



Fusarium oxysporum f. sp. *lactucae* is a vascular telluric fungus first reported on lettuce in Japan in 1955 and now spread in USA and Europe. It is the causal agent of Fusarium wilt on lettuce. The incidence in fields can be as high as 90% of plants. The emergence of a new race of Fusarium creates a serious threat for growers and a challenge for breeders.

Race 4, validation of differentials and evaluation of resistance

Differential set

Table 1: Differential Sets *Fusarium oxysporum* f. sp. *lactucae* (Fol) – Lettuce

Differential host	Fol: 1*	Fol: 2*	Fol: 3	Fol: 4*
Gisela	S	NT	NT	S
Patriot	S	S	S	IR
Costa Rica No 4	HR	S	S	S
Romabella	HR	HR	S	IR
Banchu Red Fire	S	HR	S	IR
Ballerina	S	NT	NT	IR
Lomeria	S	NT	NT	HR
Palmos	HR	NT	NT	HR

S = susceptible; HR = highly resistant; IR = intermediately resistant; NT = not tested
*differential hosts and isolates that are used by the seed sector

Evaluation of resistance for DUS

Three levels of resistance (susceptible, intermediate resistance and high resistance) have been identified. Five control varieties were defined to describe these different levels:

- **Gisela** susceptible control
- **Ballerina** lower level of intermediate resistant control.
- **Patriot** indicative higher level of intermediate resistant control
- **Lomeria and Palmos** highly resistant controls.

