EuroBlight
A potato late blight network for Europe

Facultade de Ciencias, Ourense (Spain)

18-21 May 2026

Epidemiology of Potato Late Blight in Galicia (NW Spain) and On-Farm validation of the NEGFRY model for sustainable disease management

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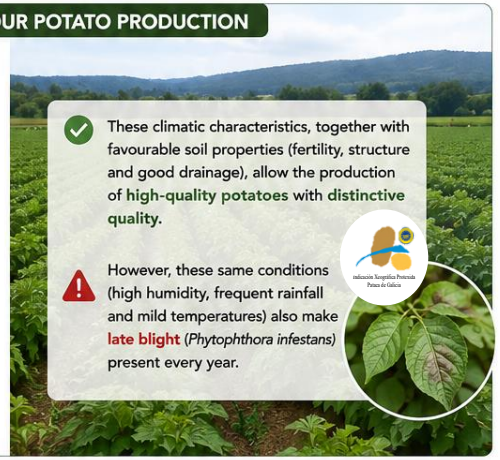
Universidade Vigo

Galicia= Ideal conditions for potato production but a constant challenge: late blight

1. GALICIA: DIVERSE CLIMATES THAT FAVOUR POTATO PRODUCTION

CLIMATIC ZONES OF GALICIA



These climatic characteristics, together with favourable soil properties (fertility, structure and good drainage), allow the production of **high-quality potatoes** with **distinctive quality**.

However, these same conditions (high humidity, frequent rainfall and mild temperatures) also make **late blight** (*Phytophthora infestans*) present every year.

2. THE PROBLEM: A CONSTANT FIGHT AGAINST LATE BLIGHT

Farmers have to fight late blight every year using fungicides based on pre-established spray calendars.

THIS CAUSES:

- High number of fungicide applications
- Increased production costs
- Environmental impact

3. EMERGING CHALLENGES

- European legislation promotes reduction in pesticide use.
- Increasing resistance of the pathogen to active ingredients.
- Farmers lack reliable tools to predict the optimal fungicide application timing.
- No operational DSS platforms are currently available for potato late blight management in NW Spain.

4. OUR OBJECTIVE: FROM RESEARCH TO PRACTICAL APPLICATION

PHASE 1: EXPERIMENTAL EVALUATION (YEARS 1–3: 2021, 2022, 2023)

Field experiments conducted in A Limia (Galicia, NW Spain) to evaluate the epidemiology of late blight and the performance of the NEGFRY DSS.

European funding

Soildiver Agro

22 members
7 countries

Total Budget of **6 999 888.75€** (2021-2023)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 817819

PHASE 2: ON-FARM VALIDATION (YEAR 4: 2024)

Implementation of the NEGFRY warning system in real farming conditions with volunteer farmers in the main potato-producing areas of Galicia: A Limia and Coristanco.

Operational Group funding

XIPrisco

Total Budget of **156.614,11€** (2023-2026).

Local consortium

Volunteer farmers

Leonardo Rodríguez Fraga

Universidad de Vigo

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1 FIELD EXPERIMENTS

2 cultivars

Agria (AG)

Yellow fiesh

Kennebec (KE)

White fiesh

3 management strategies

Control	Routine	DSS
(no fungicide)	(fungicide every 7–10 days following traditional calendars)	(fungicide applications based on NEGFRY wamings)

3 replicates per strategy and cultiver
Plot size: 4 rows of 0.75 m x 30 m

Same agronomic practices, insecticide and herbicide applications in all plots

2 WEATHER DATA RECORDING

IMetos° automatic weather station (Pessl instruments)

- Temperature (T)
- Relative Humidity (RH)
- Rainfall

Hourly data transmitted to the cloud

3 AEROBIOLOGICAL MONITORING

Hirst volumetric pollen sampler (Lanzoni model)

- 1.5 m height, center of plots
- 7-day recording slides
- Weekly spore counts

4 FUNGICIDE APPLICATION SCHEDULES

ROUTINE STRATEGY

Fungicide applications every 7–10 days regardless of risk level

DSS STRATEGY (NEGFRY MODEL)

NEGFRY

- Negative Prognosis model (Ulirich & Schrödter) → First spray when risk value ≥ 150
- Fry model → Subsequent sprays when 100 Fry units are accumulated for moderately susceptible cultivars

