

Complexity of the tripartite interaction in the rhizosphere: case of soil-borne pathogenic fungi with the holoparasitic plant Phelipanche ramosa and its host plant

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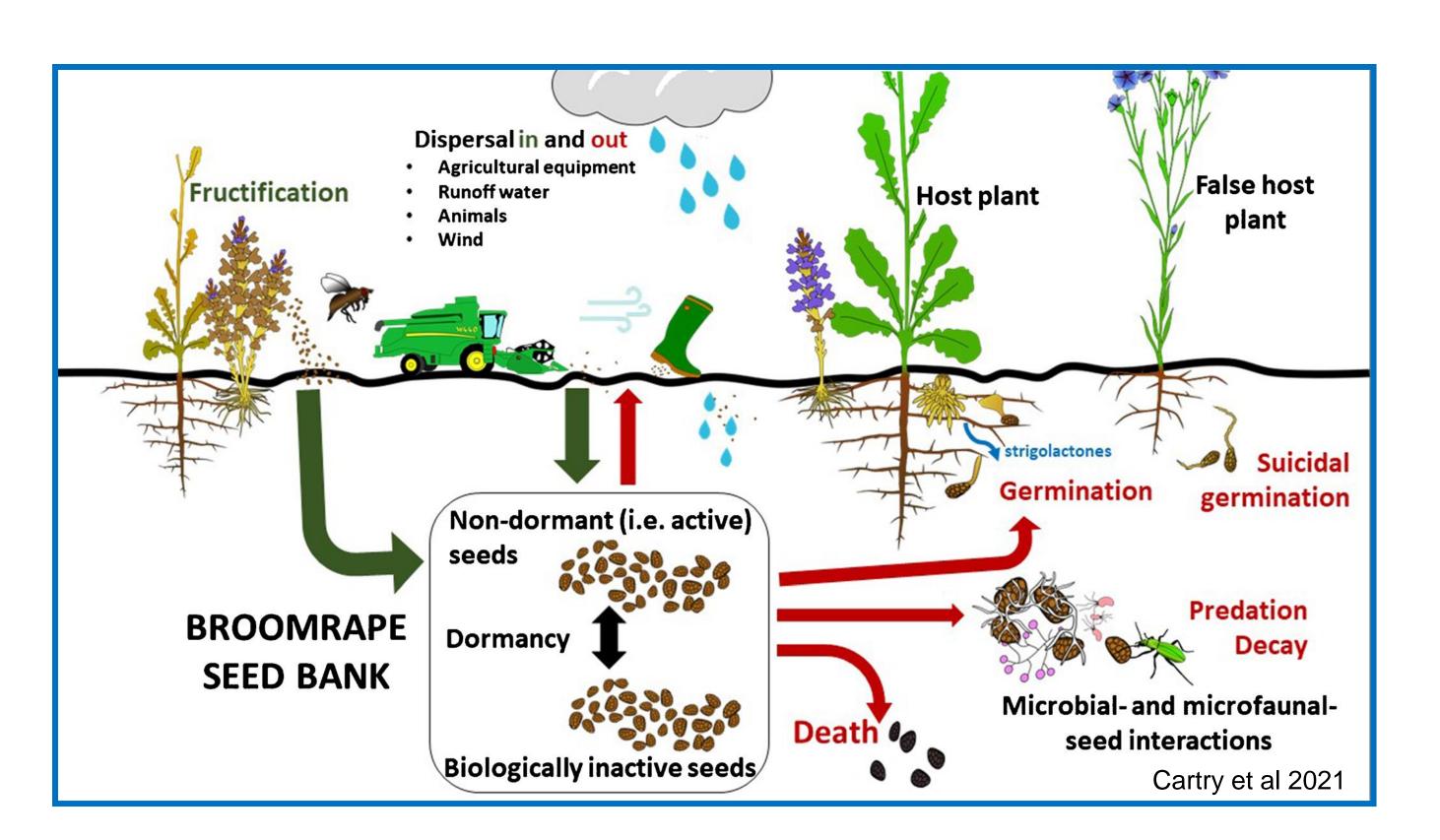


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Complexity of the tripartite interaction in the rhizosphere: case of soil-borne pathogenic fungi with the holoparasitic plant *Phelipanche ramosa* and its host plant.

