

# **EuroBlight, Potato late blight early warning – initiatives and activities in 2024 and beyond. Feed into subgroup discussions**

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**We need action!**

**Super goal: Sustainable potato production – economic and environmental**



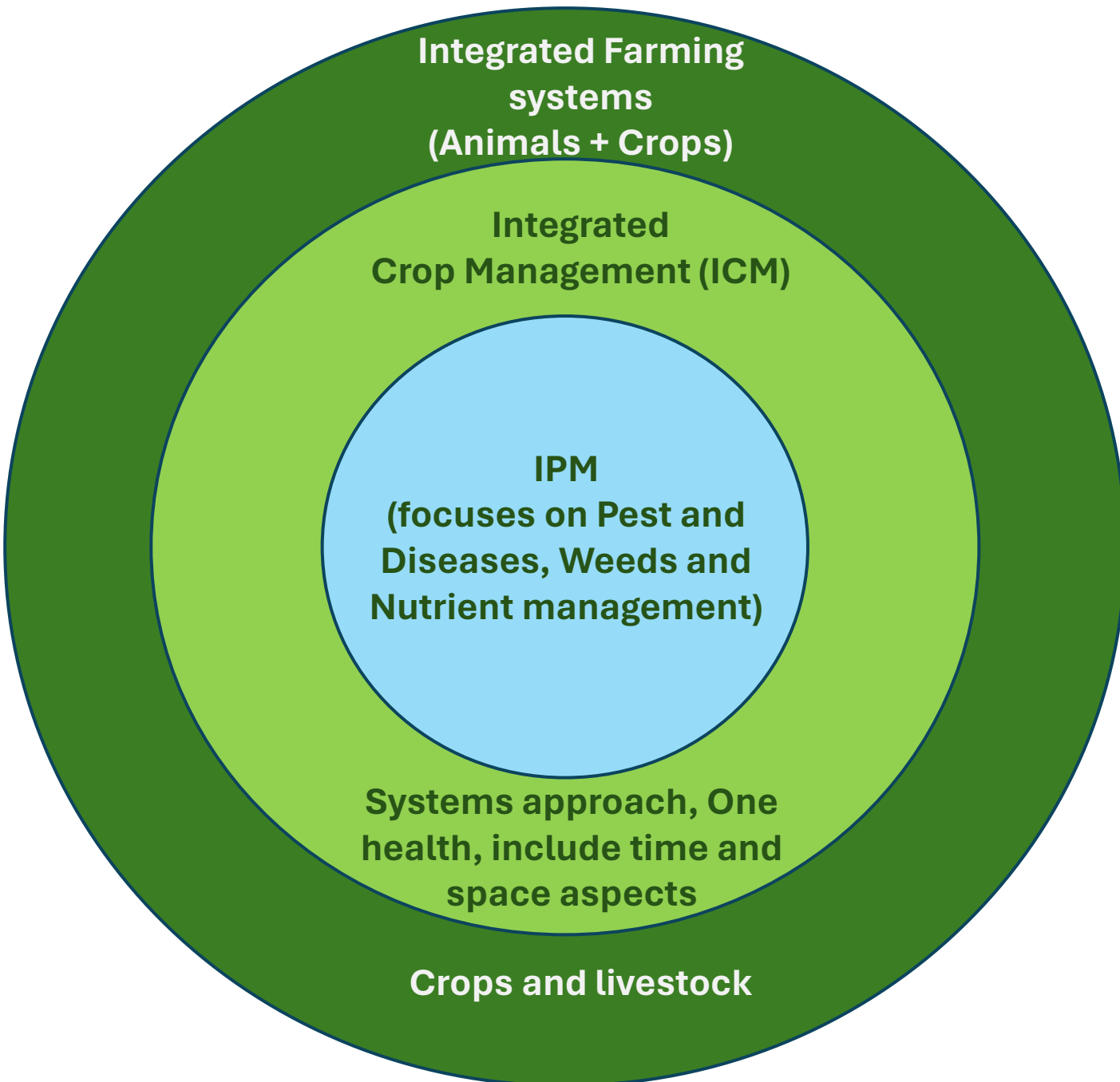
**Collaboration and Infrastructures to mitigate devastating potato late blight epidemics**