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agriculture MDPI

Article

Opportunity of the NEGFRY Decision Support System for the Sustainable Control of Potato Late Blight in A Limia (NW of Spain)

Laura Meno, Olga Escuredo * and M. Carmen Seijo

Department of Vegetal Biology and Soil Sciences, Faculty of Sciences, University of Vigo, As Lagoas, 32004 Ourense, Spain; laura.meno@uvigo.es (L.M.); mcoello@uvigo.es (M.C.S.)
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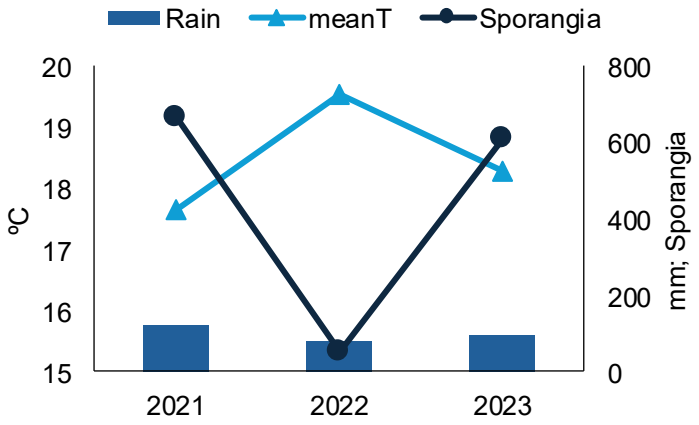

Table 1. Mean epidemic and economic parameters of 2021, 2022 and 2023

	2021		
	Control	Routine	DSS
Fungicide applications (nº)	0	6	3
AUDPC	688a	0b	42b
Period of infection (days)	53	0	34
Marketable yield (t ha^{-1})	-	41a	40a
	2022		
	Control	Routine	DSS
Fungicide applications (nº)	0	7	3
AUDPC	42	39	36
Period of infection (days)	39	35	33
Marketable yield (t ha^{-1})	-	27a	32a
	2023		
	Control	Routine	DSS
Fungicide applications (nº)	0	9	4
AUDPC	1106a	191b	466b
Period of infection (days)	75	60	77
Marketable yield (t ha^{-1})	-	27a	29a

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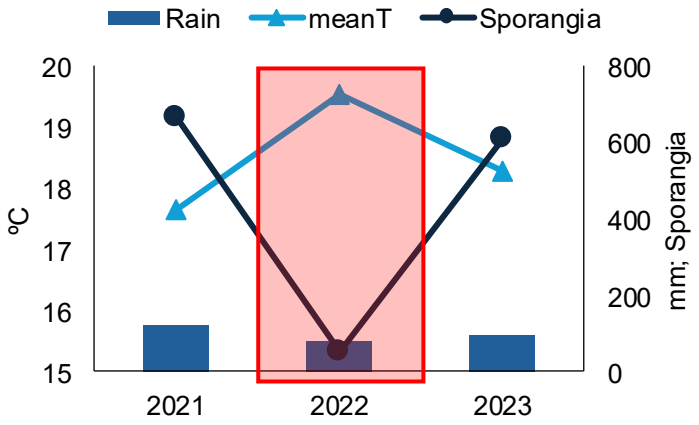

