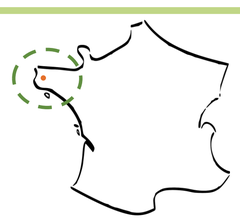
Late blight situation in northwestern France explained through three years of trials and a specific case study within the IPMorama project

Simon, J.[1,2], Le Roux, B.[1,3], Méar, A.[1,2], Borrelli C.[1,2], Barbary, A.[3], Mabire, C.[4], Viguié, C.[5], Kessel, G. [6], Prodhomme, C [7], Marhadour, S.[1,2]

The oceanic climatic conditions observed in Ploudaniel (Brittany, northwestern France) are highly favorable to late blight (LB) development, with wet summers and relatively low temperatures ①. This study:

- Describes the high LB pressure in this area based on several years of field trials dedicated to the characterization of genetic resistances within a genomic selection panel ② to illustrate the LB conditions of the IPMorama trial ③,
- Presents preliminary results from a trial conducted in 2025 under these high-pressure conditions, focusing on the management of LB using more resistant varieties within the framework of the IPMorama EU project ③.

1 Oceanic, mild and wet climate in Ploudaniel - northwestern France



Monitoring data from the INRAE CLIMATIK platform

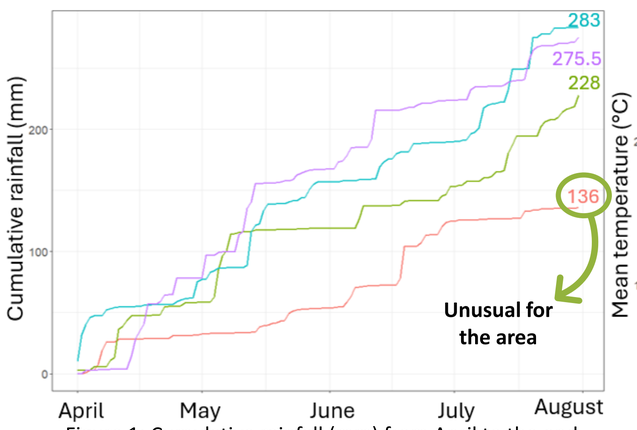


Figure 1: Cumulative rainfall (mm) from April to the end of July in 2022, 2023, 2024 and 2025 in Ploudaniel

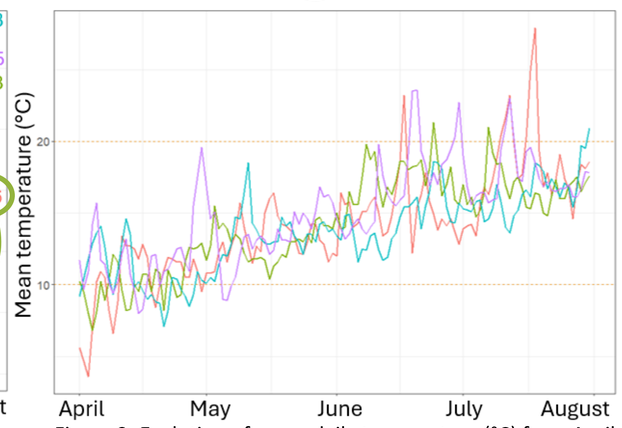


Figure 2: Evolution of mean daily temperature (°C) from April to the end of July in 2022, 2023, 2024 and 2025 in Ploudaniel.

	April	May	June	July
2022	31.5 mm	22 mm	71 mm	11.5 mm
2023	58.5 mm	60.5 mm	34 mm	75 mm
2024	75 mm	82 mm	32.5 mm	93.5 mm
2025	78 mm	89.5 mm	56 mm	52 mm

Table 1: Monthly rainfall (mm) in Ploudaniel

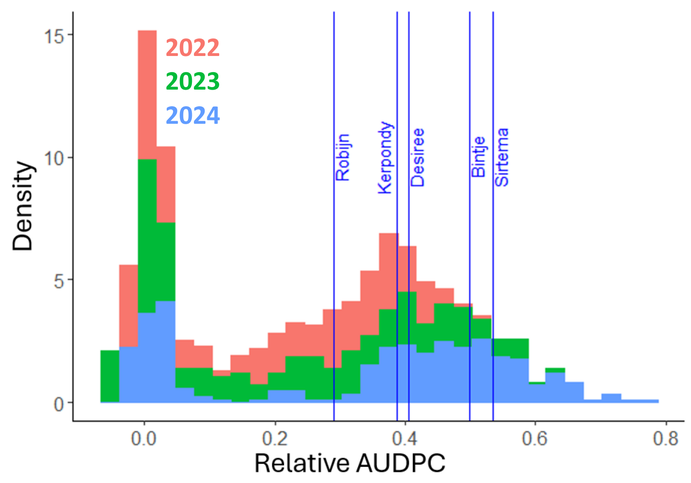
	April	May	June	July
2022	10.1°C	13.1°C	15.3°C	11.8°C
2023	10.1°C	12.9°C	17.2°C	13.5°C
2024	10.5°C	13.4°C	14.5°C	17.1°C
2025	11.8°C	13.5°C	16.4°C	17.5°C

