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Optimized method for screening wild *Aegilops tauschii* and *Triticum dicoccoides* for resistance to dry root rots caused by *Fusarium culmorum*

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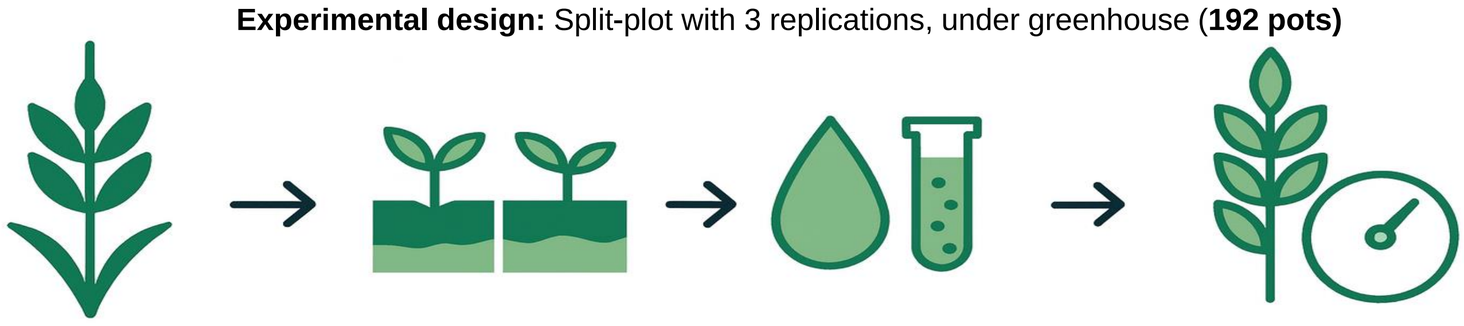
INTRODUCTION & AIM

Root rot diseases caused by *Fusarium culmorum* severely affect wheat production, particularly in arid and semi-arid regions. Wild wheat relatives (*Aegilops tauschii* and *Triticum dicoccoides*) provide valuable genetic resources for resistance breeding. This study aims to optimize a reliable screening method to identify resistant lines of *A. tauschii* and *T. dicoccoides* against *F. culmorum*.

METHOD

Experimental design: Split-plot with 3 replications, under greenhouse (**192 pots)**



Plant material
- ✓ 12 wild lines (6 *A. tauschii*, 6 *T. dicoccoides*)
- ✓ 4 checks (susceptible / moderately resistant)

Soil type
- ✓ Autoclaved (AS)
- ✓ Natural (NS)

Inoculum type *of F.culmorim*
- ✓ Organic (OI)
- ✓ Suspension 10^6 spores/mL (SI)

Disease assessment
- ✓ Pathological: severity of internodes (Bahaeddine, 2021) and roots (Oslane et al., 2015).
- ✓ Agronomic: spike number, dry biomass, plant height

5 per pot, inoculated at the two-leaf stage after vernalization and evaluated at flowering stage