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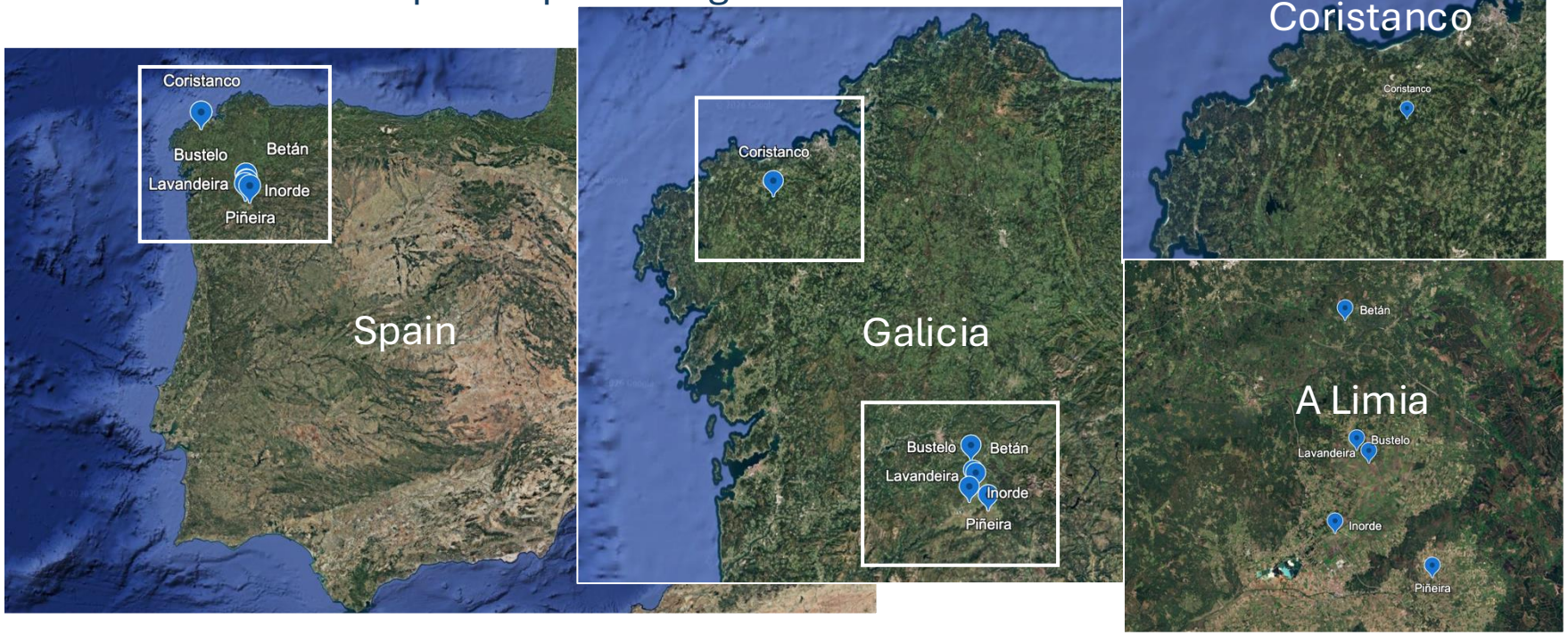
PHASE 2: ON-FARM VALIDATION (YEAR 4: 2024)

Implementation of the NEGFRY warning system in real farming conditions with volunteer farmers in the main potato-producing areas of Galicia: A Limia and Coristanco.

Move from research fields to real farmers´fields

Main potato producing areas of Galicia



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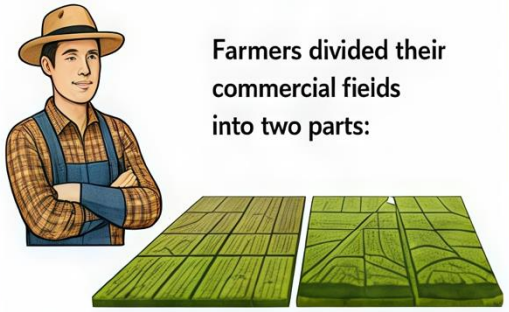
1 VOLUNTEER FARMERS AND EXPERIMENT DESIGN



Farmers divided their commercial fieids into two parts:

CONVENTIONAL
Farmer's usual management (Treatments decided by the farmer)

DSS (NEGFRY)
Fungicide applications based on NEGFRY wamings sent by the GISA research team (University of Vigo)

2 WEATHER MONITORING

Metooroiogical conditions monitored near each farm (temperature, RH, rainfall) using automatic stations or nearby moteoroiogical data.

3 CALCULATION OF THE MODEL AND ALERTS SENT

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GiSA

Model calcuiations performed daily by the GISA team.

Alerts (spray recommendations) sent to farmers via SMS.

4 COMPARISON OF OUTCOMES

CONVENTIONAL | DSS (NEGFRY)

- Total and marketabie (40–80 mm) yieids compared
- Epidemioiogical perameters compared
- Inputs use, costs and environmental impact evaluated

5 OBJECTIVE

To validate in commercial fields the effectiveness of the NEGFRY DSS for sustainable late blight management, reducing fungicide use while maintaining yield and increasing environmental and economic sustainability.