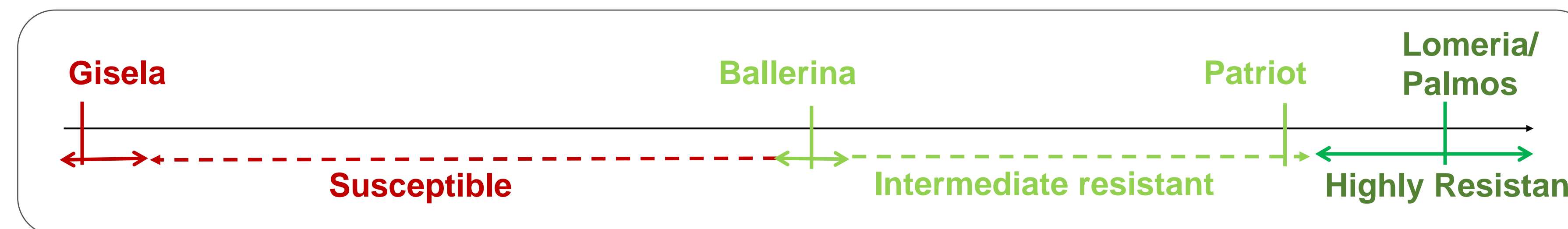
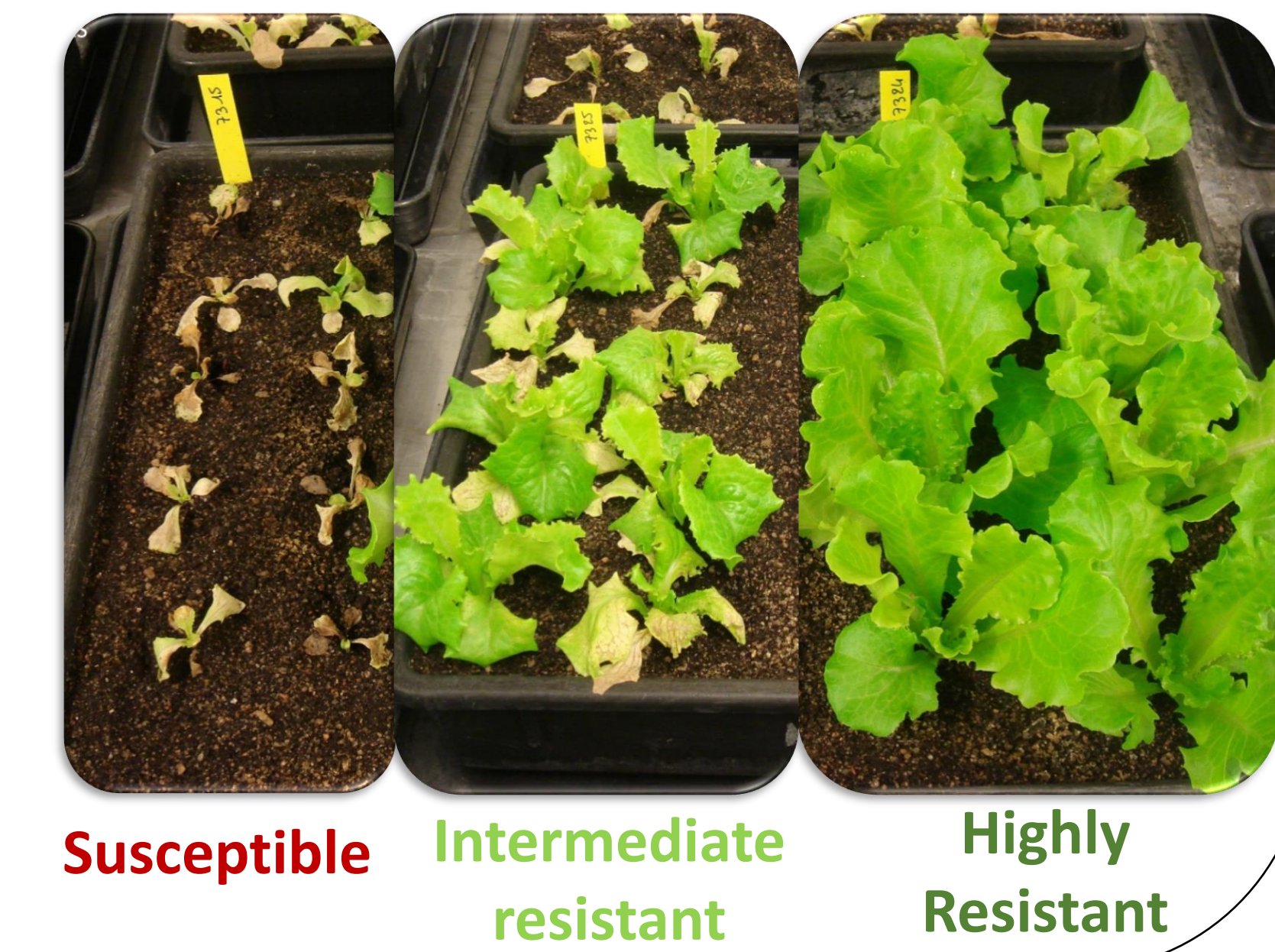


Figure 1: interpretation rule and controls for evaluation of resistance of lettuce to Fol: 4



In 2018-2021, GEVES coordinated an interlaboratory project, including 14 partners from ISF and IBEB, to validate the new race 4 of Fol described in 2016 by Giraldi *et al.* for resistance claims. The isolate **04750888** provided by G. Gilardi was selected as the type isolate for Fol: 4 and a set of 8 differentials was validated.

No seed transmission of *Fusarium oxysporum* f. sp. *lactucae*

The non-transmission through seed was studied, in the CASDAR project ACTIFOL, under natural conditions of infection from plant to seed (natural and artificial contamination of mother plants).