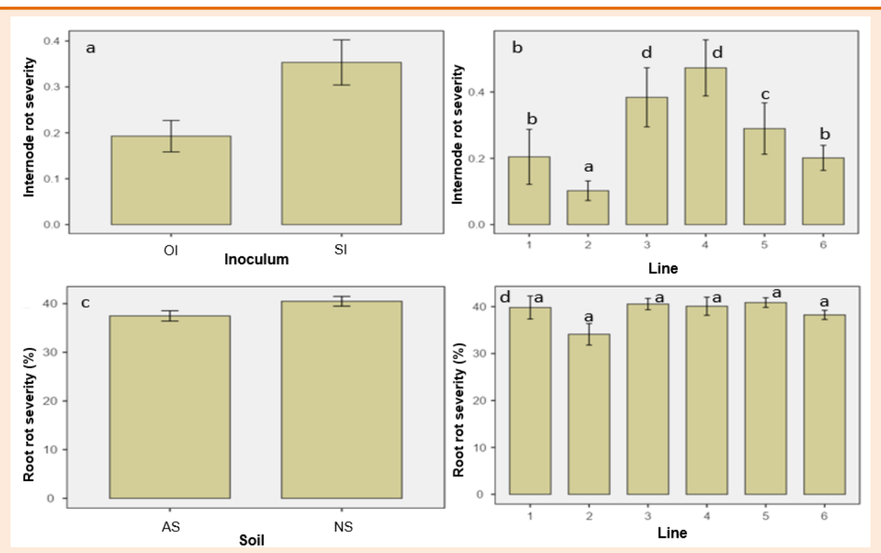
RESULTS & DISCUSSION

Aegilops tauschii

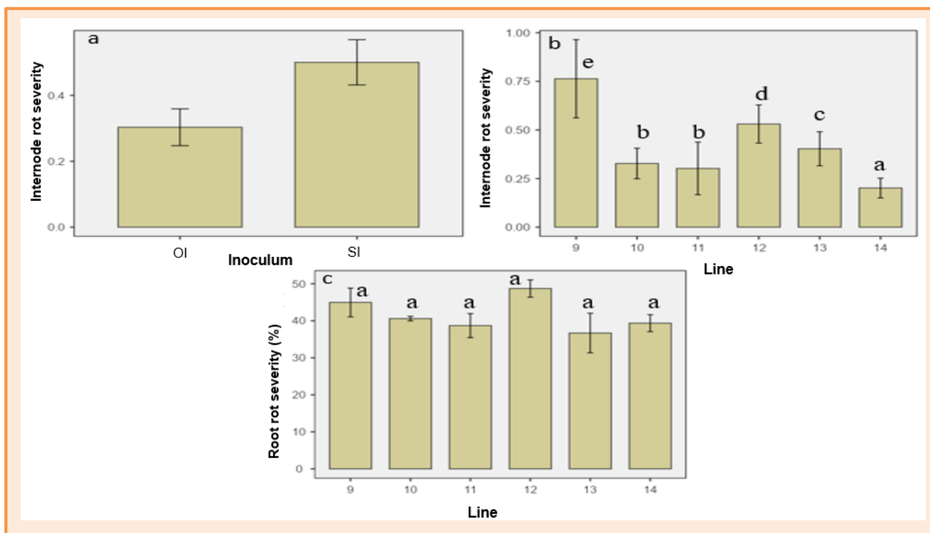
✓ **Inoculum**
SI caused higher and more uniform internode severity, allowing clear discrimination between susceptible and tolerant lines.

✓ **Soil**
NS increased root severity, while variation among lines remained low.

✓ **Evaluation**
Internode assessment was the most sensitive criterion; plant height, biomass, and spike number showed differences depending on genotype × soil × inoculum interactions.



Variation in root rot severity caused by *Fusarium culmorum* at the internode and root levels of *Aegilops tauschii* lines.



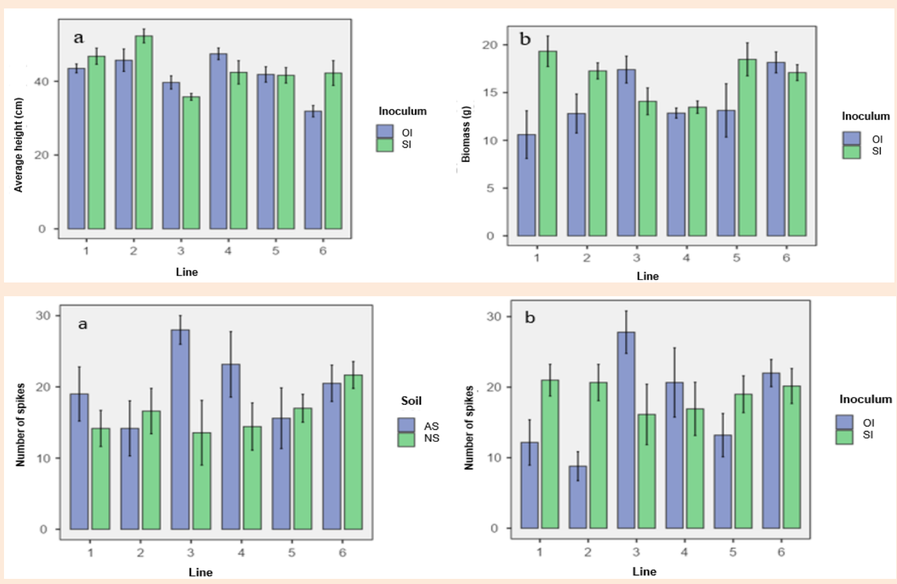
Variation in root rot severity caused by *Fusarium culmorum* at the internode and root levels of *Triticum dicoccoides* lines.

