EuroBlight early data release, 2024

EuroBlight released the first set of genotype results, 2024 late November, - now totalling approximately 2000 results from all over Europe. More data to come.

26. November 2024, Jens Grønbech Hansen, Geert Kessel and David Cooke

Given concerns at the impact of the EU43 and EU46 lineages of *P. infestans*, the EuroBlight monitoring team here releases an early indication of the status of the 2024 population. Most sponsors and partners have been providing FTA card samples earlier than usual and the teams at the James Hutton Institute and INRAE have been genotyping and reporting back on these samples throughout the season. We now have sufficient representative data to provide this update but there are more datasets to come (for example the Nordic regions) over the next month or so. The data was released to the public side of the EuroBlight database on the 26 November.

A summary of the results to date:

- The *P. infestans* population in Europe in 2024 was dominated by the EU36 genotype. The EU43 genotype has decreased in countries where it was problematic in 2022-2023, but it has spread to new countries, Poland, Austria, Serbia and southern Germany. The EU46 genotype has increased slightly. Initially found in the Netherlands and NW Germany in 2023 it has now spread into Belgium, Denmark, Wales and Scotland. In general, EU36 is however dominating in west and central Europe and isolates from the group “other” are dominating in the northeast of Europe. New fungicide resistant clones (EU43 and EU46) are present and spreading but seem to be controllable through modified fungicide control strategies.
- The frequency of EU43 in the samples examined to date has decreased from 25% in 2023 to 8% in 2024 with some variation among countries; for example, 16% (n = 328) in 2024 in the NL, 15% (n = 227) in DE and 13% (n = 165) in BE. In Denmark the proportion of EU43 dropped to 5% (n=110) in 2024 from 24% (n=144) in 2023 and 64% (n=185) in 2022. A similar decrease in the frequency of EU43 was found in NL, from 55% in 2023 to 16% in 2024. More information on EU43 in this paper: "The EU43 genotype of Phytophthora infestans displays resistance to mandipropamid".
- The frequency of EU46 sampled in the EU has increased from 3.5% in 2023 to 4.6% in 2024 with considerable regional variation; for example, 12% (n = 328) in NL in 2024, 18% (n = 227) in DE and 1% (n = 165) in BE. EU46 was first reported in 2023 in the NL, northwest DE and one isolate in the south of Denmark. In NL the frequency of EU46 has slightly increased from 11% in 2023 to 12% in 2024 and is mostly found in the northeastern starch growing region of the Netherlands and across the border in NW Germany. In 2024, EU46 was found for the first time in Belgium, Wales and Scotland.
- EU36 is an aggressive genotype and dominant across many parts of Europe. At the European level, this clone has increased from 37% in 2023 to 57% in 2024. So far, we have no indication of significant fungicide resistance among isolates of this clone. Additional phenotypic testing is required to better understand its success. It is for example, reported that isolates in the

EU36 group can defeat sources of single and double R-gene blight resistance. We should bear in mind that the current sample is skewed by EU36's 64% incidence in Great Britain (n=755).

- EU45 is a clone that is steadily expanding in the EU. It was initially sampled in Germany in 2019. Then found in France in 2021, Belgium and Czech Republic in 2022, The Netherlands in 2023 and in Austria and Switzerland in 2024. In Germany the current frequency of EU45 is 12% and it is mainly found in the south. In Switzerland the frequency of EU45 is 57% (N=7)
- Genotyped samples with results, EU n=1986 by 26 November 2024