- 1. From IPM to ICM** - EuroBlight vision and strategic plan. How to implement this paradigm shift in practice?
- 2. EuroBlight - potato late blight early warning** – Actions needed? - How can we do more together?
- 3. infrastructures to mitigate devastating potato late blight epidemics** – National, EuroBlight, Global, Policy – collaboration?
- 4. Introduction of IPMorama** – Late blight is a use case on breeding for IPM



## Integrated Crop Management and late blight

- Use a diverse set of more resistant varieties
- Keep plants healthy and strong (water, nutrients, healthy soils)
- More focus on prevention strategies and reduction of primary inoculum sources: e.g. crop rotation, healthy seed, eradicate dumps and volunteer plants & diversify e.g. by strip cultivation and more diverse use of varieties
- Use fungicide resistance avoidance strategies
- Include pathogen and host resistance information / genomics in control strategies and weather based DSSs
- Monitor the stability of host resistance in time and space
- Monitor the pathogen population in time and space
- Use resistance inducers, biological control agents and low impact fungicides to protect R-genes and horizontal resistance in new and more resistant varieties
- Information and training / regulation and control



# Potato Late Blight Early Warning System – timeline and actions

*Unusual disease epidemic event happened!*

<p><b>Actions needed:</b></p> <p>Effective and coordinated system for disease surveillance and sampling ("hunting the new").</p> <p>Fast and reliable pathogen diagnostics and characterisations.</p> <p>Effective and coordinated dissemination and communication infrastructure to facilitate alerts.</p>	<p><b>How can EuroBlight contribute:</b></p> <p><b>BlightTracker App</b> for disease surveillance, include early blight. Expand to more regions. Adapt the <b>Potato Late Blight Toolbox</b> to store, manage, display and distribute data via APIs. <b>Isolate samples</b> collected and submitted to dedicated <b>diagnostic labs</b>.</p> <p><b>Sample recovery</b>, purification and molecular genotyping and race phenotyping. <b>Response time</b> for diagnosis reduced by improved molecular diagnostic tools, and by <b>increased capacity and expertise</b> in the labs. <b>Alignment</b> needed to obtain comparable results (JHI, WUR, AU, INRAe)</p> <p><b>Genotypic</b> and race <b>phenotypic</b> data uploaded to the <b>Potato Late Blight Toolbox</b> and displayed on maps and charts, and <b>analysed in a regional and a global context</b>. Alerts via websites, press releases, and social media. <b>Maps and charts</b> integrated in <b>national agricultural &amp; knowledge information systems (AKIS)</b></p>
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**Short term alerts and transboundary warnings (1 day - 6 months). Farmers adapt IPM strategy accordingly**

<p>Assessment of epidemic potential of new emerging variants of <i>P. infestans</i></p> <p>Accelerating breeding efforts for resistance to new races.</p> <p>Developing IPM/ICM based control strategies in diverse agroecological environments.</p> <p>Impact on Value for Cultivation and Use (VCU) testing (official variety testing)</p> <p>Development of Risk Management tool: Which potato varieties are at risk? Where may the new variants spread next? How to minimise risks of future invasions, spread and how to prevent future yield losses.</p>	<p><b>New tools for coordinated impact evaluation</b> – monitoring of virulence, aggressiveness and fungicide resistance. Results feed into pan european Risk models (Vulnerability Mapping Tool (VMT) and epidemiological modelling).</p> <p><b>Develop shared facilities</b>, e.g. Biorepository, Breeding network of field nurseries. Test of new cultivars and isolate sampling. Off-season test of new genotypes/races in green house.</p> <p>Validate <b>new IPM/ICM &amp; DSS strategies</b> taking into account new genotypes/races and more resistant cultivars in field trials in EuroBlight countries, including collaboration with lead end-users, advisors and farmers (<b>case study regions / Living labs</b>)</p> <p><b>VCU host Trap nurseries</b>, 75 trial sites in Europe for structured sampling, "Hunting the new" and indication of regional disease pressure. Feed into VMT and epidemiological modelling at landscape level.</p> <p>Improve <b>risk management and prevention measures</b>. Models for pathogen evolution and spread. Utilize the <b>EuroBlight network</b> including all stakeholders to optimise <b>preparedness, resilience and early warning</b> of new genotypes and races with epidemic potential at regional, national and global level.</p>
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**Longer term actions (6-18 months). National lists of varieties updated. Breeding programs adapted. Early warning maps and charts and Risk Management tools updated. Results synthesised and communicated via stakeholder networks and academia articles, workshops and conferences.**

