Science For A Better Life

Infinito and its activity on different isolates of A2 & A1 mating type of *P. infestans*

EuroBlight Workshop Cyprus - May 14th 2013

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Phytophthora infestans adaptation…

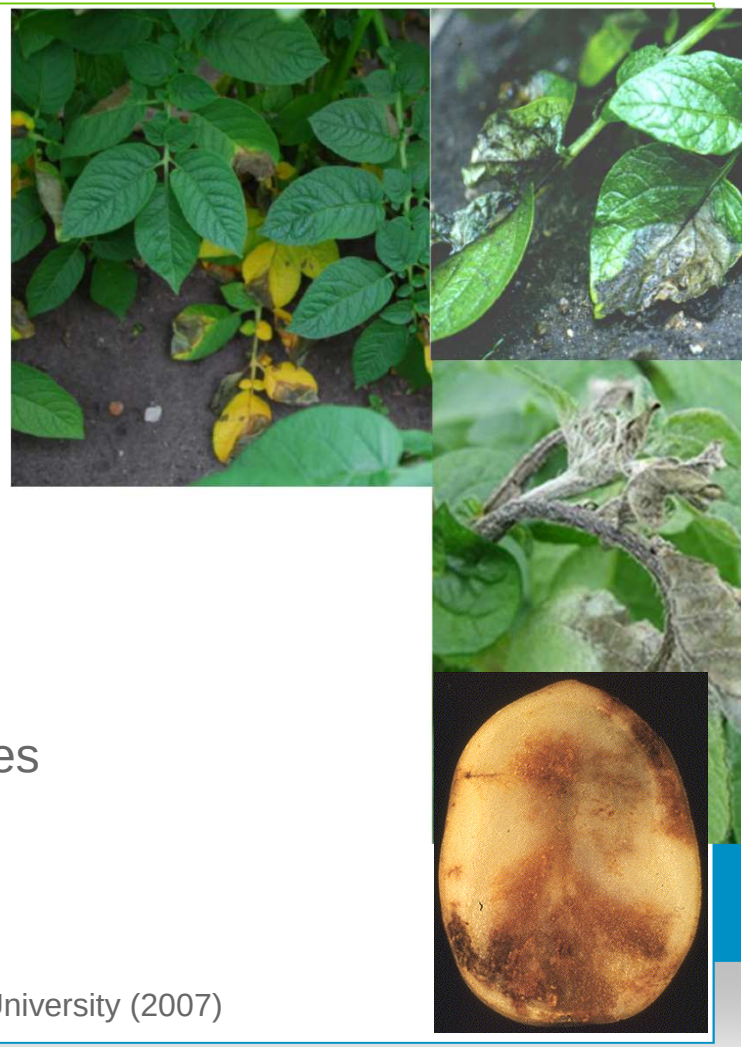
Increased aggressiveness - A2 mating types

Sexual recombination in oospores

Higher genetic variability in Phytophthora

Ongoing selection of aggressive strains:

- Shorter incubation time
- Sporulation intensity
- Infection efficiency
- Increased stem and tuber infection
- Increased growth even at lower temperatures



Source: Dr. Lees – James Hutton Institute (2011), Dr. Nielsen – Aarhus University (2007)

