Changing GB blight populations: mating type and genetic fingerprint analysis

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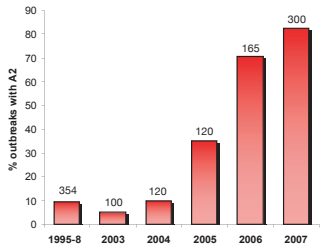
Background

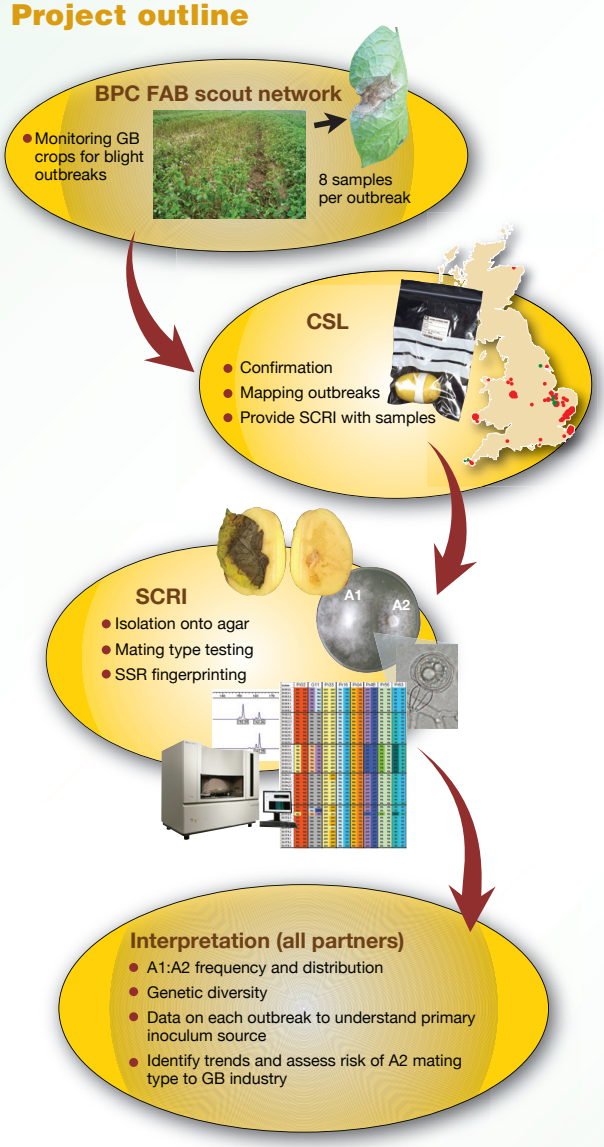
An increase in the frequency of the A2 mating type of the blight pathogen *Phytophthora infestans* has lead to concerns that more sexual oospores are forming in GB crops. This is a threat because: 1) soil-borne oospores are long-lived and may form a significant source of primary inoculum 2) in the longer term, genetic recombination improves the pathogens ability to adapt to control measures. The BPC are thus funding the current project to monitor the GB blight population in greater detail.



The proportion of sampled GB blight outbreaks in which the A2 mating type was found.

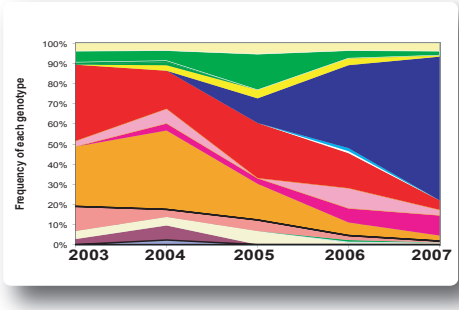
The number of outbreaks examined in each year are shown above each bar. (1995-8 data from Day et al., 2004)

Project outline



Results and conclusions

BPC 'Fight Against Blight' scouts have provided samples from more than 800 GB outbreaks (2003-07). In 2007, the A2 mating type was found in 82% of outbreaks; a dramatic increase since 2003. To interpret this we have used SSR markers to DNA fingerprint 2600 isolates. As the blue shading in the figure illustrates, the change in A2 frequency is primarily driven by an increase in a single clonal genotype (genotype 13). This type of blight first appeared late in 2005 and has increased from 12 to 71% of the GB *P. infestans* population. We have not observed a marked increase in novel pathogen genotypes that would suggest sexual recombination. Detailed analysis of specific early outbreaks supports this as we have not yet seen outbreaks typical of soil-borne oospore inoculum. However, analysis of genotype 13 suggests that it is more aggressive and fitter than the previous population. The impacts of this on blight management need to be considered.



Changing frequencies of *P. infestans* SSR genotypes over time. The red shading and all colours below represent the A1 genotypes; blue, pale yellow and green are the A2 types. The pale yellow section along the top represents novel *P. infestans* genotypes.