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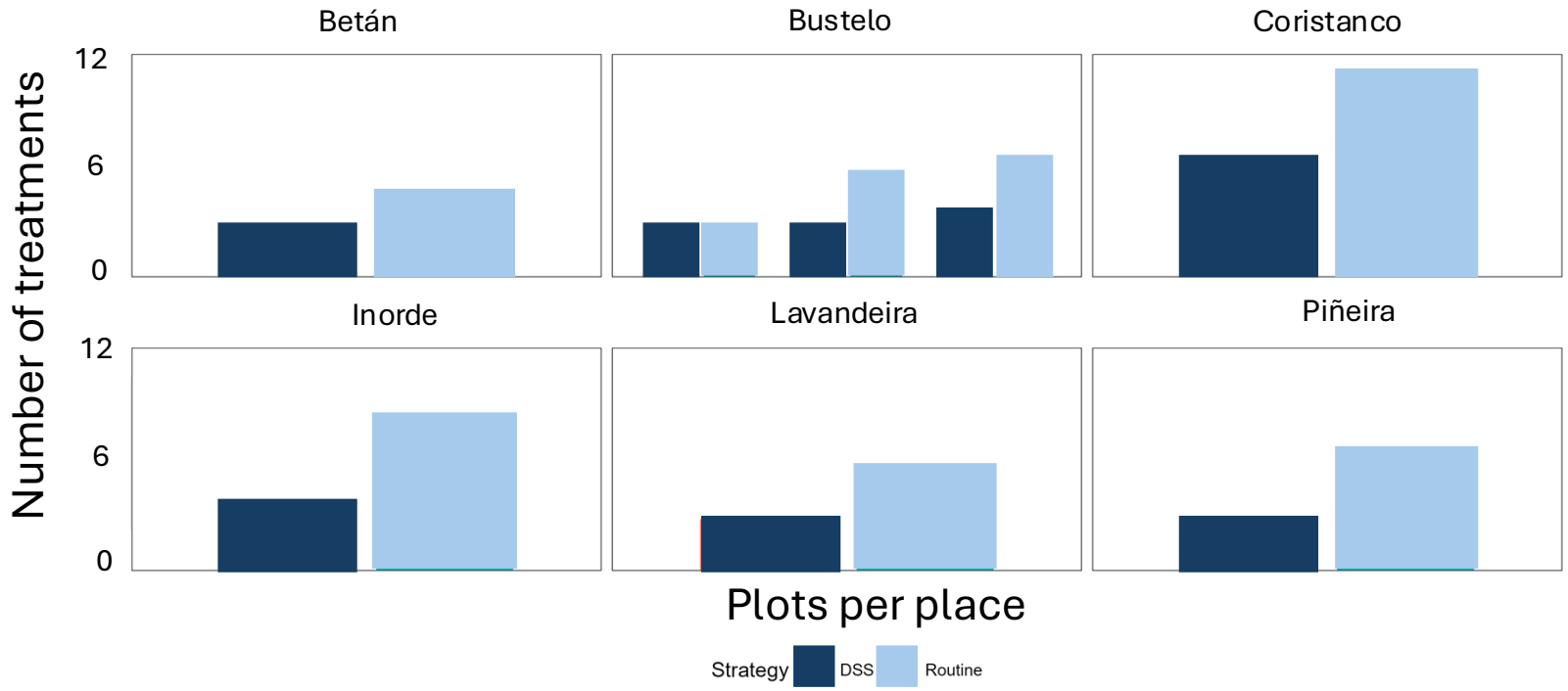