Increased virulence on potato cultivars - A2 mating types

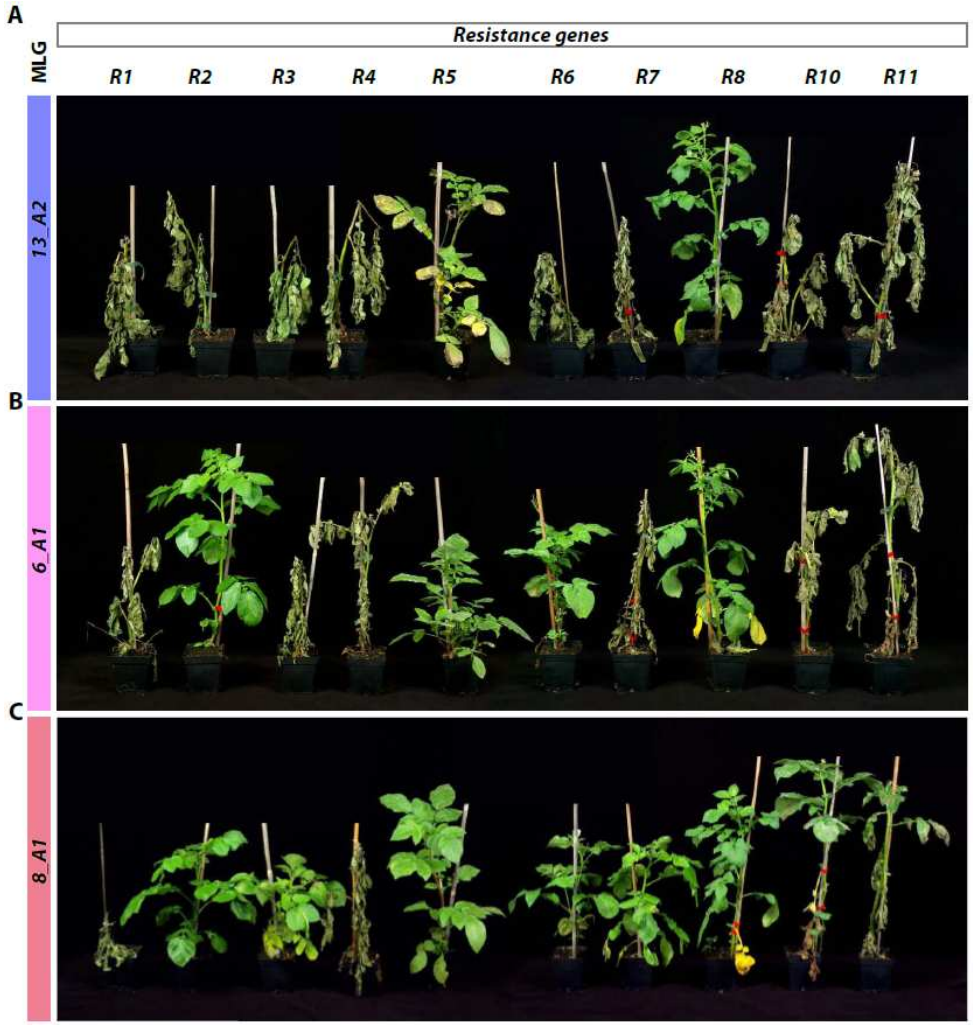
Virulence profiles of three *P. infestans* multilocus genotypes (MLGs): *13_A2, 6_A1* and *8_A1*.

Plants of Black's differential *R* gene series (excluding *R9*) at 7 days post inoculation with

(A) Isolate 06_3928A (MLG***13_A2***, virulence 1, 2, 3, 4, 5, 6, 7, 10, 11),

(B) Isolate 06_4100A (MLG ***6_A1***, virulence 1, 3, 4, 7, 10, 11),

(C) Isolate 06_4256B (MLG ***8_A1***, virulence 1, 4, 7, 11).



Source: Cooke DEL *et al*., 2012. Genome analyses of an aggressive and invasive lineage of the Irish potato famine pathogen. PLoS Pathogens 8(10)

A2_Green 33 occurrence and distribution

Phytophthora genotype Green 33 belongs to A2 mating type first detected in The Netherlands in 2009.

Green 33 is an aggressive isolate able to replace other aggressive A1 and A2 isolates of *P. infestans* such as A2_Blue 13

Green 33 increased in The Netherlands from 9% (2009) to 20% of the population in 2011

