

ScleroScreen – A global field inoculation methodology to assess Sclerotinia stem rot resistance in Oilseed Rape (*Brassica napus*)

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Introduction

➤ Important impact of Sclerotinia on Oilseed Rape

Although infrequent this disease has a strong impact with up to 1.5t/ha yield loss (Koch et al 2007, Penaud et al 2009) which leads to the systematic use of fungicide treatment.

➤ Need for resistant varieties

Resistant varieties would represent an alternative to fungicide treatments which are often badly timed, costly for growers and for the environment. The efficiency of fungicides decreases regularly due to the appearance of resistance.

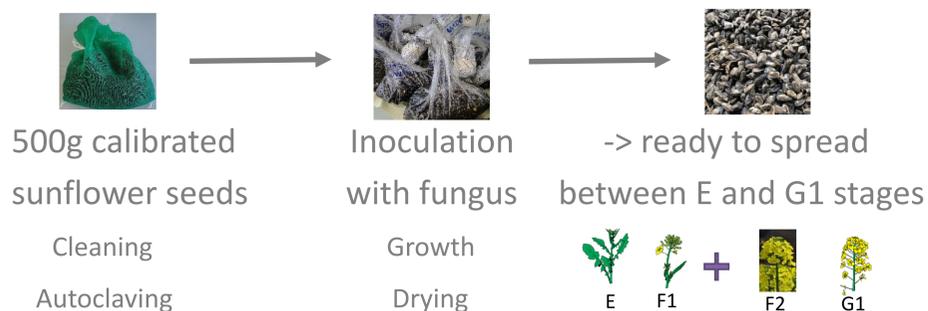
➤ Lack of field evaluation methodologies for registration

Different mechanisms are involved in the interaction between Sclerotinia and oilseed rape, making the choice of an evaluation methodology very complex. Moreover, disease development is highly dependent on environmental conditions (temperature, humidity...). Managing these constraints is critical for successful contamination and thus variety evaluation.

➤ Here we report of ScleroScreen, a method to evaluate varieties in the field for resistance to Sclerotinia

Materials and methods

Inoculum production



Field trials

Network:

- 3 locations, with 20 contrasted genotypes organized with 3 repetitions / condition.
- 2 conditions: No inoculation (NI); Inoculated (I)

Performed in 2017-18 and 2018-19



Results

Clear symptoms to score

Symptoms:

Observed as infection from the leaf going through to the stem (Fig. 1) at 2 scoring dates (Lec1 and Lec2).



Figure 1: Typical symptom observed

Clear effect of conditions:

No natural infection in NI condition

Progression of disease between Lec1 and Lec2

Variation between 0 and 100% of plants infected in I conditions, regardless of location and year (Fig. 2)

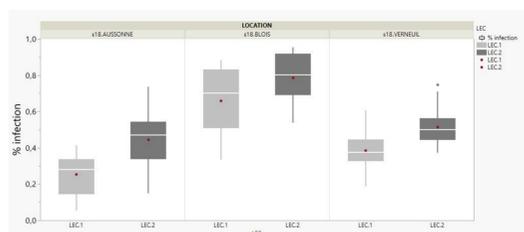


Figure 2: Range of Lsmeans for % infected plants per location and scoring date in 2018.

Good representation of global resistance

Reference data:

Within the 20 genotypes tested in our experiments, a subset had also been tested under natural inoculation conditions in the FRSO « Sclerotest » project between 2011 and 2014, discriminating globally resistant varieties from globally susceptible ones.

Results:

For all trials considered, the discrimination was consistent, either for individual trials or in a multi-local approach (Fig. 3).

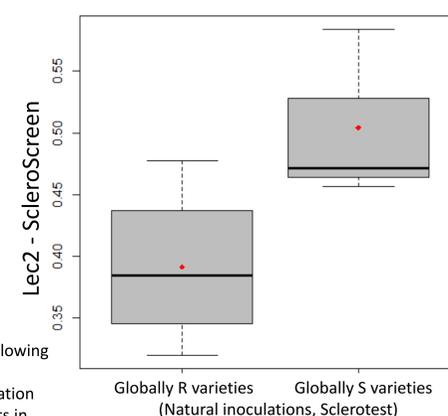


Figure 3: Consistency between classification following natural inoculation and ScleroScreen. R and S classes are derived from natural inoculation and box-plot represent the % of damaged plants in Lec2 of I conditions based on a multi-year, multi-location model.

Conclusion

- ✓ ScleroScreen is a low tech method to produce inoculum and conduct field trials at large scale
- ✓ ScleroScreen generates reproducible results over locations and years, regardless of environmental conditions
- ✓ ScleroScreen has the ability to discriminate between varieties globally resistant or susceptible