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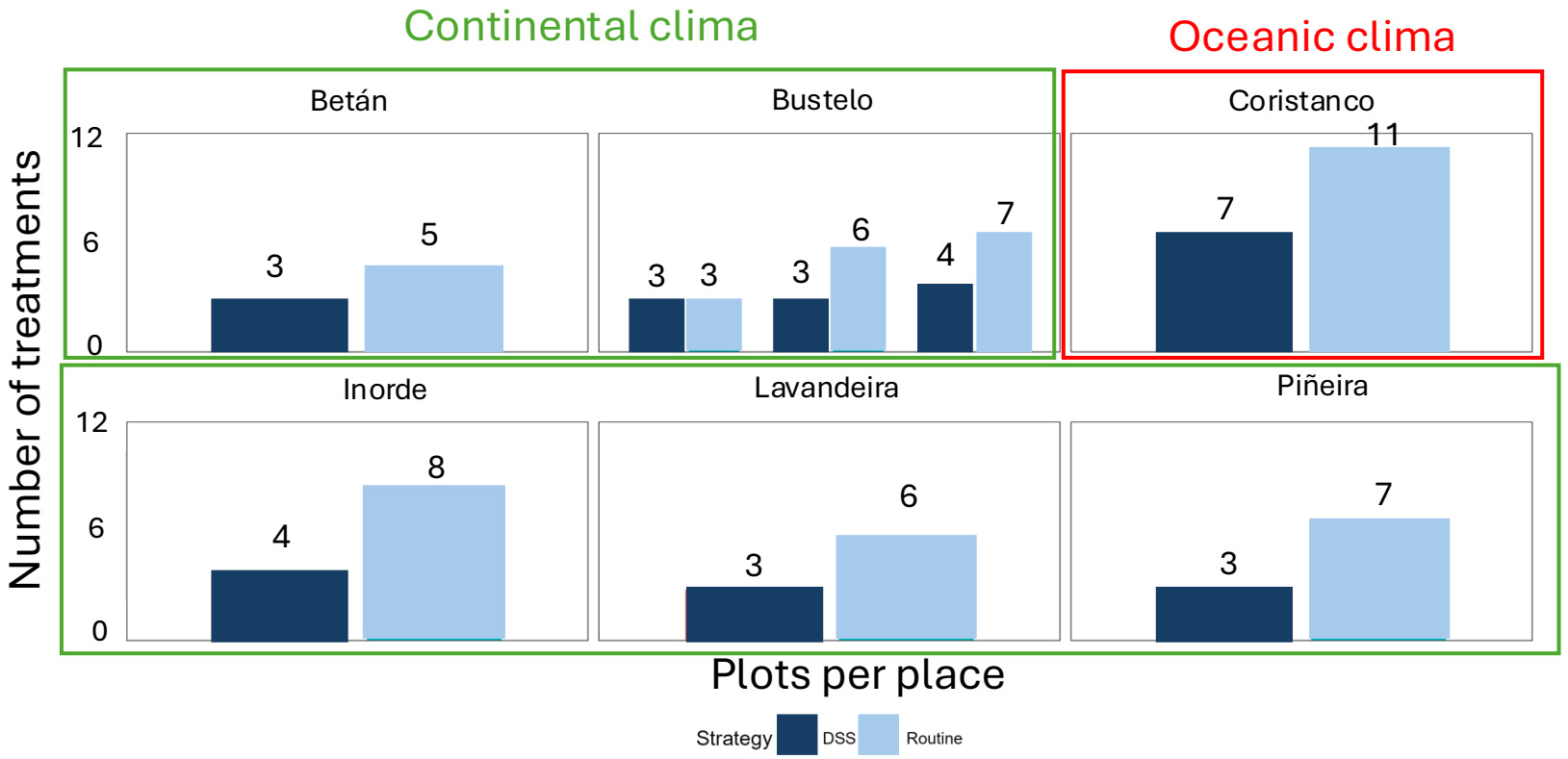

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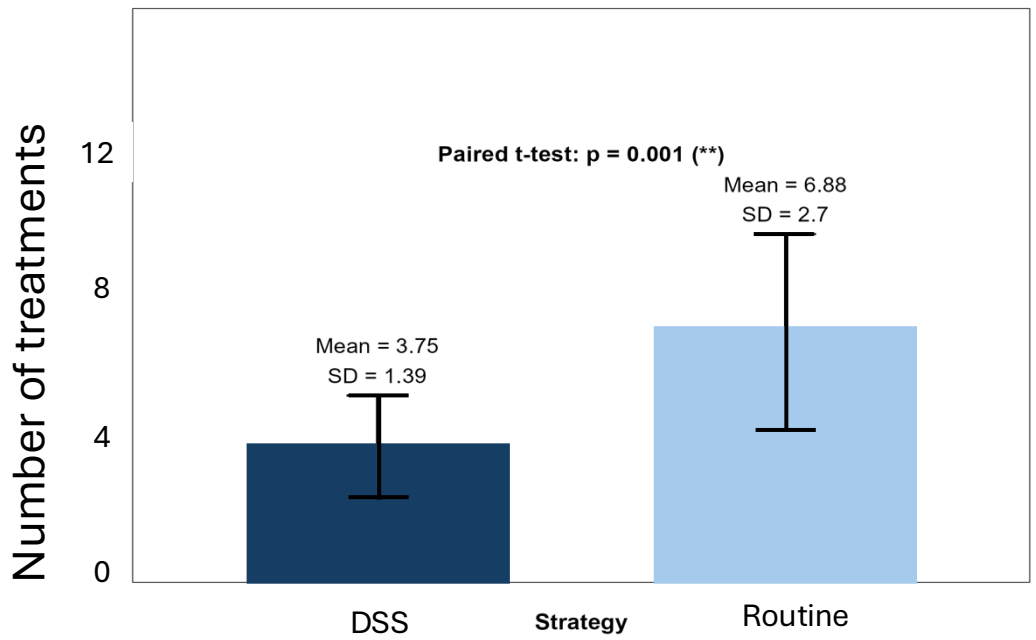