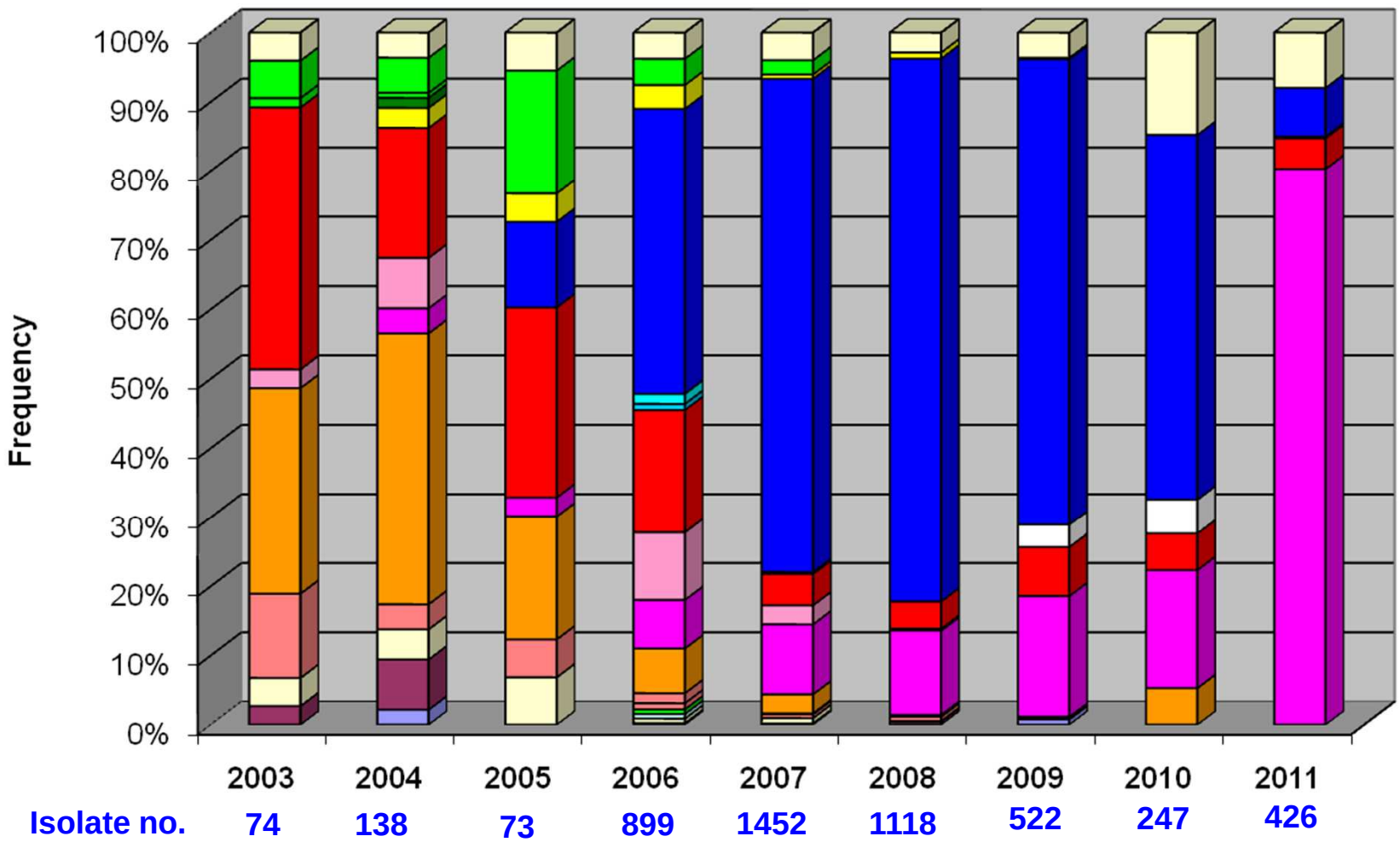
Green 33 dominates the *P. infestans* population in fluazinam treated fields