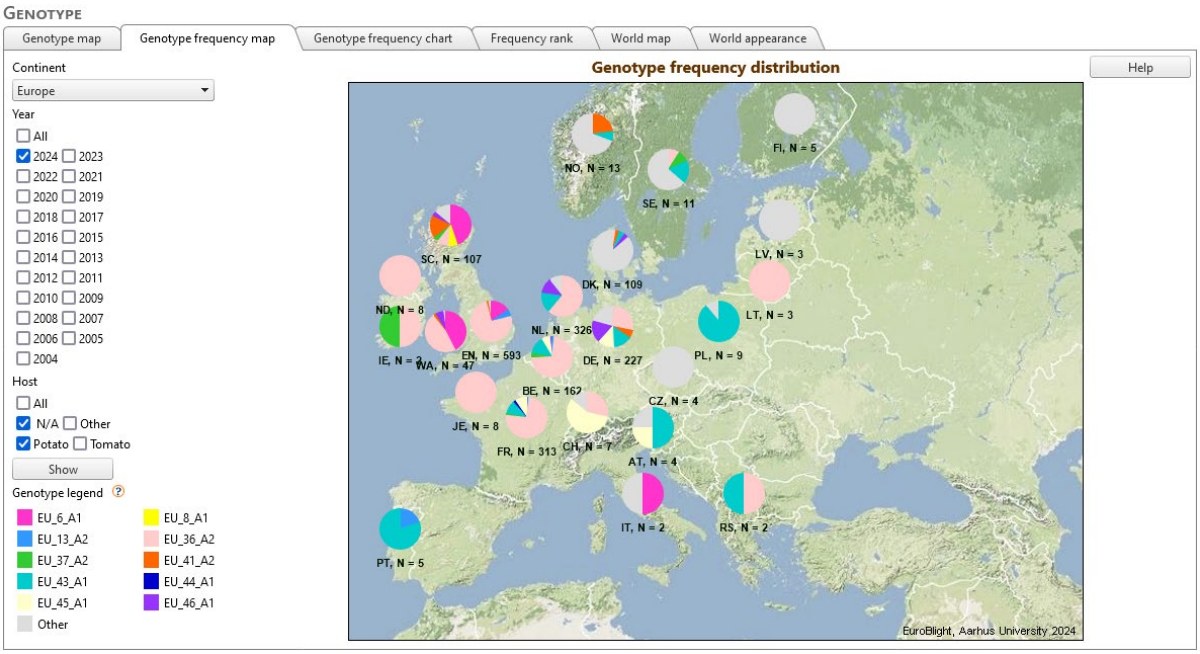

Figure 1. Genotype frequency map, Europe 2024

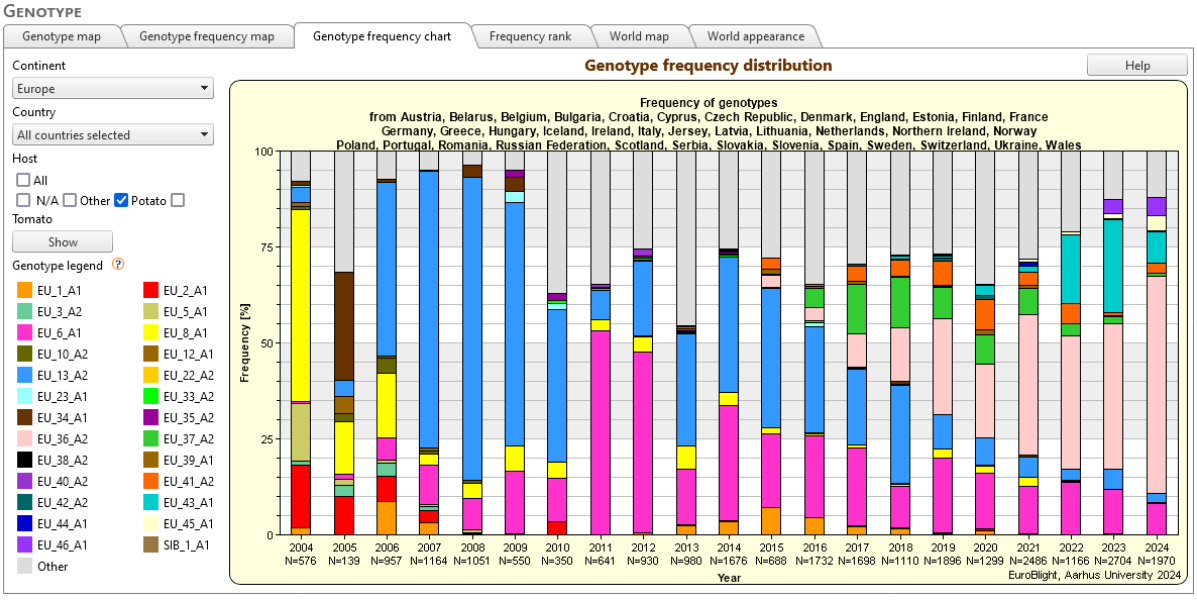

Figure 2. Genotype frequency chart, Europe 2024

Why is the frequency of EU43 decreasing in both Denmark and the Netherlands?

It is now clear that resistance to CAA fungicides is prevalent in EU43. In addition, OSBPi resistance is found in EU43 and in EU46. CAA resistance in EU43 caused significant control problems in Denmark in 2021 & 2022 and similarly fungicide resistances in both EU43 and EU46 caused severe problems in the Netherlands in 2022 & 2023. In a very challenging 2024 season the current evidence (Nov 2024) suggests that control over potato late blight has been regained. The key change in both countries was a shift in fungicide control strategy: from block applications with single products towards a fully-fledged anti resistance strategy, mixing and alternating fungicide mode of action in combination with the use of a DSS for timing (outlined at the EuroBlight workshop by Lars Bødker here). In 2024, the Danish population was highly influenced by early oospore infection. EU43 was not found until last week of June. Phenotypic results on virulence and aggressiveness from Aarhus University (DK) show that isolates from the "Other" group (most likely from oospores) are significantly more virulent and more aggressive (especially sporulation capacity) than the clones EU43 and EU41. The many early infections from oospores, effective control of the clones (EU43 and EU46) and the fact that variants from the "other" group are both relatively virulent and aggressive might explain the success of "other" variants in DK – now comprising 85% of the population (Mean for the period 2006 to 2023 = 60%).

The evidence generated via the EuroBlight monitoring has been critical in informing potato blight management in 2024. Revised strategies that were shaped by researchers, the agrochemical manufacturers and Fungicide Resistance Action Committee (FRAC) reports were implemented by agronomists and growers across Europe and have made a difference in suppressing fungicide resistant genotypes. This success should be celebrated. More work, data and collaboration are nevertheless required to continue this progress across all regions into 2025.

The EuroBlight concept relies on our collective effort to paint a detailed picture across the European population of *P. infestans*. When pending results and repeated analyses of samples that failed on the first run are available, we will complete a more detailed report and press release.

Genotype maps and charts are available here:

https://agro.au.dk/forskning/internationale-platforme/euroblight/pathogen-monitoring/genotype-map

https://agro.au.dk/forskning/internationale-platforme/euroblight/pathogen-monitoring/genotype-frequency-map

https://agro.au.dk/forskning/internationale-platforme/euroblight/pathogen-monitoring/genotype-frequency-chart

We thank all partners and sponsors that have contributed with samples and data this year. A full list will be provided in the later data release. We would also like to acknowledge James Lynott and the rest of the team at Hutton who have worked hard to process the samples throughout the season, and AU for doing the data management and visualisation of the results.

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