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Effect of certain cover crops, and flowering plant strips on pathogenicity and inoculum production of *Plasmodiophora brassicae* and *Sclerotinia sclerotiorum*

Background:

Cover crops and flowering plant strips are non-cash crops that are grown to protect and improve soil health. While cover crops have many benefits, they can also have negative effects, such as an increase in soilborne pathogens.

Objective:

Plasmodiophora brassicae and *Sclerotinia sclerotiorum* are two important soilborne pathogens that can have a strong impact on rapeseed cultivation. Both pathogens can be challenging to manage, and prevention is critical. This study aims to investigate the impact of specific plant species on the pathogenicity and production of primary inoculum by *P. brassicae* and *S. sclerotiorum*.

Methods:

Diverse plant species were separately inoculated with either *P. brassicae* or *S. sclerotiorum* isolates that varied in virulence. Disease incidence, severity, and the number of propagated primary inocula (resting spores or sclerotia) were assessed per crop species.

Results:

The results demonstrate that the virulence of the pathogens substantially influences both disease incidence and the quantity of propagated primary inoculum across various plant species. However, typical clubroot symptoms are only observed in the Brassicaceae family. Plants inoculated with aggressive *P. brassicae* display more severe symptoms, with 2 to 10 times greater intensity, larger gall formations, and a greater quantity of resting spores than plants inoculated with less aggressive isolates. Additionally, *P. brassicae* DNA was also detected in phacelia, blackgrass, field poppy and green pea, which do not belong to the crucifer family.

In contrast to *P. brassicae*, visible symptoms of *Sclerotinia* stem/leaf rot were observed in all tested plant species. However, the severity of the disease varied significantly among the plant species. Furthermore, the production of sclerotia was strongly dependent on both the plant type and *S. sclerotiorum* isolate. The more aggressive isolate produced more and heavier sclerotia than the less aggressive isolate. Additionally, the carpogenic germination test showed that the sclerotia germination rate and the percentage of apothecia production were greatest for larger sclerotia.

Conclusions:

The current study clearly demonstrates that in sustainable crop rotations with cover crops or flowering plant strips, it is necessary to distinguish between host plants that enable soilborne pathogens to complete their life cycle and accumulate new primary inoculum, and those that allow pathogen infection but not completion of its life cycle.

References:

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