



# Tolerant & resistant potato varieties against *Phytophthora infestans*



**Crop Sector**  
Arable crops



**Country**  
Belgium



## Description of the context

Viaverda is an arable and vegetable research station that carries out variety trials in potato cultivation, among other activities.. Introducing late blight tolerant or resistant varieties can significantly reduce the need for pesticide applications against *Phytophthora infestans*.

## Partner Organization

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## AdvisoryNetPEST

The **AdvisoryNetPEST** project aims to create a **network** and **upgrade advisory services** across the EU to increase the sharing of knowledge and the **adoption of innovative solutions to reduce the use and risks of pesticides** (RURP) in all **EU Member States**, enabling the agricultural sector to achieve the targets proposed by the Farm to Fork Strategy.



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## THE TECHNIQUE

### Short Description:

Growing late blight tolerant or resistant potato varieties, allows farmers to spray less against late blight ( caused by *Phytophthora infestans*).

### Type of novel approach:

Prevention and suppression

### Targeted pest and diseases:

Potato blight  
(*Phytophthora infestans*).

### Objective of the Novel Approach:

A proper control of potato late blight (*Phytophthora infestans*) with less sprayings. Therefore, tolerant or resistant potato varieties can be used.

### Level of practice adoption across the country:

1 2 3 4

1 (few farms) to 4 (widely used)





### Expectations regarding RURP\*

- Strong need for fungicides to control late blight in potato: 7-19 applications with a median of 13 in Belgium
- Regulatory loss of fungicides
- *Some P. infestans strains have become less sensitive or resistant to certain fungicides*
- Increase of environmental awareness and concerns



### Key success factors

Late blight resistant and tolerant varieties are common in organic farming but limited in conventional farms.

Acceptance of these potato varieties by potato processing industry and retail is needed in conventional farming



### Methods/strategy of application

Use of resistant (with R-genes) or tolerant (without R-genes) varieties against *P. infestans*

An adapted Decision Support System (DSS) is required to send tailored warning messages, ensuring adapted treatments at the right moment to protect the R-genes.



### Improvements of the Novel Approach

Farmer education and upskilling is needed

Adapted DSS or even an own data i.e. weather station in the field at each farm



### Resources and skills needed to adopt the Novel Approach

Availability of seed tubers of resistant varieties is an issue

Adapted DSS is needed

Workshops on:  
-The background of the different resistance spectra would be helpful  
-The choice of the cultivars

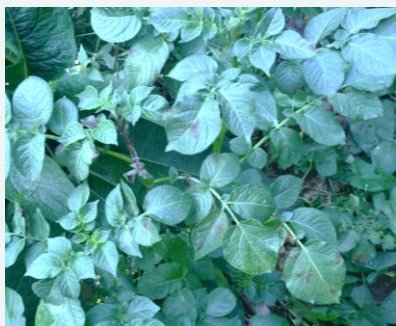


Figure 1: Potato plant with late blight symptoms



Figure 2: Sporulation of *P. infestans* on the underside of the leaves



Figure 3: Field trial with potato varieties differing in sensitivity against potato late blight



Figure 4: sensitive variety (left) and resistant variety (right)



### Advice from the Field

The main concern is the risk of a disease outbreak without available control measures. Although growers are generally open to adopting these cultivars, they will require support throughout the transition. Because the disease can cause substantial production losses, advising farmers not to spray may be challenging. Growers need reassurance that these cultivars are compatible with their farming practices and that processors will continue to accept and market the harvested potatoes.



### Policies and Regulatory Support

At the moment, there is no promotion from government



### Social and Cultural Acceptance

Potato processing industry, retail and consumer will have to accept these varieties.



### BENEFITS

(Highly) reduced number of fungicide applications with the use of resistant varieties.

Using resistant varieties and follow the DSS the farmer can optimize the use of fungicides.

Quality and yield for some resistant varieties are comparable with commonly used sensitive varieties.



### BARRIERS

Acceptance by potato processing industry to work with this varieties in conventional farming.

The end users need to accept them. Availability of seed tubers of resistant varieties is an issue.

Agronomists cannot advise farmers on which varieties to grow because the resistance genes are not known.

## Transferability of the Novel Approach across countries and sectors

Late blight resistant potato varieties are used in the UK but only on a limited scale due to market acceptance issues; late blight has occurred in Alouette, raising concerns about protection strategies. Wider adoption would require market support and better integration with fungicide use. In Ireland, these varieties are mainly grown by organic producers because retailers poorly accept alternative varieties, though there is potential in baby/salad potatoes. Finland reports tolerant varieties but no resistant ones with R genes and no current DSS. Germany sees resistant varieties as useful but faces challenges in implementing DSS to reduce spraying. Austria expresses strong interest in resistant varieties, noting variable infestation levels linked to weather and cultivation practices. The country offers free DSS tools for monitoring and prediction, plus wireworm monitoring, but has recently faced increased problems with *Alternaria* spp.

# Systemic Feasibility Analysis: Expert insights from Literature and Field Data

| CRITERIUM                                                  | INDICATOR                                                                                              | INDICATOR SCORE                                                                                     | EVALUATION |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------|
| Pesticide use reduction level                              | Reduction of the applied volume of pesticides                                                          | high reduction (>25%)<br>moderate reduction (10-25%)<br>low reduction (<10%)<br>no reduction        | 😊          |
| Effectiveness of controlling the target pest/diseases/weed | Percentage reduction of the target pest/weed infestation or of the damage caused by the target disease | high reduction (>60%)<br><b>moderate reduction (30-60%)</b><br>low reduction (<30%)<br>no reduction | 😊          |
| Biodiversity                                               | Impact on bees                                                                                         | -- / - / 0 / + / ++                                                                                 | 😊          |
|                                                            | Impact on arthropods other than bees                                                                   | -- / - / 0 / + / ++                                                                                 | 😊          |
| Water quality                                              | Impact on pesticide losses to surface water (runoff)                                                   | -- / - / 0 / + / ++                                                                                 | 😊          |
| Working conditions                                         | Knowledge requirements                                                                                 | high training level<br><b>moderate training level</b><br>low training level<br>no training          | 😐          |
|                                                            | Impact on working-time                                                                                 | - 20%                                                                                               | 😊          |
|                                                            | Impact on work peaks                                                                                   | -- / - / 0 / + / ++                                                                                 | 😊          |
|                                                            | Impact on human health                                                                                 | high risk<br>moderate risk<br><b>low risk</b><br>no risk                                            | 😊          |
|                                                            | Risk mitigation on operator/employee exposure                                                          | high mitigation<br><b>moderate mitigation</b><br>low mitigation<br>no mitigation                    | 😊          |
| Costs                                                      | Impact on various types of variable costs: fuel, energy, labour, water, consumables...                 | - 20%                                                                                               | 😊          |
| Outputs                                                    | Impact on yields (produced volumes)                                                                    | - 10%                                                                                               | 😞          |
| Profitability                                              | Impact on profit margin                                                                                | + 5%                                                                                                | 😐          |

## Impact Highlights

The use of tolerant or resistant potato varieties represents a highly effective novel approach for managing *Phytophthora infestans*, as confirmed by the systemic feasibility analysis.

It enables a reduction in pesticide use by over 25%. Fewer treatments lead to positive environmental outcomes, including reduced impact on bees and other insects, decreased surface water contamination, and lower pesticide emissions. This novel approach also decreases energy consumption, costs, and working hours.

However, it may reduce potential yields and affect end-product quality, thereby, having no significant impact on profit margins.

## Evaluation:

