

IPM Blight 2.0 at a glance

D. Andrivon, project coordinator

*C-IPM Projects kick off meeting
Brussels, 5 December 2016*



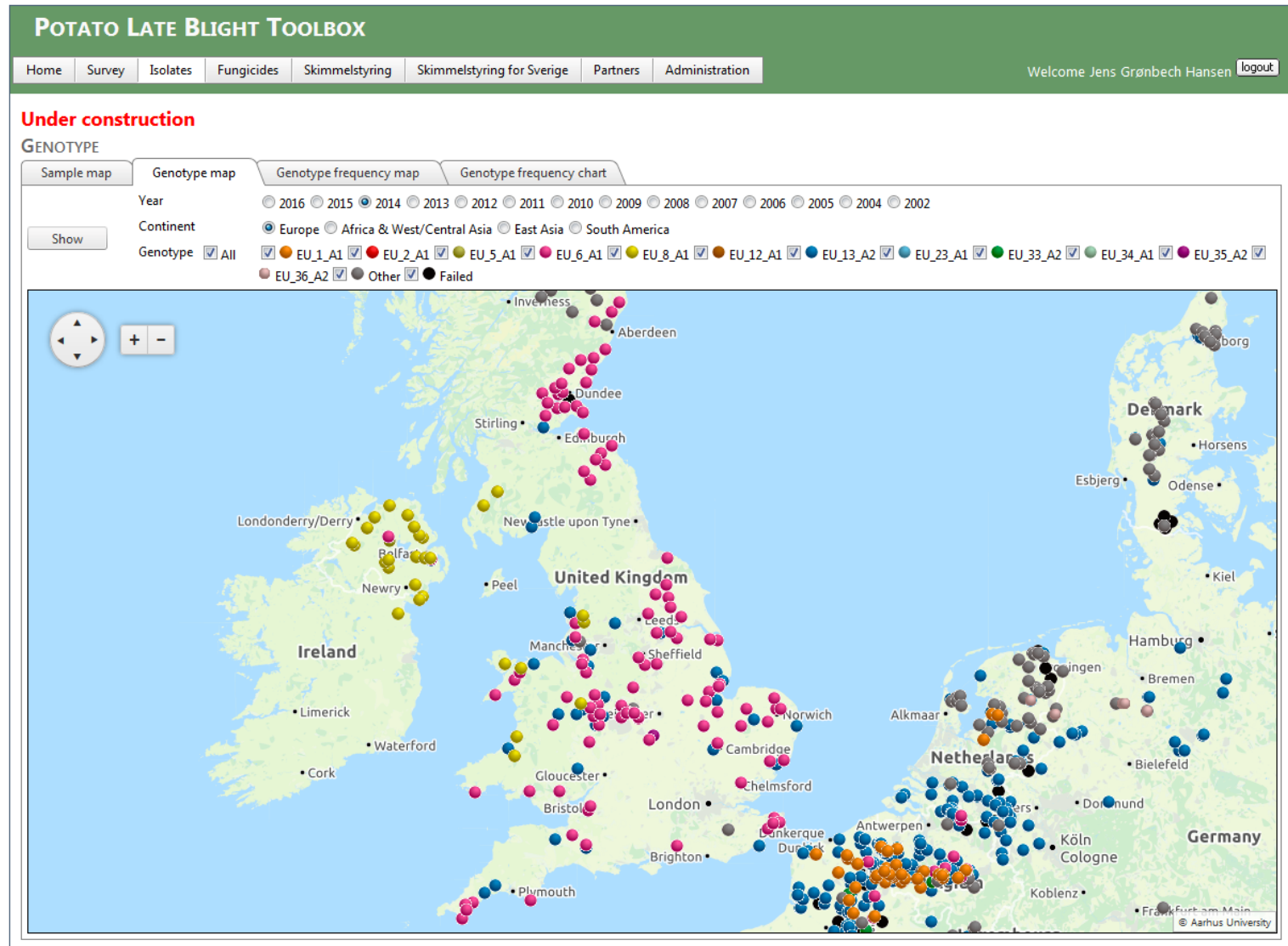
Phytophthora infestans on potato

- **A destructive...**
 - Strong defoliation
 - Fast epidemics
 - Over 900M€ annual cost in Europe