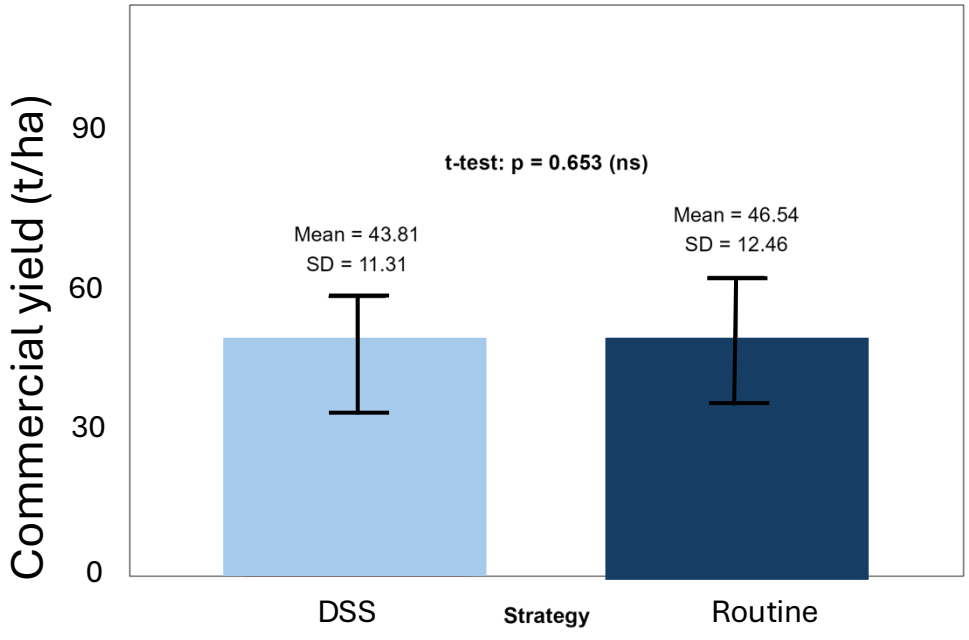

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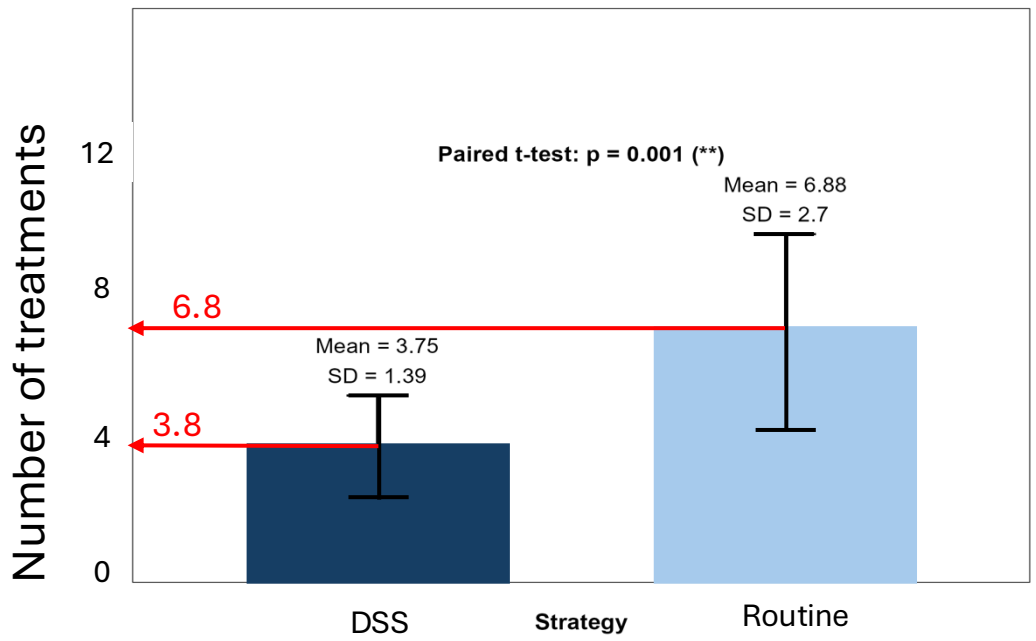

