How to pit weeds against parasitic plants. A simulation study with Phelipanche ramosa

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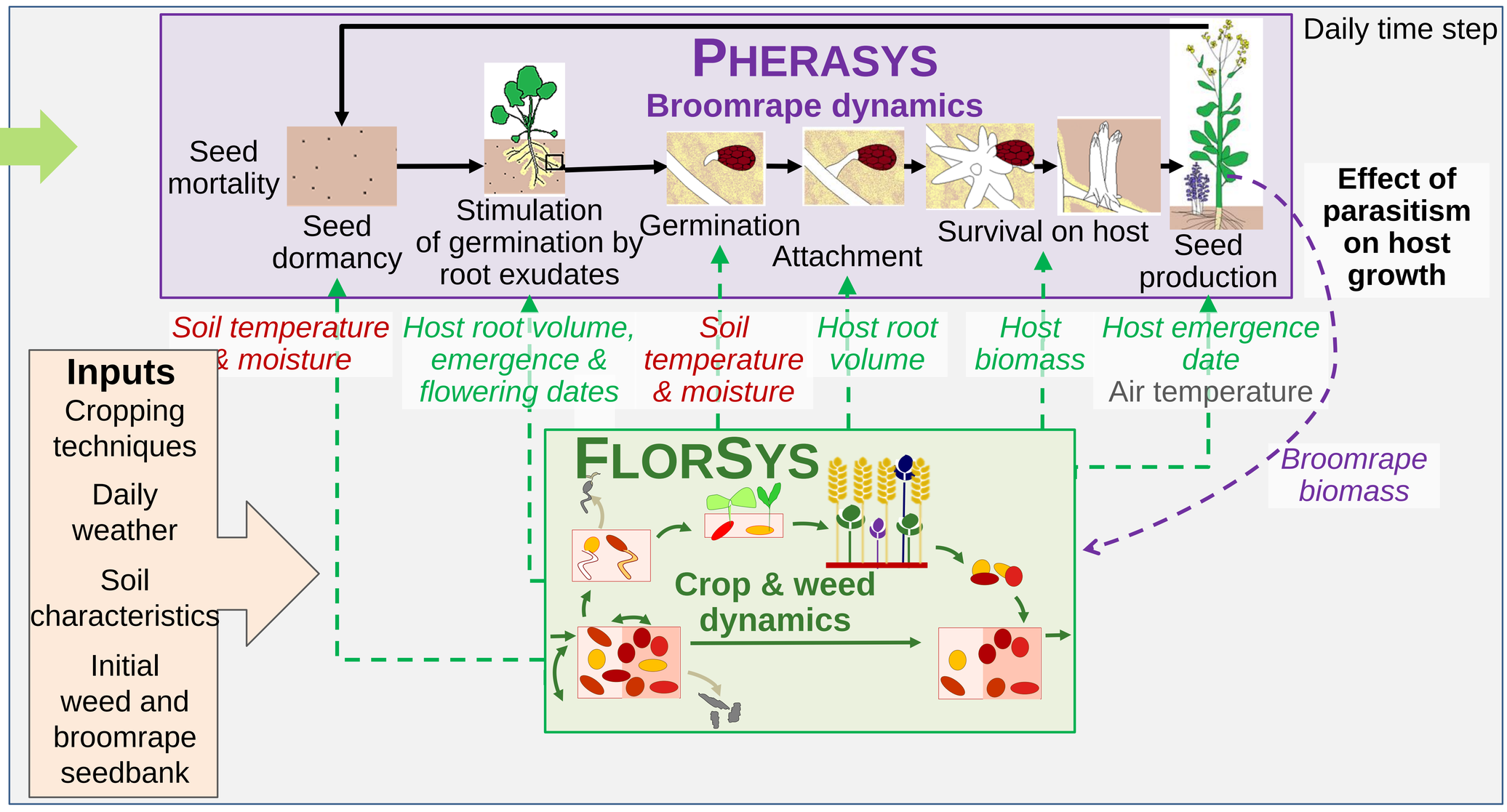
Branched broomrape (*Phelipanche ramosa* L.) is a parasitic plant that infects crop and weed species in more than 20 families (*Solanaceae, Brassicaceae*, *Asterasceae…*). It is a major pest of oilseed rape in France causing up to 90% of yield losses. No curative method is available, the parasite can only be controlled by combining cropping techniques. Simulation models are essential to design such complex management strategies.