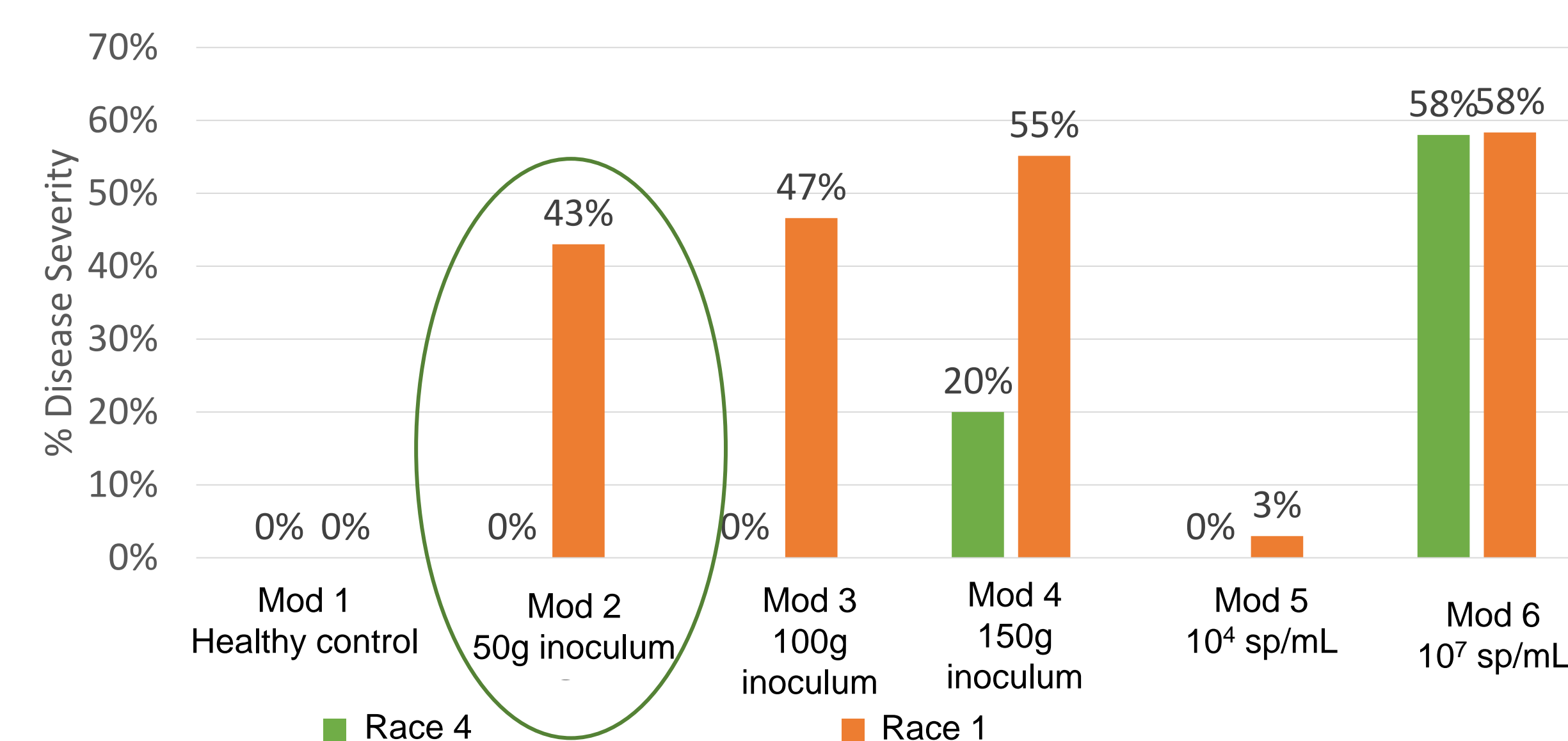
No *Fusarium oxysporum* was detected on the 12 seed lots obtained from commercial seed production or on the 44 lots obtained from artificially contaminated plants at different stages. The detection has been done by plating and morphological identification. **These results confirm the non-transmission of *Fusarium oxysporum* by seed.**

Year	Variety	Infection	Stage of infection	Number of seed lots	<i>Fusarium oxysporum</i>	Conclusion
2021	Resistant	artificially	bolting	6	0%	No transmission
	Resistant	artificially	planting	6	0%	No transmission
	Resistant	artificially	pumping	3	0%	No transmission
	Susceptible	artificially	bolting	4	0%	No transmission
	Susceptible	artificially	planting	3	0%	No transmission
	Susceptible	artificially	pumping	3	0%	No transmission
	Susceptible	naturally	NA	12	0%	No transmission
2022	Resistant	artificially	bolting	3	0%	No transmission
	Resistant	artificially	planting	4	0%	No transmission
	Resistant	artificially	pumping	6	0%	No transmission
	Susceptible	artificially	bolting	3	0%	No transmission
	Susceptible	artificially	pumping	3	0%	No transmission

