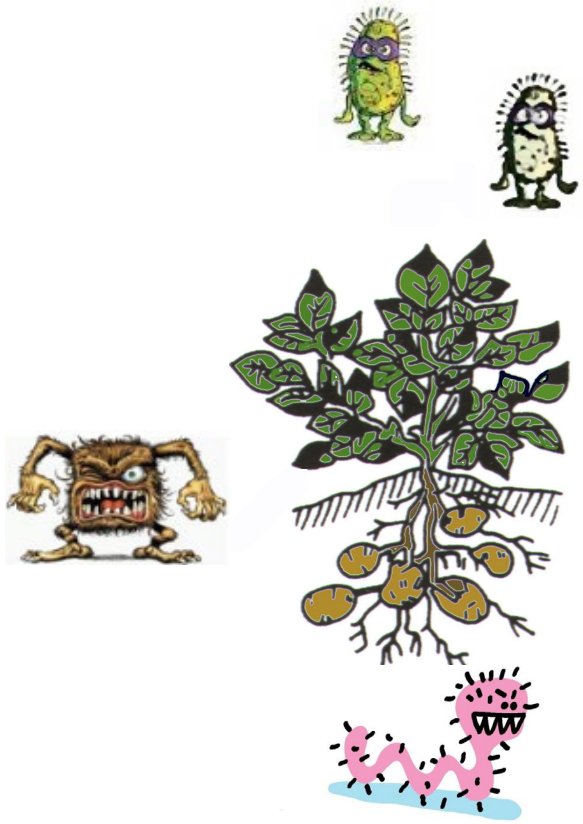
When pathogen union strenghten plant resistance:

co-infections modulate resistance expression to late blight (and cyst nematodes) in potato

Didier ANDRIVON... et al!

Plants are generally subject to multiple infections during their life cycle



They sometimes show resistance, but…

- **Against whom?**
  - Several parasitic species?





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  - Only some strains of given species?

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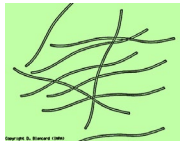
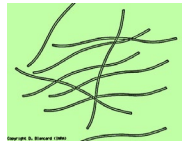
- **More or less efficient**

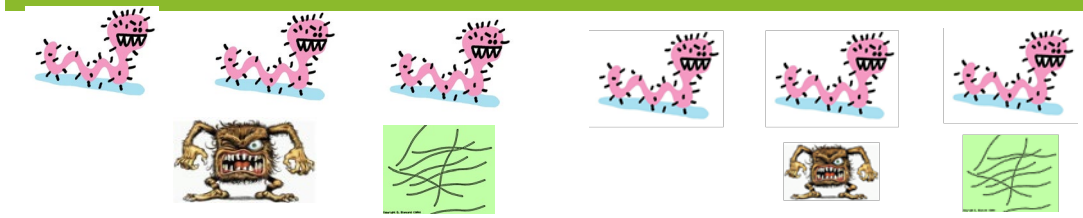
- **Often bred for in a context of single infections**

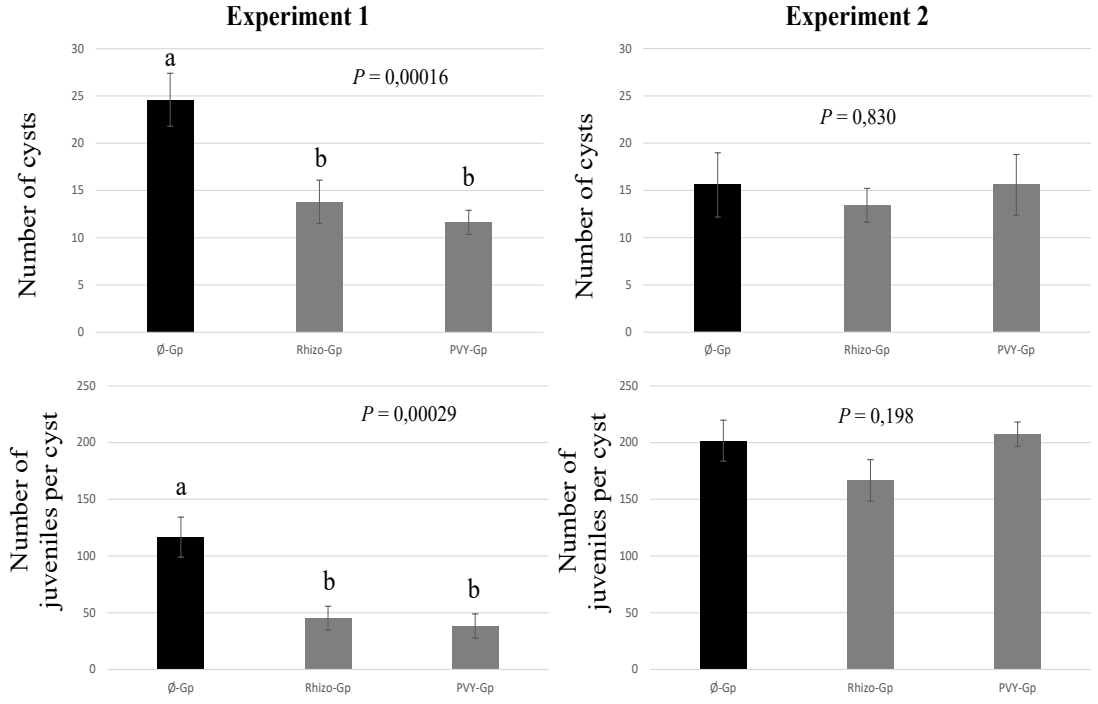
↳ **Do they work as well/ also in case of multiple infections?**