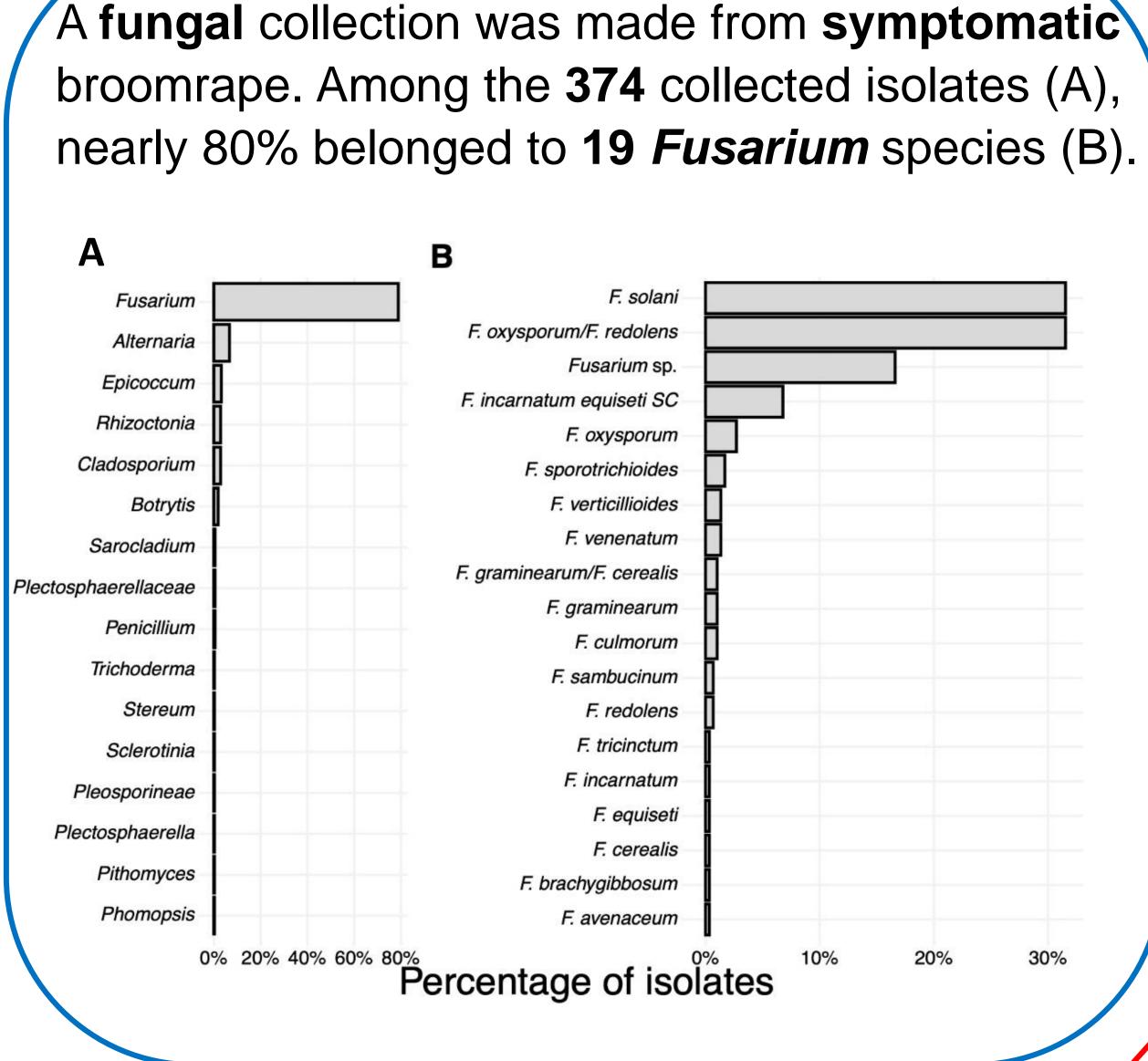
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Branched broomrape (*Phelipanche ramosa* (L.) Pomel) is an achlorophyllous root parasitic plant with a wide host range. Its complex management is leading to the abandonment of tobacco or oilseed rape cultivation in the most affected regions in France. Among broomrape regulation factors [1], soil fungi could be a relevant biocontrol lever.

