



# Identification and characterisation of novel *Ascochyta* blight resistance resources within the exotic germplasm of lentil

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# Ascochyta blight (*Ascochyta lentis*) in lentil

- Substantial yield losses ranging up to 70% combined with poor quality seed

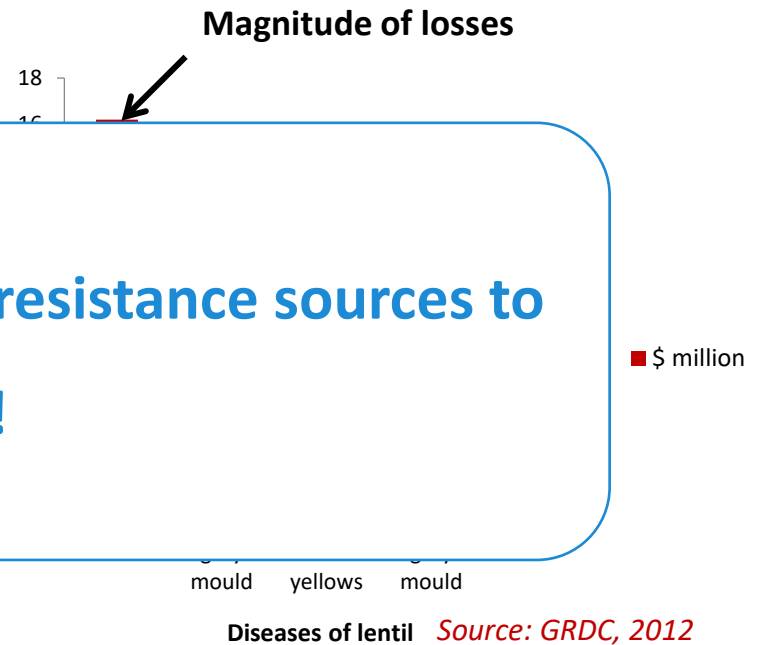
- **AB is the highest potential disease among the diseases that**

- Severe disease

- How

population has deteriorated the resistance status of several cultivars such as Nipper, PBA Hurricane XT and PBA Hallmark XT (Blake et al. 2019)

**There is an urgent need of new and diverse resistance sources to widen our genetic base!**



## Wild lentil *vs* *Ascochyta lentis*



Susceptible

AB resistance



Resistant

- 2 accessions (*Lens orientalis*) – highly resistant (R)
- 10 accessions - moderately resistant (MR)

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## Stability of ILWL 180's resistance

- ILWL 180 remained resistant against aggressive *A. lentis* isolates
- ILWL 180 demonstrated superior resistance over cultivars ILL 7537, Indianhead and PBA Hurricane XT

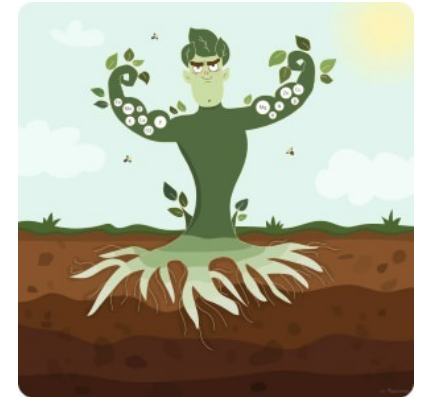
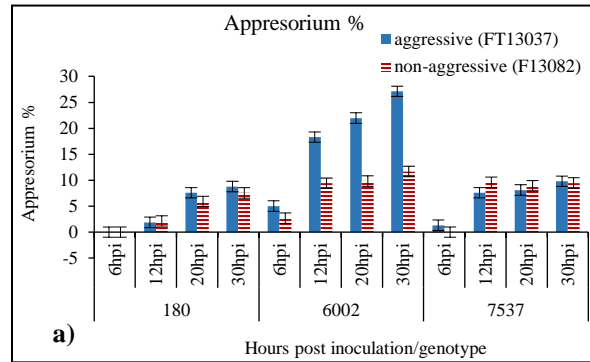


Fig : Performance of ILWL 180 against seven isolates

# Histopathological characterization of ILWL 180's resistance



Assessments revealed significantly **lower germination, shorter germ tubes and delayed appressorium formation** by *A. lentis* on the leaflets of resistant ILWL 180