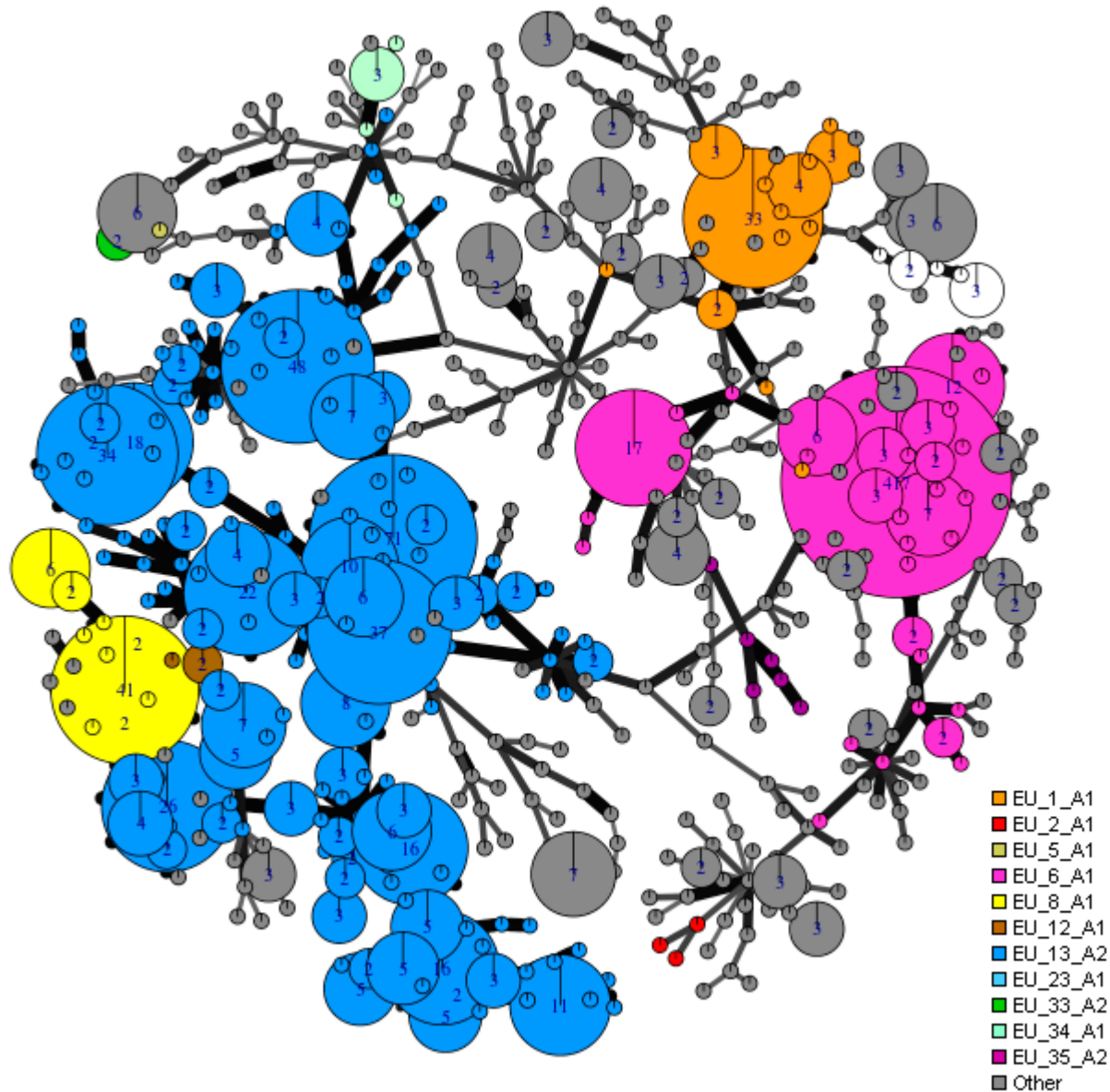


- **... and re-emerging pathogen**

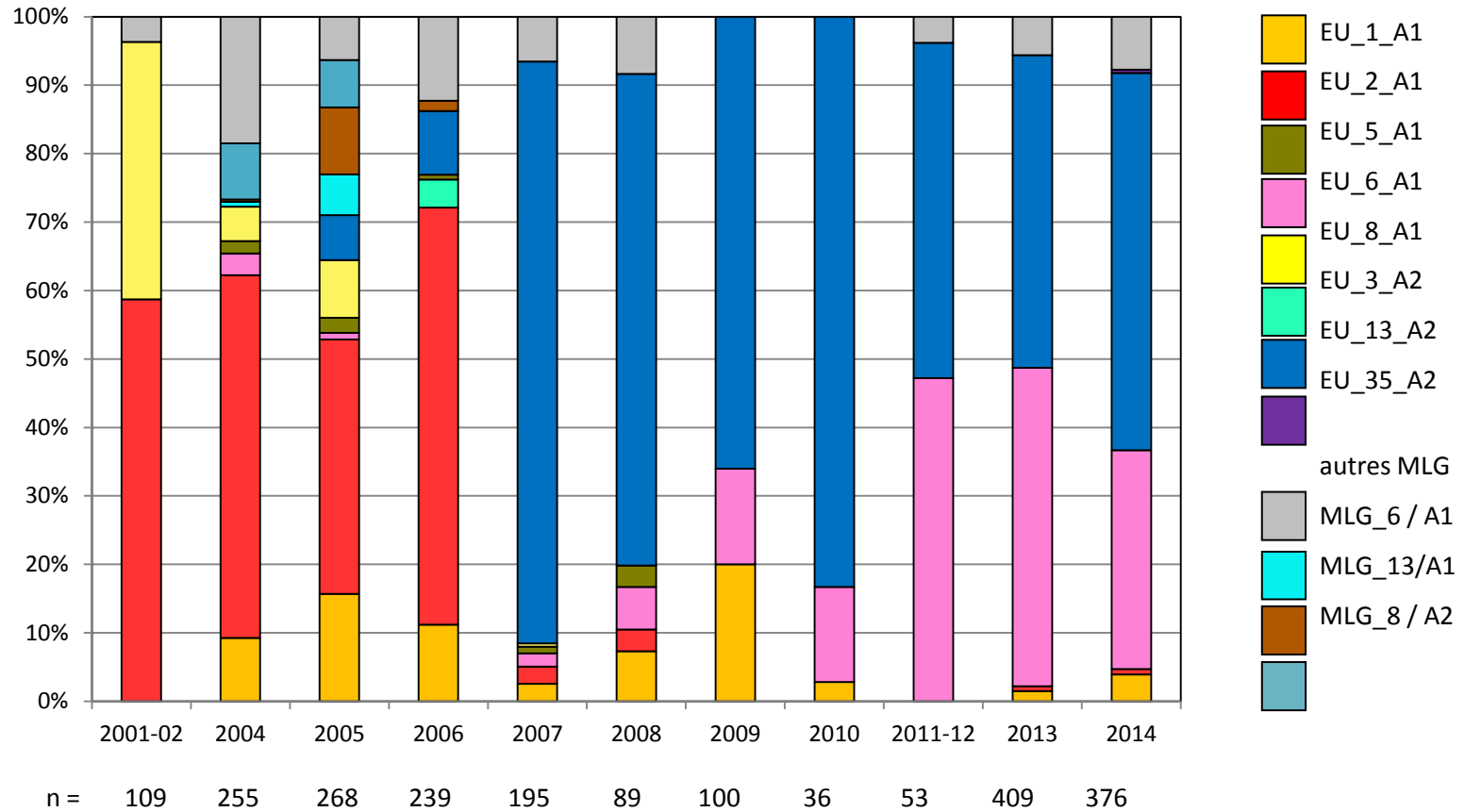
Genotype diversity and distribution in Europe



Clone diversity: between and within



Rapid changes in clones

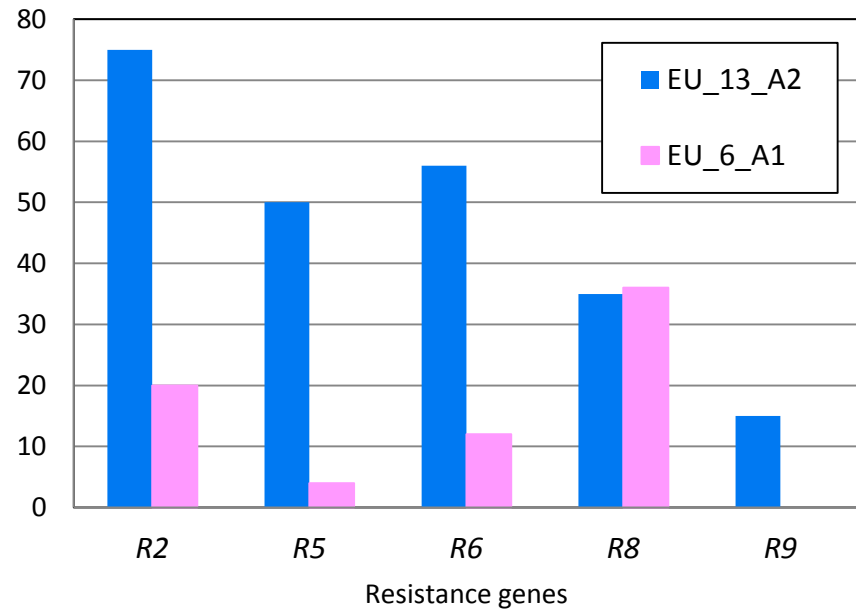


Understanding population changes

Problem 1: Genotypes may not predict phenotypes

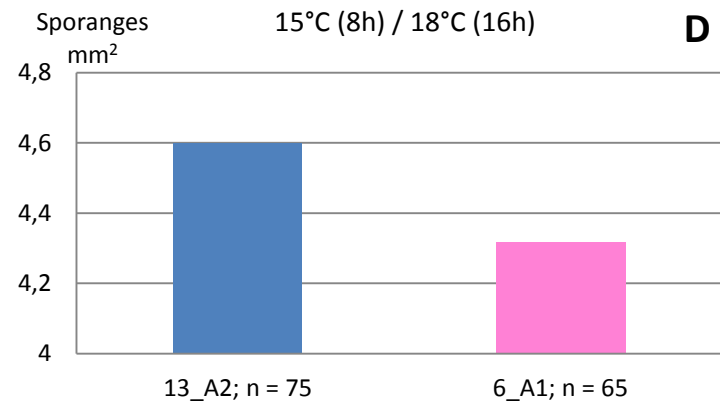
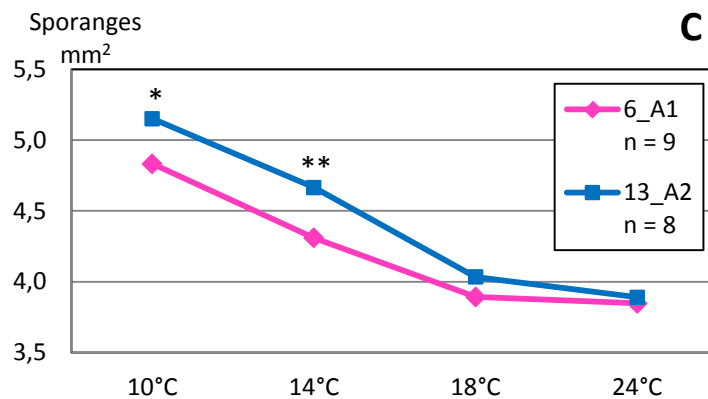
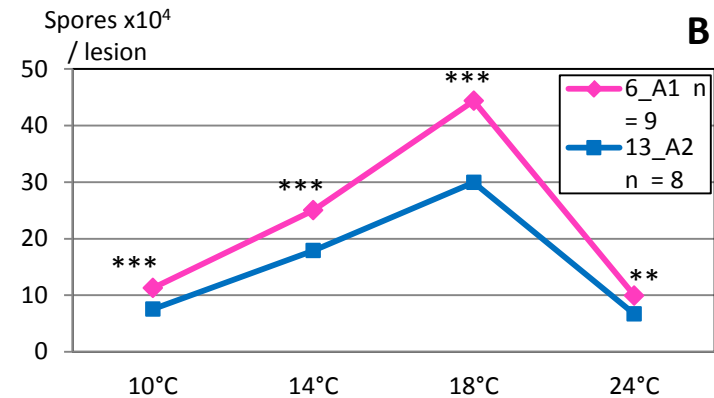
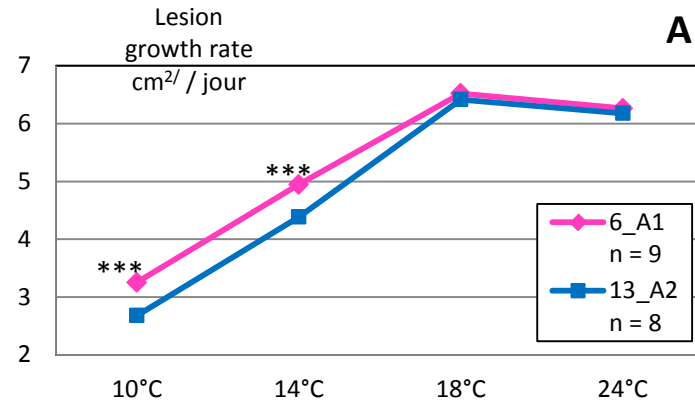