Based on a template from the EU project RustWatch (2018-2022)

## EuroBlight Early warning system

- Virulence and genotype monitoring
- Within season sampling and reporting  
Results on maps and charts appr. a week after
- On the same samples apply Markers for fungicide resistance.
- Trap/Field nurseries with breeders
- Engage with the official variety testing
- Network of ICM living labs
- Network of phenotyping labs (IHAR, AU JHI, INRAe)
- EuroBlight Fungicide trials
- Test of DSSs in a panEuropean context
- Risk modelling for Europe
- Communication & dissemination infrastructure
- Activate BioEuroblight
- Collaborate with IPMorama, Copa Cogeca and other projects and initiatives

# Super goal: Sustainable potato production – economic and environmental infrastructures to mitigate devastating potato late blight epidemics – Draft ideas

## National Action plans for sustainable potato production 2030 – engage all stakeholders

How can we engage all stakeholders along the potato value chain?

How to coordinate communicate and disseminate in a structured way?

How can we organise early warning in a national context. And collaborate regionally and make use of the EuroBlight network and the EuroBlight services?

How to follow up on the EuroBlight statement and the Copa Cogeca Policy brief?

How and who define and document the needs for changes in policy frameworks and about specific actions needed at the national level.

## EuroBlight – Early warning of potato late blight – Science & ICM

### Short Term

Effective and coordinated system for disease surveillance and sampling (“hunting the new”).

Fast and reliable pathogen diagnostics and characterisations.  
Effective and coordinated dissemination and communication infrastructure to facilitate alerts.

### Longer term

Assessment of epidemic potential of new emerging genotypes and races.

Accelerating breeding efforts for resistance to new races.

Developing IPM/ICM based control strategies in diverse agroecological environments.

Impact on Value for Cultivation and Use (VCU) testing (official variety testing)

Development of Risk Management tool: Which potato varieties are at risk? Where may the new variants spread next? How to minimise risks of future invasions, spread and how to prevent future yield losses.

## Global – Early warning of potato late blight – Science & food security

### Short term

Address the risk of spread of new fungicide resistant variants of *P. infestans* among continents e.g. EU43 & EU46 from Europe

Network of networks. Discuss the need for collaboration and global actions

Who can participate in developing a white paper to support national, regional and global project proposals

### Longer term

How can we organise more regular global meetings and interactions

How can the EuroBlight community help to Activate AfricaBlight

Can we link up with the One Health initiative and CGIAR Mega project on potato

## Policy

1. **Copa Cogeca +:** EU policy brief – Wake up call, EU Action plan, organise Communication and dissemination & living labs together with EuroBlight,
2. **Ongoing projects:** IPMorama, IPMWorks, SAGROPIA, AGSENSE .....
3. **FAO:** Support global actions and contribute to white paper
4. **CIP:** Help to organise global actions and contribute to white paper. Help to activate AfricaBlight