Fig : Pre-penetration behaviour of *Ascochyta lentis* on accession ILWL 180

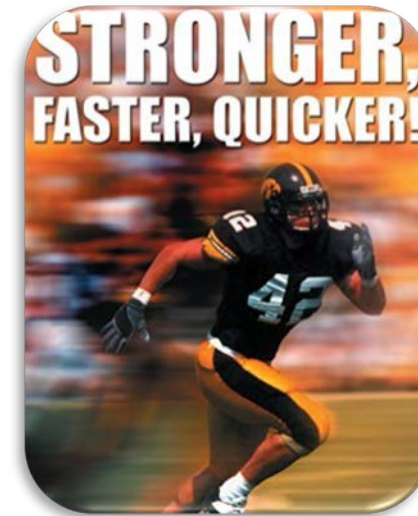
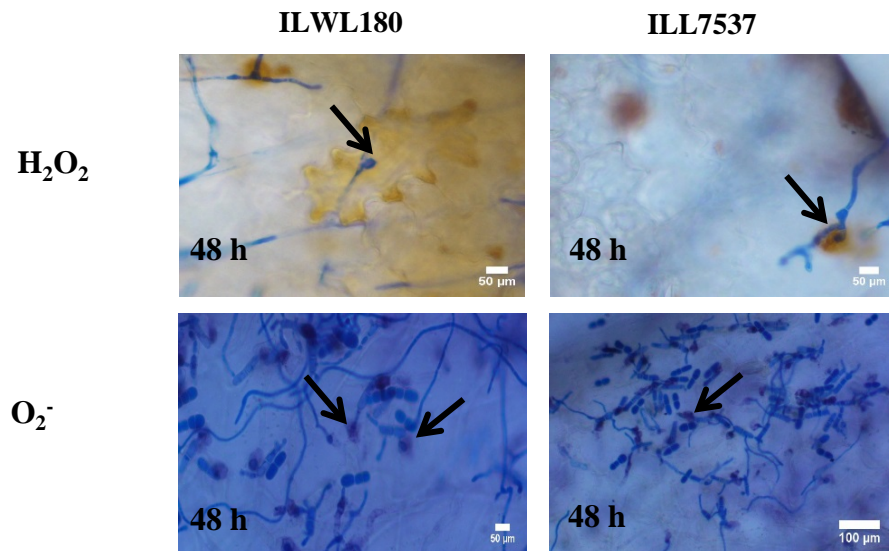


Fig: Histochemical localization and quantification of biochemical defence responses to *A. lentis*

## Identification of quantitative trait loci (QTL) associated with the AB resistance

- Genotyping by Sequencing through Transcriptomics (GBS-t) method was used to sequence 140 RILs ( $F_5$ ) and parents.
- Sequence output was aligned against reference transcriptome of Cassab to call 815 high quality SNPs following stringent filtering.
- The Linkage map constructed spread across eight LGs and spanned a total distance of 488.02 cM with a mean-mean marker

distance of 0.66 cM

- A QTL associated with

- The width of the QTL

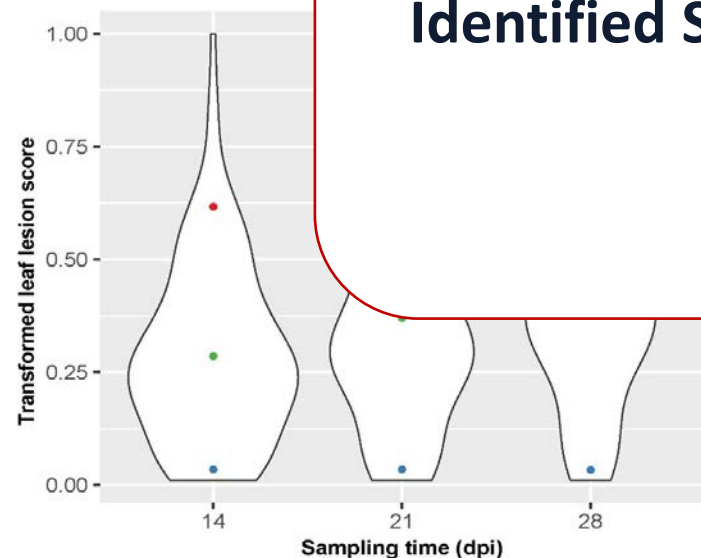


Fig: Segregation within RIL population for AB resistance

**Prominent resistance sources**  
**Identified SNPs may assist in marker assisted selection**  
**Sustainable lentil production**

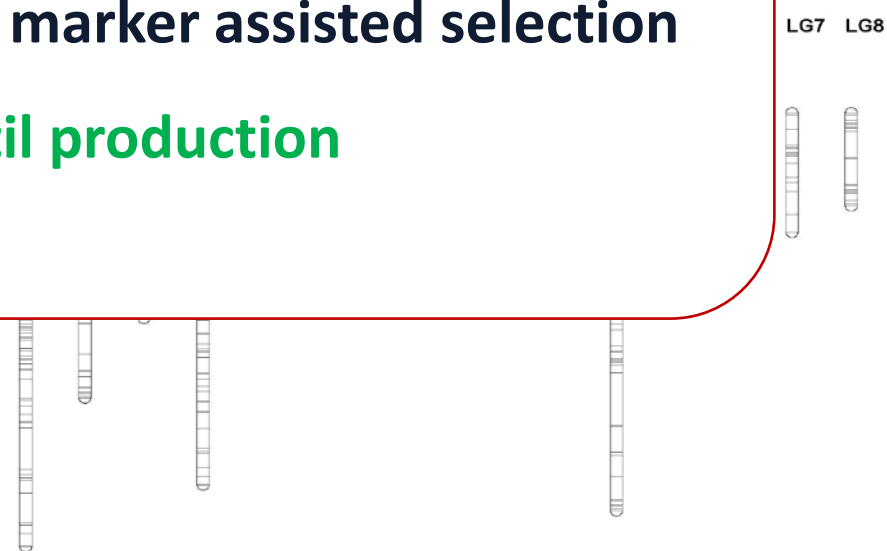


Fig: Linkage map with QTL positioned at LG5



## A Novel *Lens orientalis* Resistance Source to the Recently Evolved Highly Aggressive Australian *Ascochyta lentis* Isolates



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### Evidence of early defence to *Ascochyta lentis* within the recently identified *Lens orientalis* resistance source ILWL180

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