% virulent
isolates

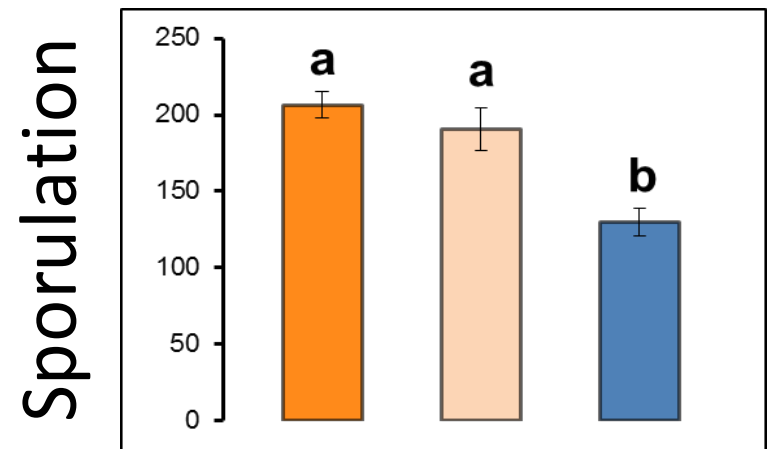
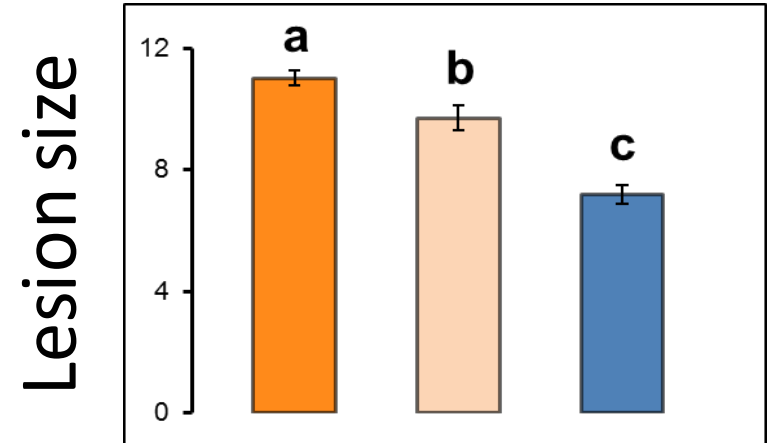
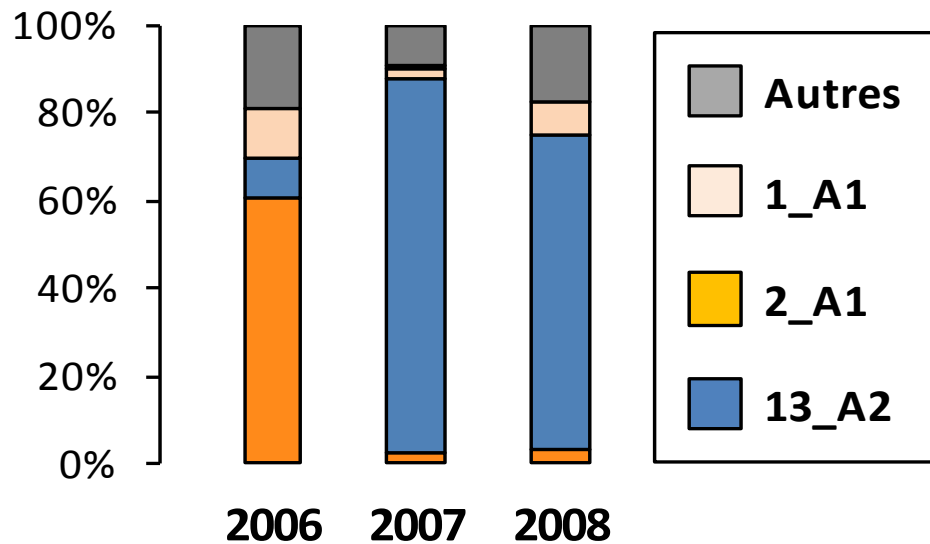