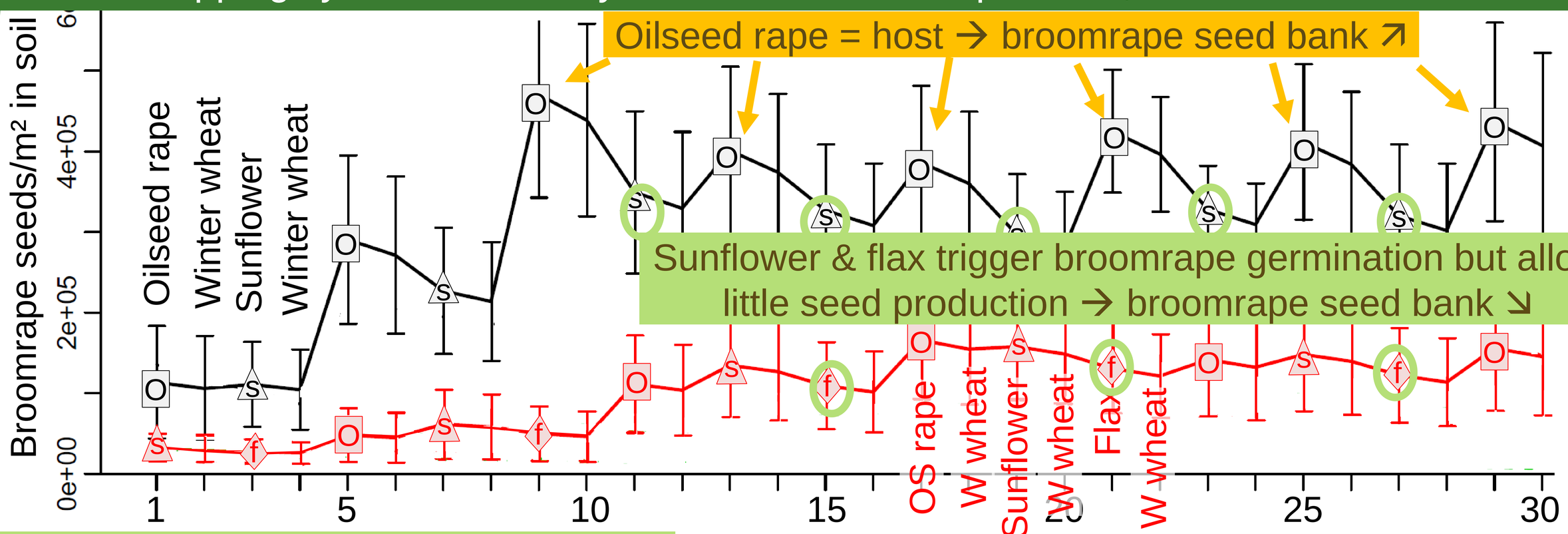
Aim Develop a simulation model & use it to design strategies to manage broomrape

Synthesize knowledge on broomrape dynamics & effects in a 3D individual-based model

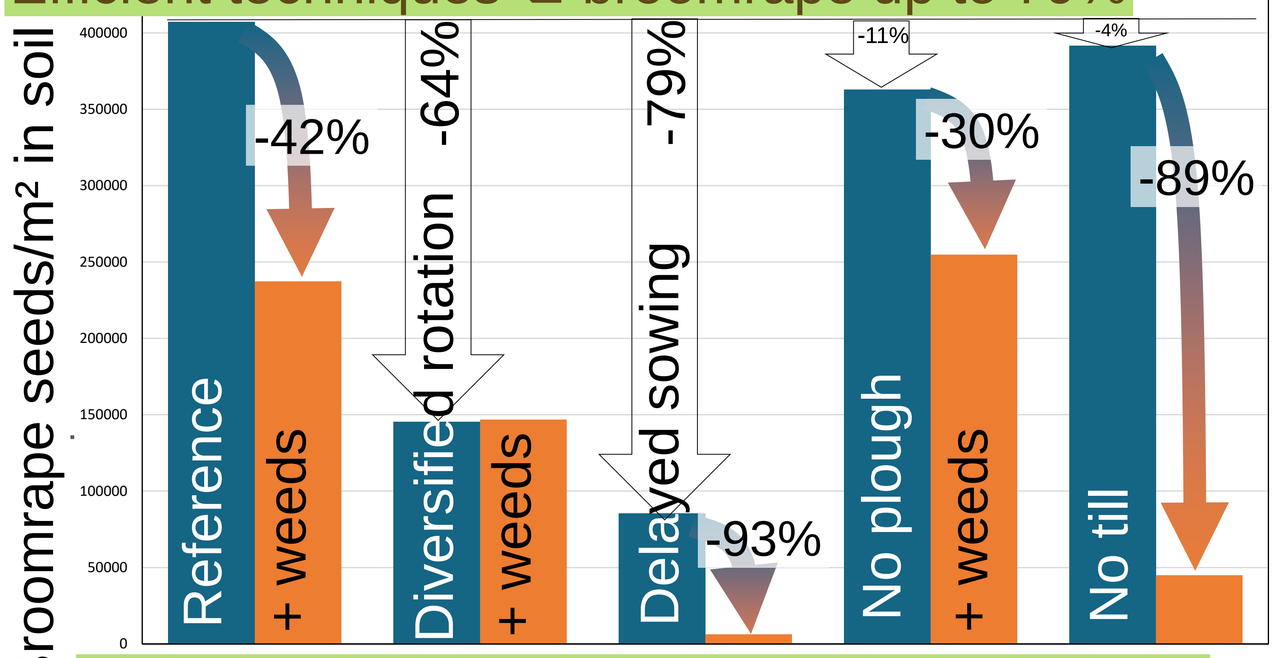
Experiments to fit functions & estimate parameters



Simulate cropping systems over 30 years x 10 weather repetitions, with and without weeds



Efficient techniques ↘ broomrape up to 79%



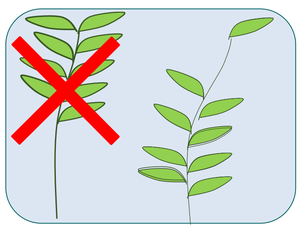
Non-parasitic weeds↘ broomrape up to 93%

Weed ideotype to ↘ broomrape seed bank

Trigger broomrape germination

Allow broomrape attachment

Spring/ summer annual



There are efficient strategies to control broomrape → need to design strategies adapted to local conditions

Conclusion are only valid if broomrape-attaching weeds reproduce before broomrape does → need to confirm

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