Triticum dicoccoides

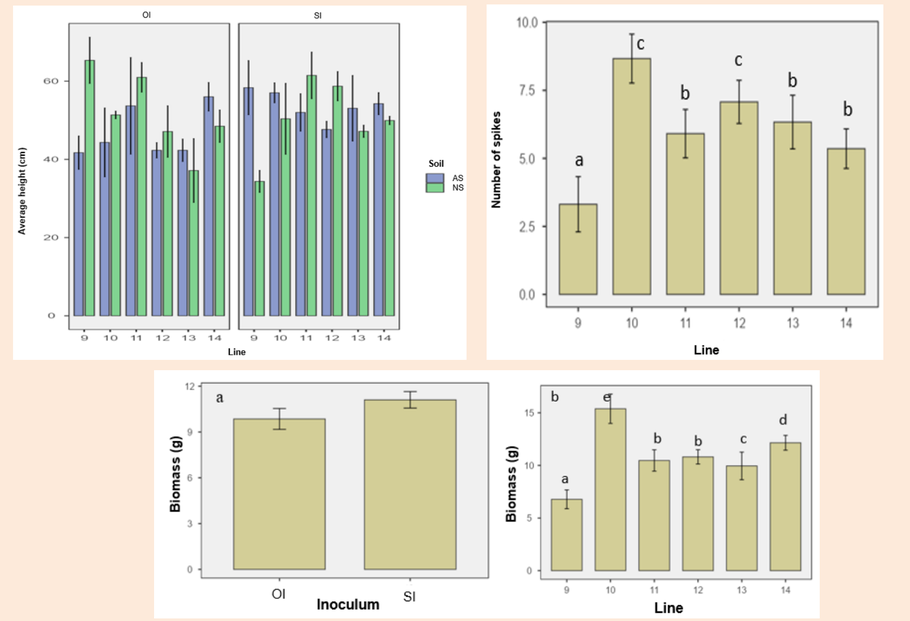
✓ **Inoculum**
SI produced more severe internode symptoms.

✓ **Soil**
The root response was stable and little affected by soil type.

✓ **Evaluation**
Internode assessment distinguished resistant lines; plant height and biomass depended on genotype × soil × inoculum interactions, while spike number was mainly genotype-dependent.



Effect of the interaction between inoculum type and soil type with *Aegilops tauschii* lines on plant height, dry biomass, and spike number under *Fusarium culmorum* inoculation. OI: organic inoculum; SI: suspension inoculum; AS: autoclaved soil; NS: natural non-autoclaved soil.



Effect of the interaction between inoculum type and soil type with *Triticum dicoccoides* lines on plant height, dry biomass, and spike number under *Fusarium culmorum* inoculation. OI: organic inoculum; SI: suspension inoculum; AS: autoclaved soil; NS: natural non-autoclaved soil.

CONCLUSION

- ✓ Suspension inoculum combined with natural soil and internode evaluation provides the most reliable method to identify resistant lines to root rot caused by *F. culmorum* .
- ✓ This approach allows clear discrimination between susceptible, tolerant, and resilient lines.
- ✓ Interactions between genotype, soil type, and inoculum type play a key role in plant response and should be considered in breeding programs.
- ✓ The proposed method provides a solid basis for rapid and effective screening of wild germplasm for wheat improvement.

REFERENCES

- ✓ Baha Eddine, S., El Yousfi, B. & Douira A. 2020. Effects of nitrogen forms and rates on *Fusarium culmorum* growth, fitness, aggressiveness and wheat, barley and triticale. Plant Cell Biotechnology and Molecular Biology 21(63&64):107-129; 2020.
- ✓ Oslane, I., El Yousfi, B., Ouabbou, H., El Younsi, A., & Tallal, R. 2014. Assessment of root rot severity in a Moroccan durum wheat collection. AMPP, No. 5: 1–7 (in French).

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