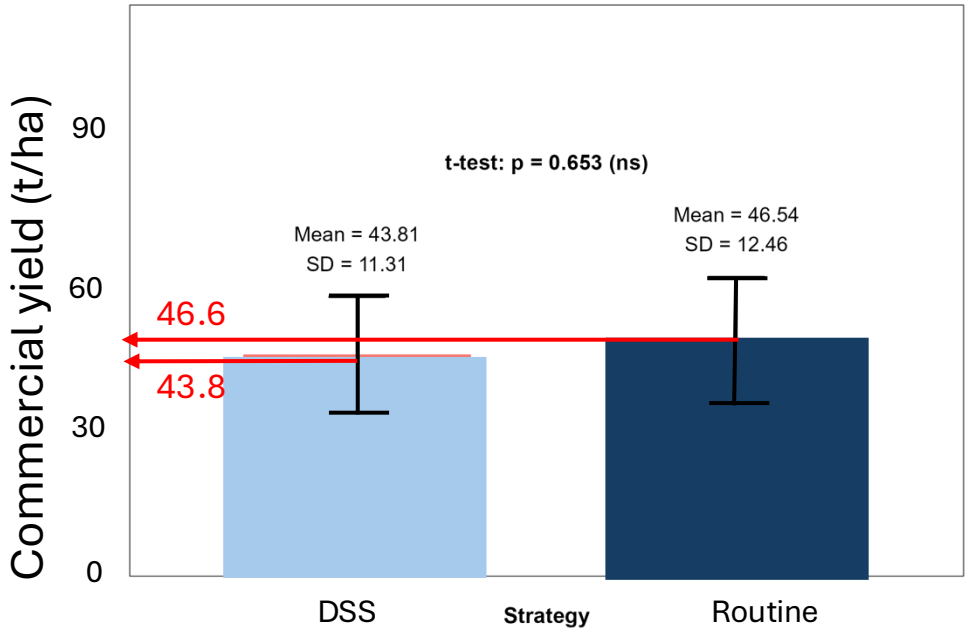

Conclusions

PHASE 1: EXPERIMENTAL EVALUATION (YEARS 1–3: 2021, 2022, 2023)

Field experiments conducted in A Limia (Galicia, NW Spain) to evaluate the epidemiology of late blight and the performance of the NEGFRY DSS.

NEGFRY is an effective alternative to fixed fungicide spray schedules.

- 50% reduction in fungicide applications in NW Spain.
- Similar late blight control compared with the routine strategy.
- Lower fuel consumption and CO_2 emissions

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Implementation of the NEGFRY warning system in real farming conditions with volunteer farmers in the main potato-producing areas of Galicia: A Limia and Coristanco.

On-farm validation, field trials with farmers achieved:

- 30–50% reduction in fungicide use.
- **No significant yield losses.**

Main limitations

- Some unnecessary disease alerts were generated.
  - No inoculum in the air
- Efficacy of each treatment to late blight control

Future improvements

- Include more growing seasons for model calibration.
- Continue adapting the DSS to local environmental conditions.
- Incorporate:
  - Pathogen concentration in the crop environment (Aerobiology).
  - Efficacy of each fungicide treatment
- Inclusion of molecular information about genotypes
- Feeding back the DSS with information about:
  - Efficacy of active matters and presence/absence of active late blight

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Volunteer farmers

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COMUNIDAD DE REGANTES DE LA LAGUNA DE ANTELA
inorde agrogandeiro
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Leonardo Rodríguez Fraga

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