Experimental protocol

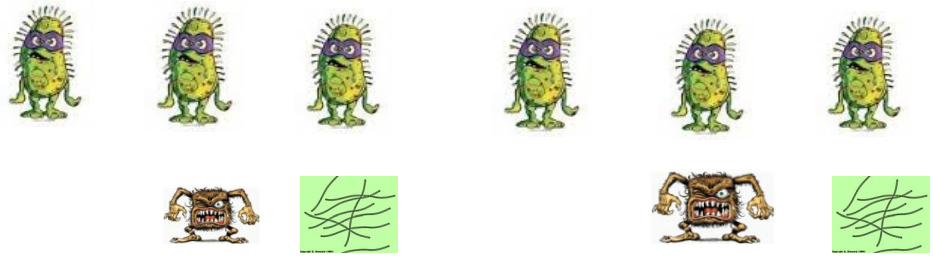
Host cultivars	Robijn		Iledher		
Target pathogens		*Phytophthora infestans*		*Globodera pallida*	
Co-infectants		*Rhizoctonia solani*			
		*Potato Virus Y (PVY)*			
Variables measured	**Lesion size; spore number**		**Cyst number; larvae number**		

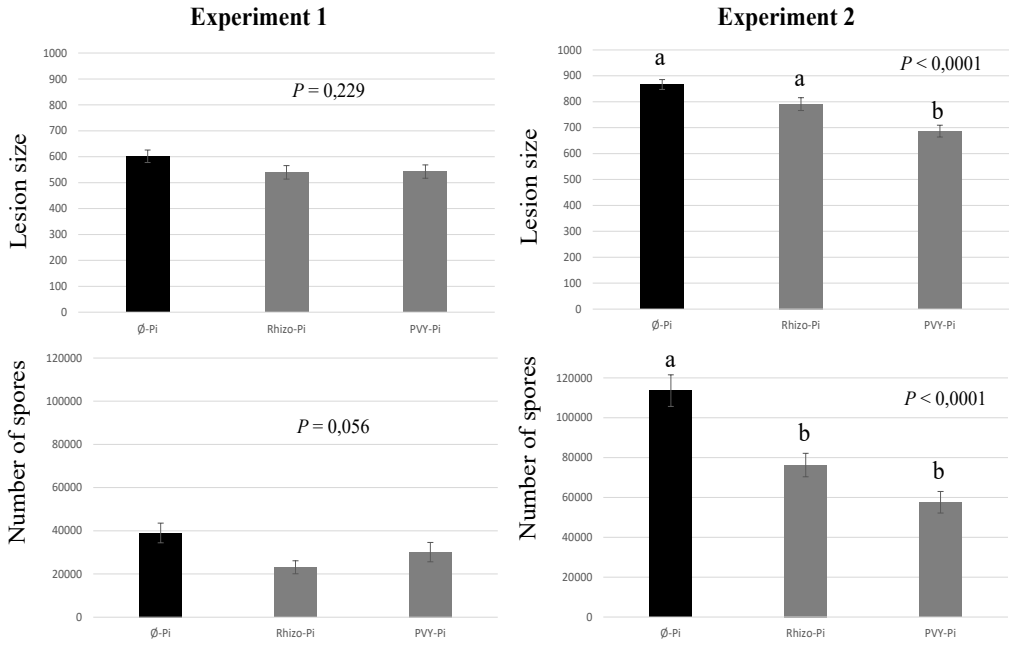
So what?





G. pallida





P. infestans

Conclusion (still provisional)

Partial resistance to *G. pallida* and to *P. infestans* increases under co_infections relative to mono-infections!

Globodera pallida or
Phytophthora infestans
Alone

Single infections

Globodera pallida or
Phytophthora infestans
+
PVY or *Rhizoctonia solani*

Multiple infections

What comes next…

Hypotheses to explore/confirm

Activation of general or specific defense reactions by the first infectant?

Pleiotropic effects of some resistances?

Related to the type of resistance (the ones tested here directly impact pathogen reproduction)

Results to expand

Other types of resistance (ex: major genes and virulent pathogens?)

Funding to secure

INRAE project (Démulti) > ☹

EU project (IPMorama) > ☹

Other funding opportunities?

To sum up…

An unexpected result…

… obtained from interdisciplinary, multi- team collaboration

> INRAe, inov3PT, Institut Agro

… self funded (so far)

A ‘blue sky’ project - a too rare type!

For more info

Andrivon D., K. Bouchek-Mechiche K., Boulard F., Le Boulc’h P., Fournet S., Fouville D., Glais L., Hervet M., Kerlan M.-C., Mabon R., Martin R.L., Pasco C., Pellé R., Val F., Montarry J. Multiple infections influence the resistance of potato cultivars to late blight and potato cyst nematodes. *Plant Pathology* (online 12 Dec 2022). DOI: https://doi.org/10.1111/ppa.13691

Thanks for your attention!