Alternative treatments, first steps towards a solution

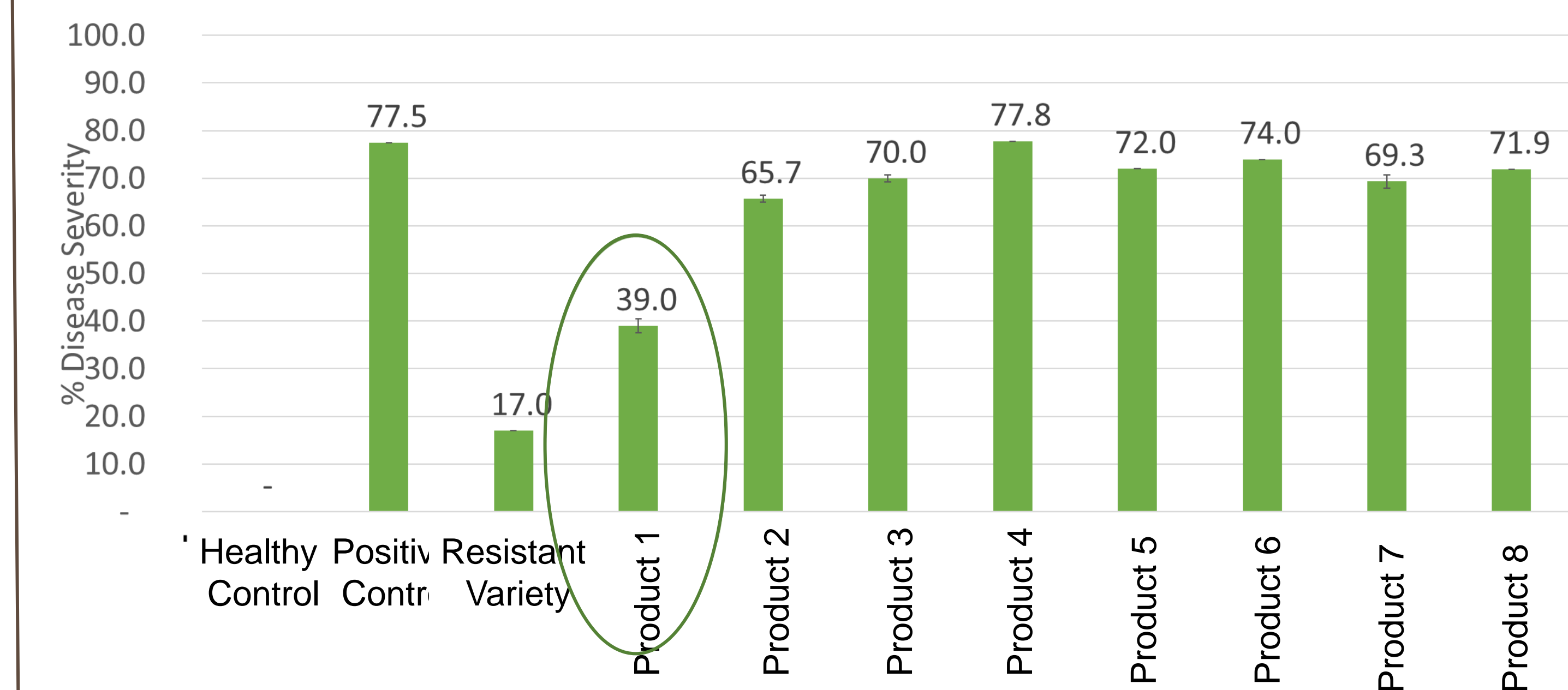
Methodological step

Test of different inoculum (grains or liquid), at different concentration and different races. Assay conducted in greenhouse. Notation of typical symptoms



Modality 2 selected
Infection by 50g of solid inoculum in soil

Screening alternative solutions



Product 2 to 8 : no impact of the different treatments on disease severity
Product 1 : selected to be tested in field experiment naturally infected by FOL