



**Optimal disease management is dependent on understanding the pathogens and their evolution**

The 17th EuroBlight workshop held in York in May 2019 was attended by 110 scientists and industry stakeholders from 22 countries. The delegates included representatives of similar networks in North America, Latin America, Asia and Africa, thus offering a unique global forum for the review of late blight and early blight. These devastating diseases are adapted to conventional and organic potato and tomato production, crops grown under commercial or subsistence practices and in both developed and developing countries. Under discussion were the striking scientific advances made since the previous workshop in Aarhus (May 2017), and the current challenges and opportunities for improved control and management strategies. Participants of the 17th EuroBlight workshop unanimously adopted the following statements:

The emergence of new clonal lineages of the late blight pathogen *Phytophthora infestans* in Europe was presented. Genotypes EU\_36\_A2 and EU-37\_A2 are spreading in north-west regions and replacing genotypes such as EU\_13\_A2 and EU\_6\_A1 and over the past 3 years, genotype EU\_41\_A2 has become established in previously sexual Nordic populations. Progress in genetic characterisation, including typing with SSR markers and genotyping by sequencing of selected effector genes, provide new opportunities to track emergences. The recent spread of older European *P. infestans* genotypes worldwide has also been tracked, including for example the recent discovery of genotype EU-2\_A1 in Latin America, eastern Asia and eastern sub-Saharan Africa, with potentially major consequences for disease control.

Population surveys have also been instrumental in understanding the composition of the early blight species complex dominated by *Alternaria solani* and *A. alternata*, and its epidemic dynamics. *A. alternata* is often associated with early attacks, whilst *A. solani* occurs later but has more severe impacts on yield. The use of specific molecular markers to target genes involved in the mode of action of active ingredients such as the strobilurin and SDHI fungicides, which are important for the control of early blight, has enabled a better understanding of the distribution of insensitive isolates in European potato-growing areas. Populations with resistance to more than one mode of action, which are particularly difficult to control, have been identified.

Despite these advances, and new quantitative data on the geographic distribution of major phenotypic traits, critical information which would allow population data to be used for predictive management of pathogen emergence and disease outbreaks is lacking. In particular, the connection between genotypic and phenotypic variation in *P. infestans* remains elusive. Reasons for the rapid changes in population structure are untested, in part due to the absence of accurate curated data on the distribution of fungicide use and cultivar deployment, which would allow quantification of selection in the pathogen population to these drivers.

**Recommendation 1:  
Develop the global genetic landscape**

**EuroBlight recommends that global efforts to monitor pathogen population changes are continued. Where possible, new markers closely predictive of specific phenotype should be developed. The global data should be compiled and collated into an integrated database along with information on fungicide use and cultivar deployment.**

**Euroblight is willing to collaborate with AsiaBlight, Tizon Latino, USABlight and AfricaBlight to build capacity to establish regional infrastructures for continuous population monitoring.**

**Addition of innovative tools to the blight control toolbox**

As pathogen populations are evolving quickly, the arsenal of sustainable control methods is also expanding and this was reflected in an increasing number of presentations in this area. For example, targeted breeding of resistant potato cultivars and the development of biocontrol options either through plant defence stimulation or microbial biological control. Decision Support Systems and risk assessment methods have been improved thanks to cutting-edge technologies including machine learning, in-field sensors and pathogen detection, GIS and satellite data. These innovations are at various stages of development and their use in practice, in some cases, will require changes to production systems.

**Recommendation 2:  
Adopt innovative IPM technologies**

**Faced with increasingly stringent regulations on pesticide approval and use and a desire to meet Integrated Pest Management targets, EuroBlight strongly recommends that efforts to develop, assess and implement innovative technologies are strengthened.**



***Participatory, multiactor IPM strategies are key to sustainable disease control***

The workshop re-enforced the added value of coordinated research, development and training. Activities are tailored to local needs and informed by all actors along the value chain. The need for rapid capacity building in many regions (e.g. Africa, Asia, Latin America) was highlighted. Modern infrastructure and dedicated staff are required to best fulfil R&D requirements and that requires sustainable funding sources and close collaboration between regional blight networks. The aim is to develop harmonised protocols and databases, establish shared resource collections (isolate reference and DNA collections, gene repertoires), and disseminate critical knowledge.

***Recommendation 3: Work together and share resources***

**EuroBlight considers that a participatory, multi-actor approach is necessary to deliver tangible improvements and a long-term strategy for the control of late and early blight. For this to be achieved, attention should be given to efficient networking activities and the development of shared resources. Integrated strategies for the simultaneous control of early and late blight will be important.**

**Euroblight recommends that awareness of the threats posed by Solanaceous blights, and opportunities for their sustainable control is better communicated to all relevant actors including agrochemical companies, breeders, retailers, and particularly international donors and funding agencies. It will be necessary to secure lasting financial and in-kind support for the activities undertaken by the blight networks worldwide to protect vital food crops.**

***Contact***

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