Understanding population changes

Problem 2: All clones do not respond equally to climate



One good news: the nastiest ones do not (always) win



Open issues

- We can quite accurately describe and explain past changes...
- ... and we can follow current evolutions...
- But:
 - we still have a hard time predicting future changes
 - > when will the next change occur?
 - > who is going to be the next invader?
 - > What are the key traits behind invasive success and/or lasting presence in populations?
 - Population data are ignored in current DSS

The needs – EuroBlight Statement - 2015



15th EuroBlight Workshop - Statement

Brasov, Romania 10-13 May 2015

'Designing sustainable management strategies of early and late blight in potato'

25 June 2015

Coordinators: Jens G. Hansen, Alison Lees and Huub Schepers



What is EuroBlight?

Potato late blight (*Phytophthora infestans*) and Early blight (*Alternaria* spp.) continue to severely damage both the foliage and tubers of potato crops, and also to cause severe losses in other important food crops, such as tomato.

Despite active research and recent breakthroughs, further investigations are still needed to fully achieve integrated pest management (IPM) strategies. Remaining questions include: what are the genotypic (DNA) and phenotypic (behavioural) diversity and the mechanisms of evolution of the European meta-population of *P. infestans*? how can we use this information to develop new innovative and more effective IPM strategies (IPM2.0)? why are these diseases so difficult to control sustainably? how can we sustain the use of both efficient fungicide active ingredients and host resistance genes whilst simultaneously minimising the risk that the pathogen overcomes the efficacy of these important control measures? These, and other, questions were the rationale for establishing 'EuroBlight', a network of European scientists, with initial funding by the European Union.

EuroBlight is a very active consortium of scientists and industry representatives, which has met regularly since 2006 with a simple overall objective: to identify, evaluate and combine the best possible tools to predict, manage and control blight diseases in the field. EuroBlight is a unique collaborative platform to tackle the challenges that early and late blights pose in Europe and worldwide. Its biennial workshops allow key research and extension priorities to be identified and formulated into collective Statements that can serve as the core principles of joint actions and international collaborations to improve IPM strategies.

The 15th EuroBlight Workshop, held in Brasov, Romania in May 2015, brought together over 100 participants from all parts of Europe, South America, USA, Israel and China to achieve this aim.

The European-wide monitoring initiative of *P. infestans* populations carried out by EuroBlight partners in 2013 and 2014 (> 2200 isolates collected and genotyped using SSR markers) confirmed that the populations are constantly evolving and that some of them are subject to repeated biological invasions by novel genotypes ([read news story about this](#)). Such genetic changes may jeopardize the ability to develop durably resistant cultivars and the sustainability of other control measures. It is thus essential to understand the mechanisms behind the changes and also to their relation to human intervention (e.g. pathogen transportation with plant material or cropping practice) and to the changing climate.

Together with the comprehensive web-based resource developed within EuroBlight i.e. hosting harmonized research protocols and extensive databases allowing the compilation and sharing of data on pathogen populations, host resistance and fungicide characteristics, the research and extension efforts carried out within the network pave the way for the set-up and adoption of 'smart control', IPM strategies for early and late blight in Europe.

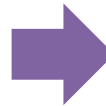
The recent Europe-wide late blight monitoring initiative demonstrated the value and necessity of constant monitoring of populations and characterization of invasive genotypes in order to understand and predict changes. It directly influences the development and deployment of resistant cultivars, the performance of disease warning systems and the efficacy of plant protection products. A coordinated and continuous monitoring effort would be best supported through National Action Plans relating to IPM implementation in EU member states.