Green 33 is distributed all over The Netherlands…

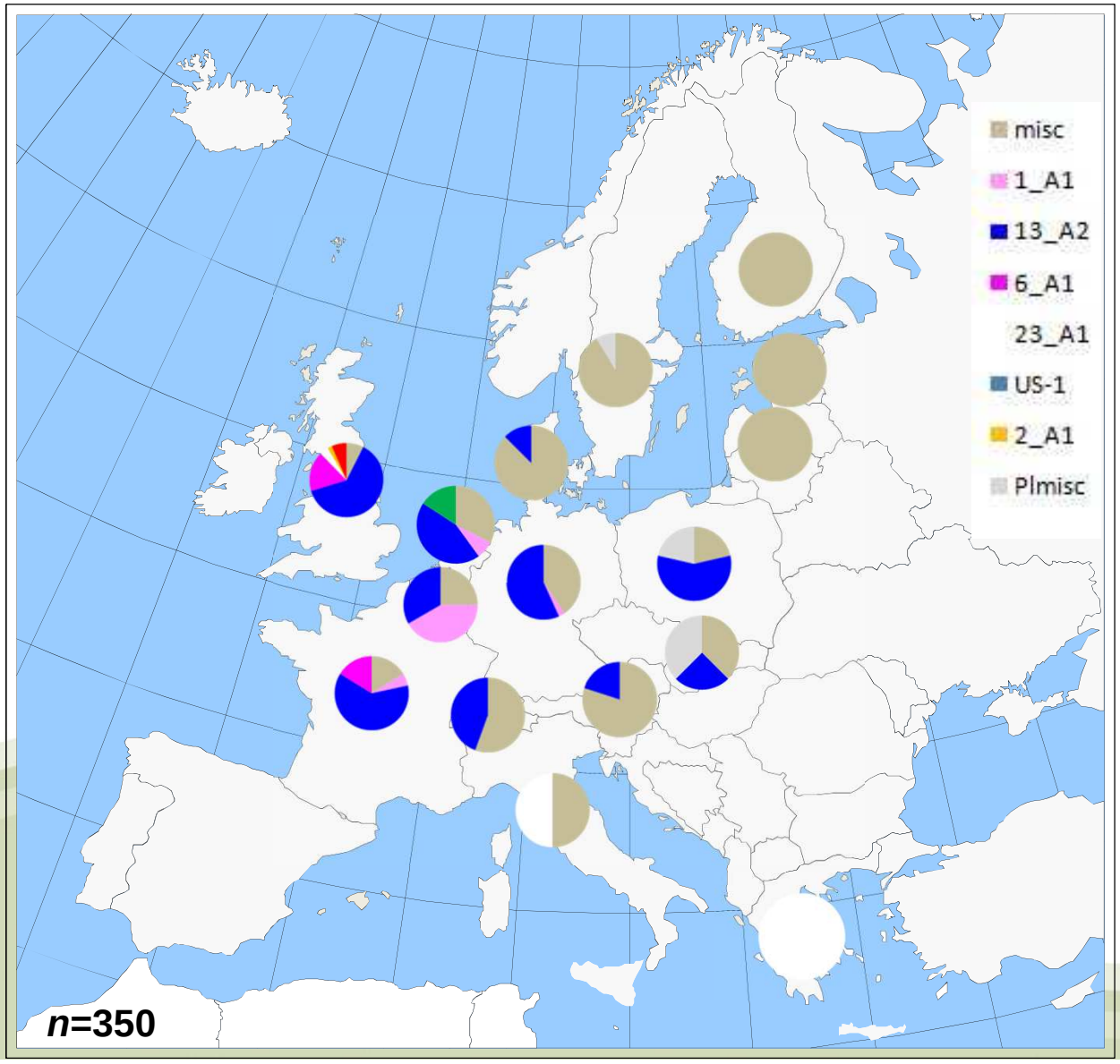
Source: Wageningen UR /PPO 2011

Great Britain *P. infestans* population change

The James Hutton Institute

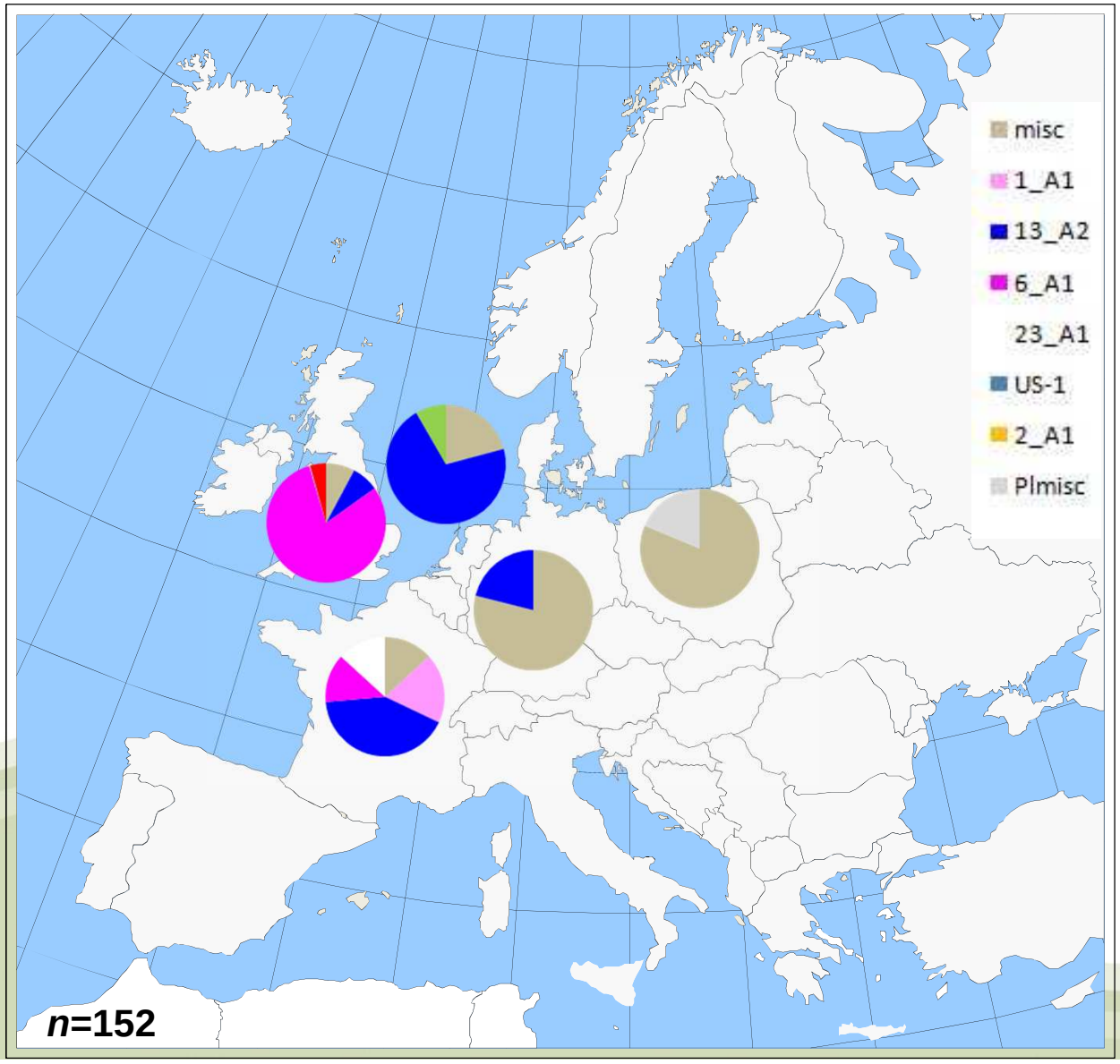


P. infestans genotypic diversity NW Europe (2008- 2010)



- **13_A2 present in many countries**
- **A high proportion of novel ‘misc’ types particularly in East**
- **New clonal genotypes in East (Plmisc and and NL green33)**
- **23_A1 originally from tomato more common in Italy and Greece**
- **Active collaboration among EU scientists and industry**
- **Combined dataset of EU-wide monitoring**

P. infestans genotypic diversity NW Europe (2012)



- **France (n = 53) the population remains mainly clonal**
- **Germany (n= 57) fewer 13_A2 isolates and more novel misc genotypes**
- **Netherlands (n=24) 13_A2 dominant with misc and genotype 33 also present**
- **Poland (n=16) One Polish clone and many diverse isolates**
- **UK 2011 (n=288) dominance of 13_A2 slipped in 2011**