Hypotheses: i) symptomatic broomrapes are indicators of a pathogenic fungus ii) the later will negatively impact broomrape's growth at young phenological stages but not rapeseed and iii) the biological candidate colonizes both plants but with a pathogenic action in broomrape, not rapeseed

Objectives: i) to identify soil fungi as potential biological agents ii) to evaluate their pathogenicity against broomrape and iii) to understand the tripartite interaction between broomrape, rapeseed, and pathogenic fungi.

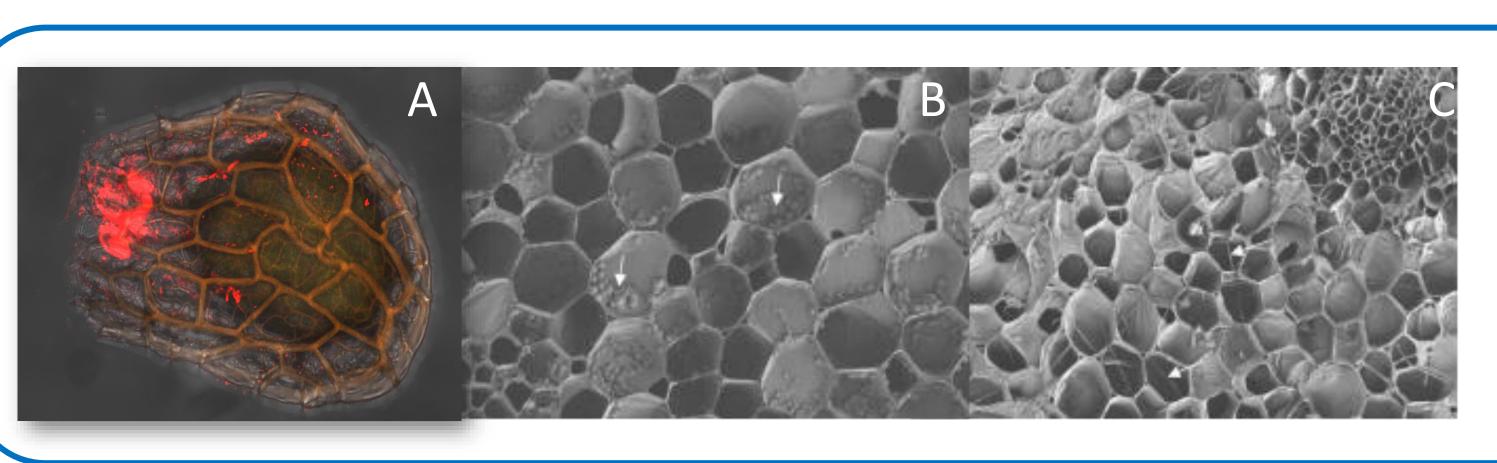


These isolates differences show their necrotic activity against the stems of the parasitic plant in in vitro conditions.

functional diversity by inhibiting seed germination of the parasite - The 20 bestperforming isolates showed differences in germination inhibition of *P. ramosa* at the intraspecific level. F. oxysporum strain, candidate C-2108 described in the literature [2] also C-NoF Germination rate with GR24 (%)

87 isolates representative of this diversity showed

Fusarium venenatum showed isolates dual competence, i.e. germination inhibition and necrotic activity, and were nonpathogenic to tobacco.



Cytological observations confirm that the fungi colonize the broomrape tissues (mycelium colored in red on photo A) and uses the starch reserves of the plant to ensure its colonization (see arrows, photo B, C).

Conclusions: The results highlight different and complex biotic interactions possible between broomrape, host plant and pathogenic fungi, more specifically *Fusarium* sp. in the rhizosphere [3]. A metabarcoding approach will enlighten the colonization mode of the fungus to understand its pathogenic virulence against broomrape. Understanding the Fusarium pathogenicity in this tripartite interaction is essential to implement an integrated control solution.