Major achievements and breakthroughs on past EuroBlight statements

Major issues of relevance to policy making in Europe

Recommendations:

*Monitoring of the meta population of *P. infestans* in Europe and beyond*



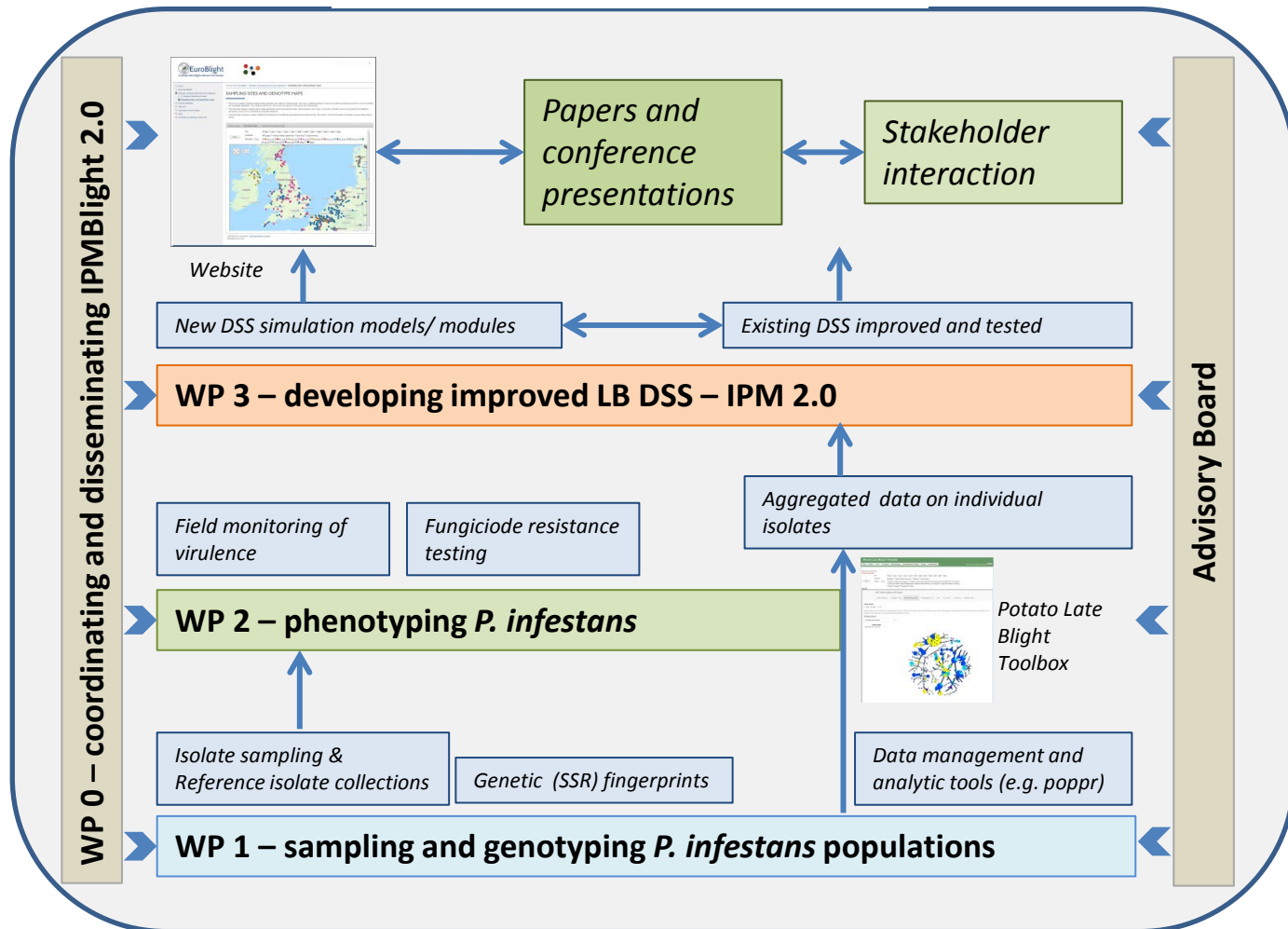
Linking genotypes to phenotypes

EuroBlight engages in the development and improvement of DSS adapted to IPM2.0

Fostering international collaboration

An answer : IPMBlight2.0

IPM2.0 for sustainable control of potato late blight - exploiting pathogen population data for optimized Decisions Support Systems



IPMBlight 2.0 – partners



NAES



IPMBlight 2.0 – deliverables and communication

- **New knowledge**
 - Population structures
Population phenotypes and variability
Phenotype x genotype connections
 - Methods and protocols
- **Operational tools**
 - New/improved open DSS modules
 - Network of reference labs for efficient epidemiovigilance (connected to Euroblight)

What have we done already?