BCS greenhouse trials - PHYTIN BCS strain*

- Protective application 1day before inoculation at 4 weeks old potato plants
- Inoculation with 10.000 Spores/ml
- Evaluation after 7 days

* Sensitive field isolate Germany 2008

BCS greenhouse trials - PHYTIN Green 33*

- Protective application 1day before inoculation at 4 weeks old potato plants
- Inoculation with 10.000 Spores/ml
- Evaluation after 7 days

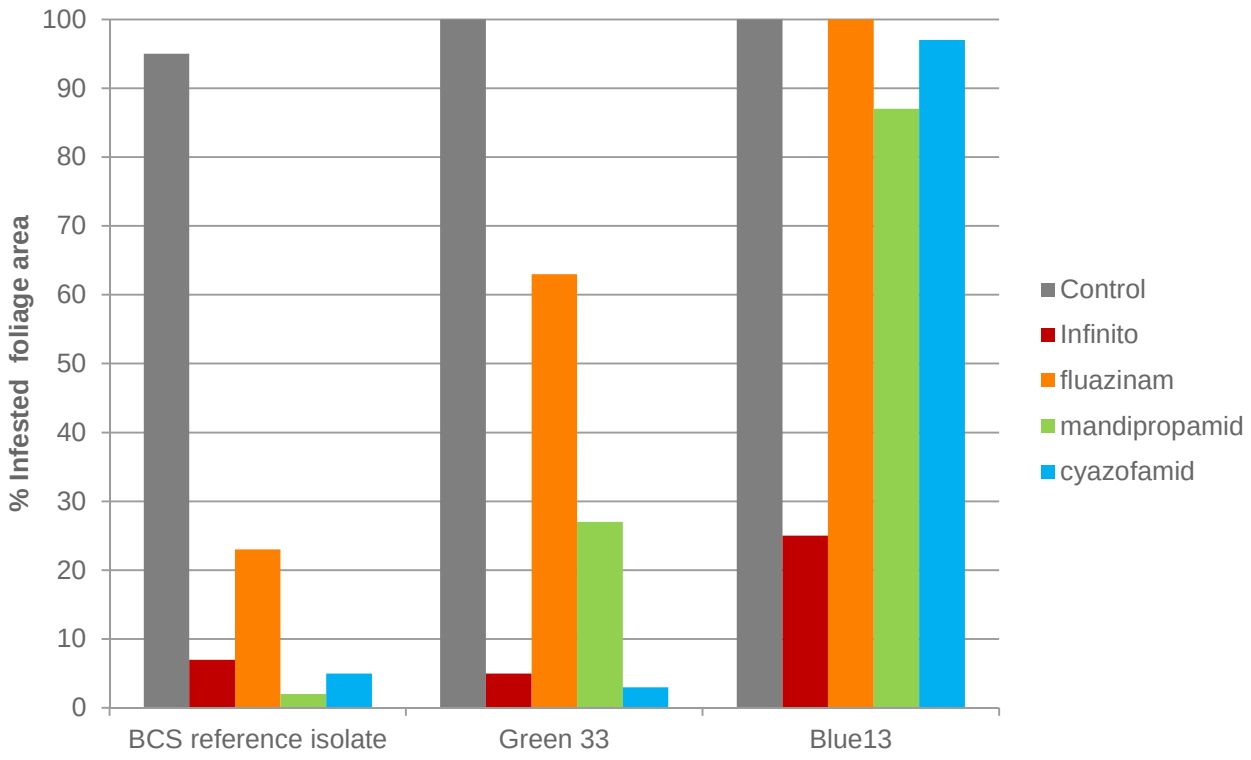
* PHYTIN_NL_2012_008, Genotyping 2012 Netherlands