**IPMorama: Integrating breeding for IPM into the deployment landscape for wheat, potatoes and grain legumes**

**Type of Action: RIA; Coordinator: Dr Dan Milbourne (TEAGASC); Duration: 48 months**

#	Participant Organization	Country	#	Participant Organization	Country
1	TEAGASC	IE	10	Inov3PT	FR
2	AU	DK	11	SIS	IT
3	WU	NL	12	LFL	DE
4	WR	NL	13	AFL	LT
5	FSH	RS	14	GEVES	FR
6	INRAE	FR	15	JHI	UK
7	CSIC	ES	16	FiBL*	CH
8	CREA	IT	17	WBF-Agroscope*	CH
9	SAKA	DE		<i>*Swiss partners funded by SERI</i>	



# Nested scales of integrating pathogen and host characteristics in IPMorama (PxGxExM)

P: pathogen; G: host; E: environment; M: management

Pathogen population surveillance and impact on disease prevention/control



Adapted from Rimbaud et al. 2021 and Jerome Enjalbert (unpublished)

### 3.1.3 List of work packages

WP No.	WP Title	Lead Partic. No	Lead Participant	PMs	Start	End
WP1	Developing germplasm, tools and breeding resources for variety-centric IPM	1	TEGASC	286.3	1	48
WP2	Disease vulnerability of crop varieties at landscape level	2	AU	117.73	1	48
WP3	IPM deployment	3	WR	131.63	1	48
WP4	Communication, Stakeholder Engagement and Impact	5	FSH	112	1	48

#### Objectives

1. To analyse the distribution and impact of emerging pathogens on wheat, potato and legumes in a pan-European context
2. To facilitate resistance breeding by developing rapid, transparent and reliable access to the most virulent and aggressive variants of target pathogens
3. To facilitate IPM breeding and disease management by developing web-based landscape level tools for prediction of host vulnerability.

