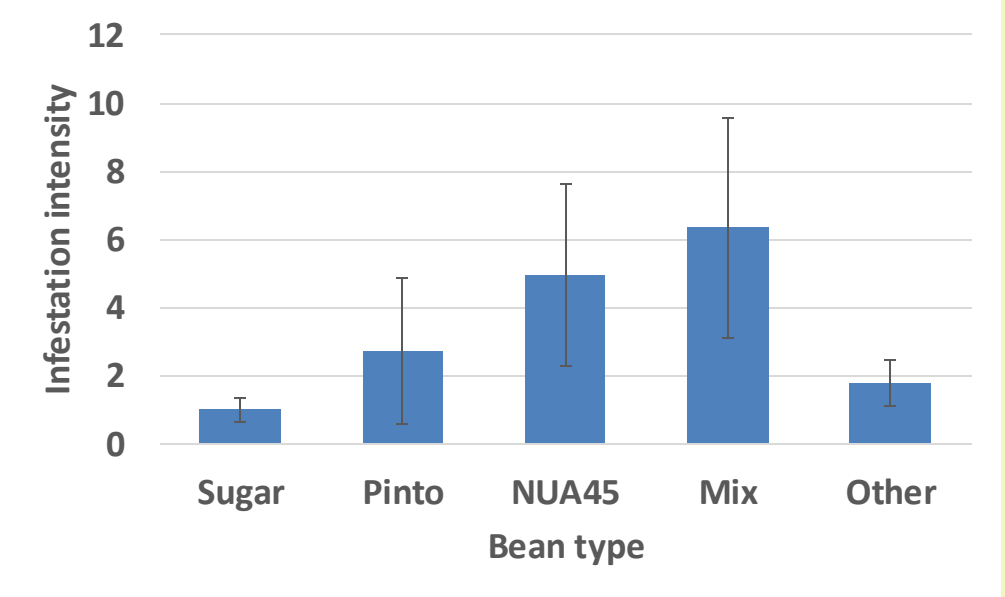


ANOVA, F (4, 129) = 0.96 ; p = 0.4303

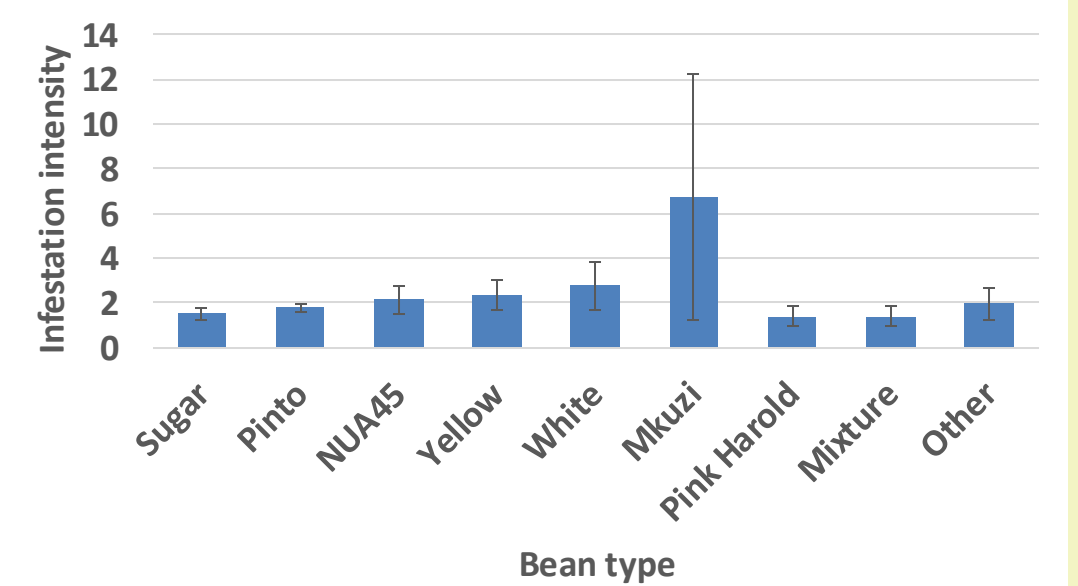
ANOVA, F (8, 139) = 0.12; p = 0.90).

The intensity of infestation (# of emergence holes/# of damaged seeds) among the different types of beans

2022



2023



ANOVA, F (4, 129) = 0.61; p = 0.6580

ANOVA, F (8, 139) = 0.2.04; p = 0.039

CONCLUSIONS

- The species of bean weevils (bruchids) attacking common beans in Lesotho is *Acanthoscelides obtectus*
- Although *A. obtectus* is found throughout the country, it appears to be rare and causing insignificant damage in common beans in Mokhotlong
  - More work needed on mapping spatial distribution of A. obtectus in the highland areas of the country
  - Bean production and marketing in Mokhotlong have more potential than is currently realized
- Different types of beans commonly produced in Lesotho appear to be equally susceptible to *A. obtectus* damage except for Mkuzi variety that suffered the highest damage

ACKNOWLEDGEMENTS

- The Agricultural Productivity Program for Southern Africa – Lesotho
- Department of Field Services
- DAR
- National University of Lesotho