BCS greenhouse trials - PHYTIN Blue 13*

- Protective application 1day before inoculation at 4 weeks old potato plants
- Inoculation with 10.000 Spores/ml
- Evaluation after 7 days

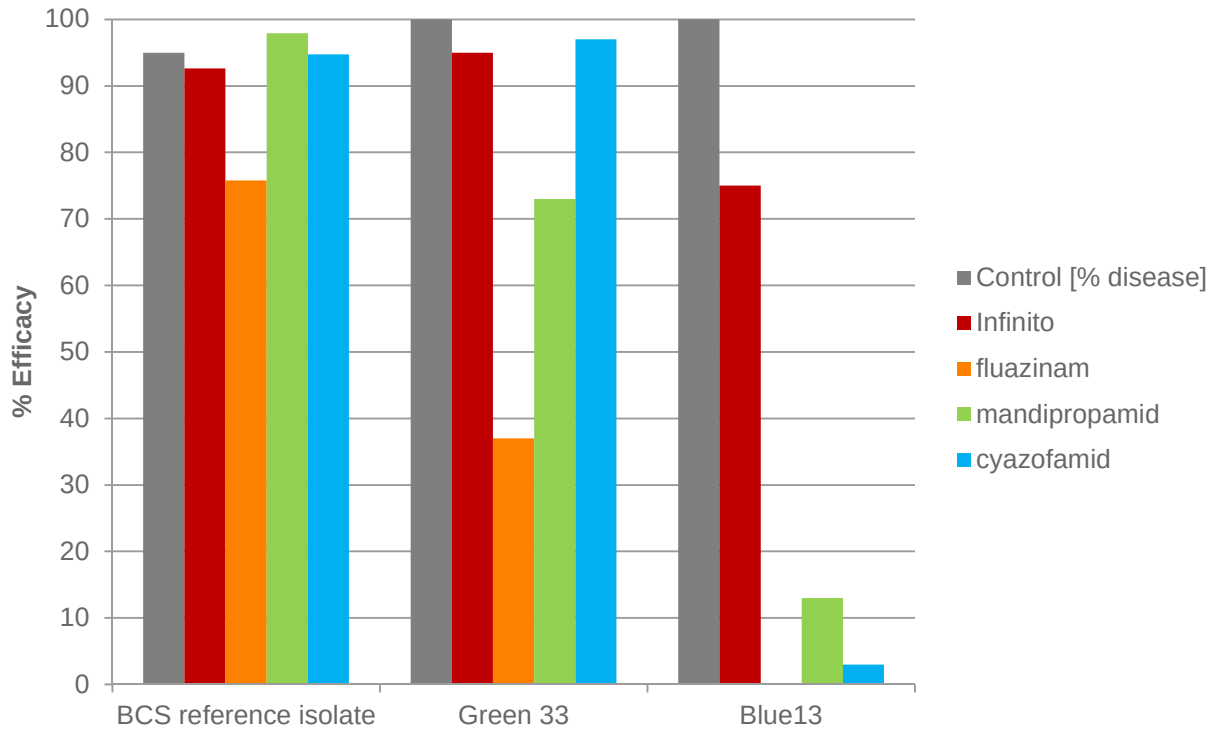
* PHYTIN_DE_2012_015, Genotyping 2012 Germany

Intensity of infestation



A2_Blue 13 is more aggressive compared to the reference isolate and A2_Green 33
Infinito provides excellent control on both _Blue 13 and _Green 33

Fungicide efficacy on A2_Green 33, _Blue 13



Infinito provides excellent control on both A2_Blue 13 and A2_Green 33

Summary

- BCS conducts annual monitoring programs to evaluate shifts in the European population of *Phytophthora infestans*

- Monitoring results from Infinito against different isolates & genotypes from 2012 indicate no shift in sensitivity to Infinito in either A1 or A2 genotypes

- Infinito proved to have high efficacy on both A2 genotypes, A2_Green 33 and A2_Blue 13

- Infinito, still the best product against *Phytophthora infestans* in the market, will be recommended by BCS in spray programs in alternation with other fungicides

Acknowledgments

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Thank you!