## **WP2 Tasks (Lead: Mogens Hovmøller & Jens G. Hansen, AU)**

**T2.1** Isolate collection, characterisation and accessibility for breeding.

**T2.2** New molecular tools for characterisation of isolates

**T2.3** Accessibility of new virulent and aggressive genotypes and races for resistance breeding.

**T2.4** Isolate sampling in VCU and breeders' networks

**T2.5** Stakeholder driven disease surveillance using a crowdsource mobile App

**T2.6** P\*G\*E analysis of the level, type and stability of resistance in time and space

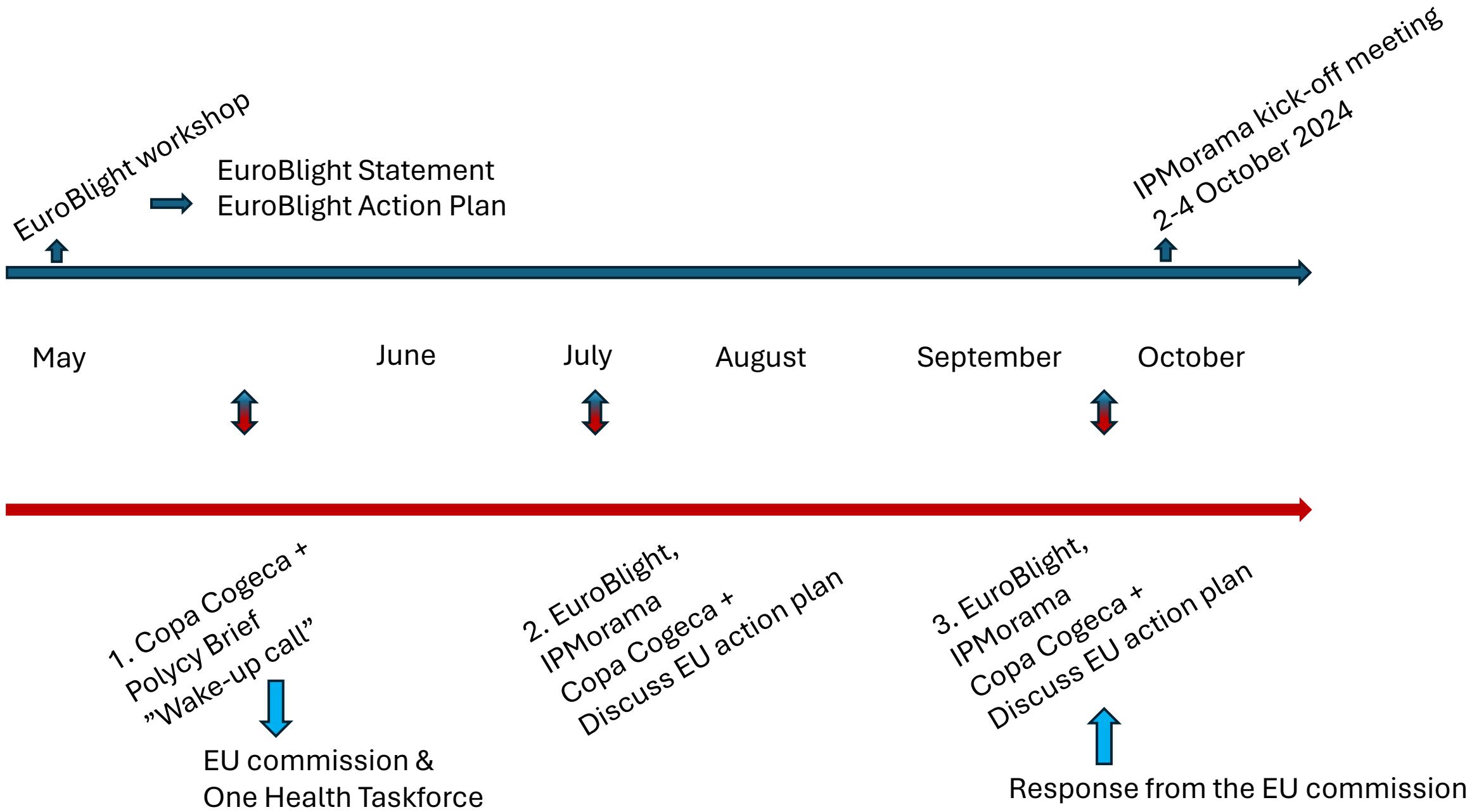
**T2.7** Adapt existing information platforms and databases to the needs of IPMorama

**T2.8** The Vulnerability Mapping Tool

## **WP3 (Lead: Geert Kessel, WR)**

**T3.1** IPM design based on landscape level monitoring tools







A case study group (CSG) is defined as a group of stakeholders (including actors and partners) relevant for the project regarding the identification and uptake of EU regional needs, best practices and testing of IPM & ICM tools and services developed by IPMorama & EuroBlight

The CSGs will be concrete actors and will take part in the development of IPM&ICM tools and services developed by or together with IPMorama & EuroBlight.

The project will collaborate with existing EU operational groups as well as establish new groups targeted the goals of IPMorama & EuroBlight (e.g. a group of industry contract growers or growers' associations e.g. Copa Cogeca).

## Examples of activities to be dealt with by potato case study groups

- Organise stakeholder workshops to identify needs, best practices and tools used for IPM & ICM
- Enlarge availability and access to more resistant varieties at regional scale (Case studies – how to, overcome barriers)
- Test new tools for the inclusion of pathogen and host resistance information into IPM& ICM strategies
- Create and conduct knowledge exchange and training programs for end user re IPM & ICM (all 8 principles + and related outputs from IPMorama & EuroBlight)
- Contribute to disease surveillance using Smartphone crowdsource and registered user APPs
- Contribute to sampling of isolates or target pests
- Host a trap nursery (common Europe network) together with the VCU
- Host a field Nursery testing new registered varieties (common Europe network) together with the breeding industry and growers' associations, Copa Cogeca (including participatory breeding)
- Test new innovative IPM & ICM strategies as defined by IPMorama & EuroBlight (and regional stakeholders)
- Contribute with data to a IPMorama & EuroBlight crop-environment-management, demonstration farm and Field Trial database targeted (GxExM) modelling and validation of DSS components and systems, models and new systems approaches re IPM
- Establish and/or consolidate regional stakeholder infrastructures and value chains to be prepared for new or emerging plant health risks – be part of an EU operational group network
- Integrate tools and services from IPMorama & EuroBlight into regional Agricultural and Knowledge Information Systems (AKIS)
- CSG partners contribute to the communication and dissemination process re new knowledge, tools and services developed.
- Assess impact of IPMorama & EuroBlight activities at the regional level as well as increase general awareness of the benefits of IPM & ICM
- Select 15 Case Study Groups enabling the collaboration with other proposals and Initiatives (15 CSG) including collaboration with projects on other topics relevant for a sustainable potato production in Europe.