Table 2: Monthly mean temperature (°C) in Ploudaniel

2 Three years of field trial in Ploudaniel

Despite interannual variability in climatic conditions, late blight pressure observed on susceptible cv. remained consistently high

This context enables a robust evaluation of genetic resistance effectiveness



Planting dates:
05/05/22
05/05/23
24/05/24

ROBIJN → partial resistance
DESIREE and **KERPONDY** → intermediate level of suceptibility
SIRTEMA and **BINTJE** → highly susceptible

Figure 3: Relative AUDPC (Area Under the Disease Progress Curve) of the 301 genotypes from the genomic selection panel according to trial year. Five control cultivars (KERPONDY, ROBIJN, SIRTEMA, BINTJE and DESIREE) were included in the experimental design (augmented design with five blocks). The mean interannual rAUDPC values of these five cultivars are indicated on the plot by **dark blue** vertical lines.

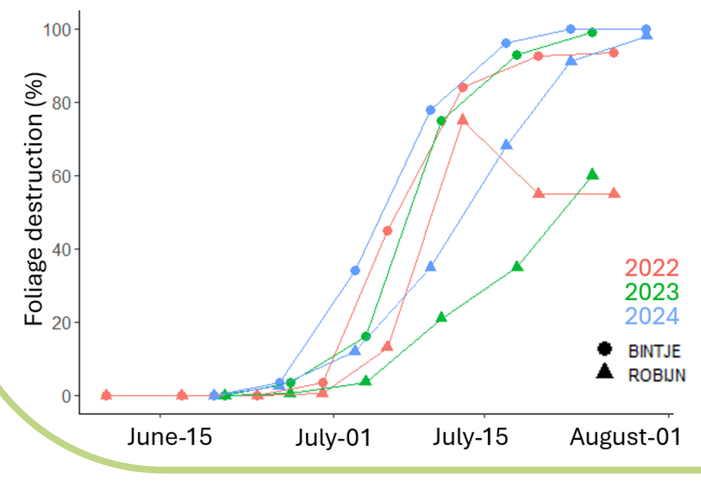


Figure 4: Disease progress curves (%) over time for BINTJE and ROBIJN across trial years. In 2022, eight severity assessments were performed from 10 June to 27 July. In 2023, six assessments were performed from 21 June to 25 July. In 2024, seven assessments were performed from 20 June to 30 July.

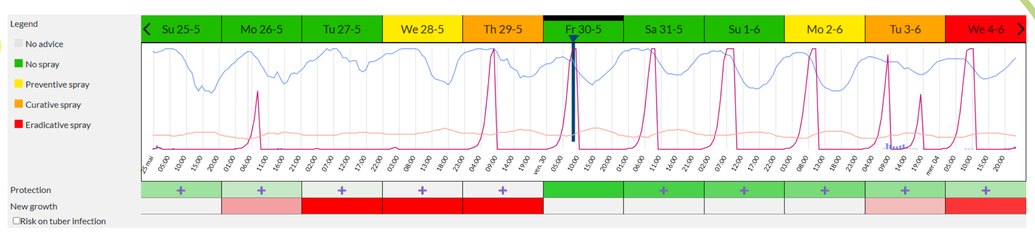
3 Small-scale trial 2025 - WP3 IPMorama

Combining resistant varieties with DSS-based decision-making reduced the treatment frequency index

Almost no late blight symptoms were observed on resistant cultivars

Objective: demonstrate that, depending on the genetic composition of **resistant varieties**, the onset of fungicide application can be delayed

farmmaps BlightApp - DSS



Uses hourly, local weather data to drive the **simulation of the *P. infestans* infection cycle** and assess **infection risk levels** including crop growth and remaining fungicide protection

Comparison of two management strategies

Common practices
Following **common local practices** adapted to the **high LB disease pressure**

IPM
Fungicide application timing guided by a **Decision Support System** (DSS, the Farmmaps BlightApp)