Advisory Board appointed

Kick Off meeting, Paris, 04.2016

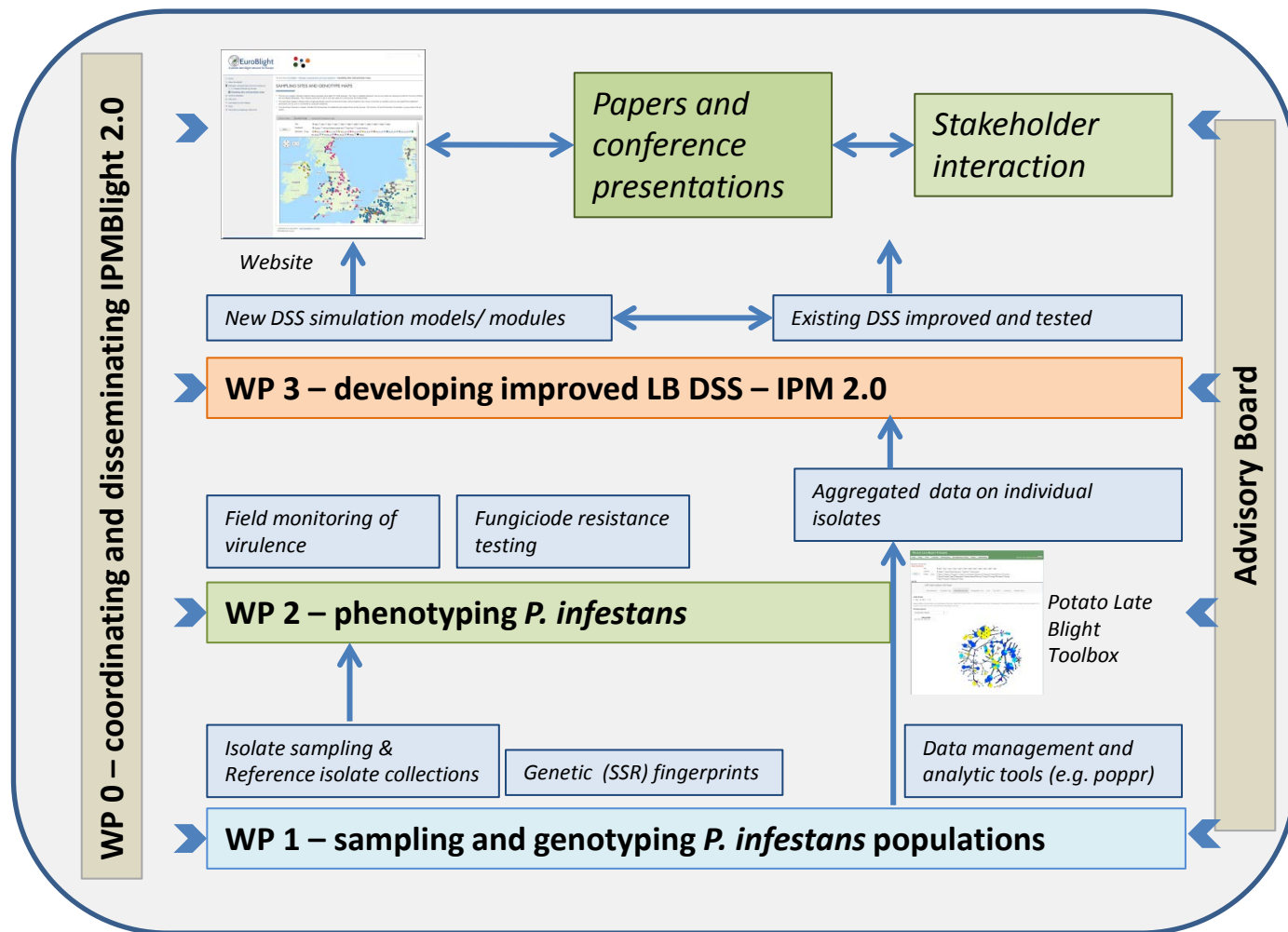
Contracts signed

Web meeting room

Project announced

Outlines for 3 papers drafted

Presentations being prepared for Euroblight 2017 workshop



2016 sampling completed

2016 isolates genotyped

2016 collection established

Data upload started