# Subgroup discussions - Thursday

**Control strategies:** (*Moderator: Bert Evenhuis, Secretary: Faye Ritchie*)

1. Updating the fungicide tables. What is next – in the light of the EU43 and EU46 resistance situation.
2. New initiatives - EuroBlight early warning activities+

**Pathogen and host resistance:** (*Moderator: David Cooke, secretary: Geert Kessel*)

1. Collaboration between networks: harmonisation, integration and sharing of data and results
2. New initiatives - EuroBlight early warning activities – Collaboration about phenotyping and global issues re pathogen monitoring

**Alternaria:** (*Moderator: Hans Hausladen, Secretary: Laura Meno Fariñas*)

1. Updating fungicide table. What is next - Fungicide resistance monitoring
2. New initiatives - EuroBlight early warning activities

<b>Topic</b>	<b>Control strategies</b>	<b>Host-Pathogen</b>	<b>Alternaria</b>
<b>What are the Key research questions in the subgroup</b>	Write here	Write here	Write here
<b>Suggest actions for improved Collaboration, shared facilities and outreach</b>	Write here	Write here	Write here

# How actors can gain and contribute to the EuroBlight early warning system

Write actor name and how this actor can Contribute

Write here

## **EuroBlight – Early warning of potato late blight**

### **Short Term**

Effective and coordinated disease surveillance, aerial spore assessments and Isolates/DNA sampling (“hunting the new”).

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### **Longer term**

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Development of Risk Management tool: Which potato varieties are at risk? Where may the new variants spread next? How to minimise risks of future invasions, spread and how to prevent future yield losses.

Write actor name and how this actor can Gain

Write here

# EuroBlight immediate action plan 2024 (draft ideas)

## Short Term

Effective and coordinated disease surveillance, aerial spore assessments and Isolates/DNA sampling ("hunting the new").

Fast and reliable pathogen diagnostics and characterisations.

Effective and coordinated dissemination and communication infrastructure to facilitate alerts.

Coordinated early sampling of FTA cards (SSR and Markers for Fungicide resistance). Aerial spore sampling (Mapping tool), DNA sampling using e.g. Spornado and live sampling for phenotyping. Coordinator:????

Lab network meeting re.sharing of protocols, QC and IP issues re sharing of biological material, data and results Agree on Capacity building and training. Coordinator: ?????

EuroBlight task force re analysing and QC results before release (Fungicide resistance). Coordinator and members:

Report about early attacks (disease surveillance map). Show results on the EuroBlight maps on early sampling up to 15 June, 1 July and 15 July. Results in one week after received in the lab. New mapping tools? Coordinator:

Copa Cogeca organise a dissemination framework and -infrastructure together with EuroBlight, Industry associations and EIP-AGRI. Link up with national action plans. Coordinator:

On EuroBlight website link to national action plans and dissemination platforms with relevant info

We can do more together (EuroBlight, Relevant ongoing projects and Copa Cogeca, Industry associations e.g. Crop Life Europe). Can we wait for EU initiatives / Funding? Identify needs for concrete actions and funding needed to get started with a European action plan by 1 January 2025. Approach private donors and /or industry foundations.

## Policy

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