O.43 - SIPPOM-WOSR: simulator for integrated pathogen population management for blackleg on canola

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Resistant cultivars are an effective way to reduce the structural dependency of cropping systems to fungicides. However, specific resistances usually lack durability. A model was developed to help design control strategies that i) limit pathogen populations and ii) preserve the efficacy of specific resistances. In addition to the limitation of the selection pressure, the reduction of the size of pathogen populations by combining cultural, chemical, biological and physical control methods should also enhance specific resistance durability. Due to its agronomic importance, the phoma stem canker/oilseed rape pathosystem was chosen as a case-study to develop SIPPOM, a Simulator for Integrated Pathogen POpulation Management. However, the structure of the model is generic in order to be easily applied to other pathosystems. SIPPOM is composed of 5 sub-models simulating primary inoculum production, ascospore dispersal, changes of the genetic structure of pathogen populations over time, infections and yield losses, and crop growth dynamics. Input variables describe the considered cropping systems and their spatial distribution, soil and climate, along with the initial size and genetic structure of pathogen populations. Output variables are disease severities, pathotype frequencies, actual yields, gross margins, Treatment Frequency Indexes, and cultural practice energetic costs. After independent evaluations of the modules, and a sensitivity analysis, SIPPOM was used to rank strategies with regard to their agronomic, epidemiologic, economic and environmental performances. This type of integrative model, with large temporal and spatial scales, is useful to help design integrated crop management strategies.