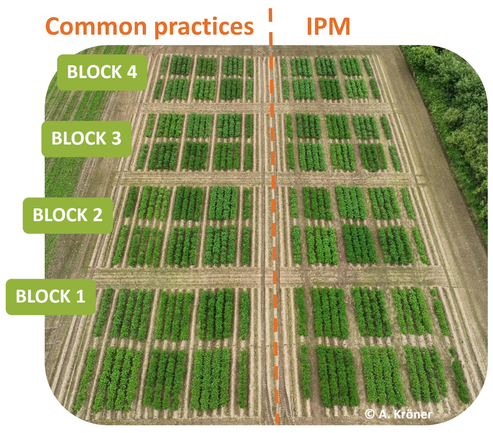
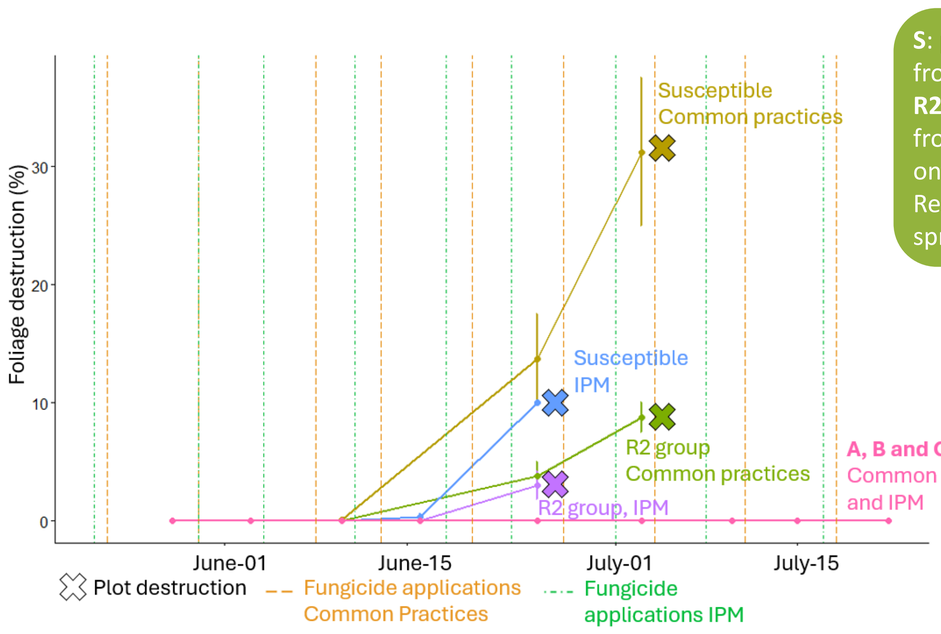


Figure 5: Aerial photograph of the small-scale trial on 10 June 2025. The trial was planted on 30 April, and plant emergence occurred mid-May. The first LB observation in the area (within a 5 km radius) was recorded on 27 May. Six cultivars were evaluated, each replicated in four blocks under two management strategies (common practices and IPM). These cultivars differed in their resistance to late blight: one susceptible cultivar (**S**), one cultivar carrying the *R2* resistance gene (**R2**), and four resistant cultivars (one from group **A**, one from group **B**, and two from group **C**).



S: preventively sprayed using DSS-based timing from emergence onwards
R2: preventively sprayed using DSS-based timing, from the first report of late blight in the area onwards
Resistance groups **A**, **B** and **C**: preventively sprayed with a delayed first application (18 June)

	Cycle length (days)	Number of sprays	Treatment Frequency Index
Common practices	85	9	13.14
S - IPM	61	6	10.25
R2 - IPM	61	5	8.75
A - IPM	**85**	5	**7.63**
B & C - IPM	**85**	5	**5.38**

Figure 6: Disease progress curves (%) as a function of cultivar and management practices. Disease severity assessment were conducted from 28 May to 22 July 2025. The assessment was completed once the plants had almost finished their life cycle. Nine assessments were performed under the IPM strategy and seven under common practices. Mean foliage destruction for the **susceptible cultivar** under common practices is shown in **gold**; under IPM, in **blue**. For the R2 group, values are shown in **green** under common practices and in **purple** under IPM. For the **resistant cultivars**, values are shown in **pink** for both strategies. Crosses indicate the dates when foliage was removed from the plots due to excessive infection levels. Dates of fungicide applications under common practice are indicated by vertical **orange** dashed lines; under IPM, by **green** dashed-dotted vertical lines.

Cultivar resistance groups (A, B and C) are based on the Plantum classification for *P. infestans* resistance, determined by R-gene content

4 Perspectives

- Small-scale trial is currently repeated in 2026 including three additional resistant varieties
- Similar trials conducted in Scotland and Poland: network of experiments under contrasting climatic conditions

IPMorama
Horizon Europe project
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Addresses

[1] inov3PT, Paris, France, [2] IGEPP, INRAE, Institut Agro, Univ Rennes, Ploudaniel, France, [3] Bretagne Plants Innovation, Hanvec, France, [4] SIPRE, Bretteville du Grand Caux, France, [5] Grocep, Laurière, France, [6] Wageningen University Research, The Netherlands, [7] IGEPP, INRAE, Institut Agro, Univ Rennes, Le Rheu, France

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Monitoring data from the INRAE CLIMATIK platform (https://agroclim.inrae.fr/climatik/, in French) managed by the AgroClim laboratory of Avignon, France. AgroClim. (2025). AgroClim. INRAE. https://doi.org/10.17180/0K57-Q467.
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