



# Steady progression in potato late blight DSS' use by seed farmers in Brittany (France) : a safe way to comply with EU agroecological regulations



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## Introduction

Due to certification requirements, potato seed production implies highly qualified and technically up-dated operators. Potato foliage has to be protected against major pests, blight and viruses, namely. Still too often, late blight control relies on a seven-day routine treatment. But, due to ecological concerns, these practices should be progressively replaced by more integrated control measures. Late blight risk monitoring coupled with accurate meteorological data have been implemented and followed by seed growers for the past years in western Brittany.

The recent development of DSS-MilPV as a personal computer-based facility has been tested in 2006 by a larger group of seed potato growers (20). New Met stations have been deployed allowing more accurate blight risk assessment and the model recently calibrated with potato cultivar levels of blight resistance offer a new challenge for an integrated management of chemical input. Seed professional organizations such as Bretagne Plants and Germicopa, federated with Plant Protection Service and FEREDEC, have implemented this action.

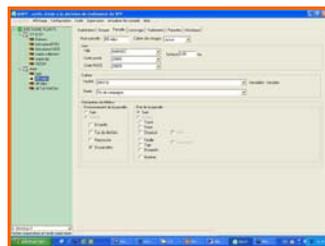
## Material & Methods

**MilPV-DSS** : MilPV is a model calibrated according epidemiological models Guntz-Divoux & Milsol (Fig.1). Input variables are climatic and sanitary environmental data. Chemicals (A.I.) and most potato cv's resistance level data have also been integrated (Fig.2). Action threshold (treat or not) is according met data into models, *P. infestans* pressure and cultivar susceptibility. On a daily basis, growers up-date their own data (crop growth status, local *Pi* pressure, irrigation, chemical treatment etc...) via an Internet connection.

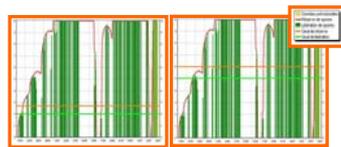
**Climatic data** : 4 automatic Met stations (Pict. 1), based amid seed production areas, record 4-hourly temperature, RH and rainfall, from April 1st until end July. On a 24h-basis, met data are validated by the agro-met centre of FEREDEC Midi-Pyrénées.

**Seed growers** : In 2006, 20 seed growers were connected individually to MilPV server, monitoring all together a total of 100 ha in the 2 major seed production areas of Brittany. Each farmer could monitor up to 15-20 different fields/cultivars per farm.

**Official *P. infestans* field monitoring network** : Tracking any out break in a given environment is crucial for the quality of DSS'output and treatment recommendations. Consequently, field scouting has to be organised thoroughly. From mid-April until end-July, many different field watchers are active in all potato growing areas ; they not only visually scout for blight outbreak but they also collect diseased material for isolation and subsequent observation by specialized lab (LRPV Loos) . Results of this exhaustive monitoring are weekly mailed to all seed potato growers, whether they are connected to MILPV or not.



**Figure 1. MilPV Input** : Personal data like field description, met station id, potato cultivar & level/type of PI resistance, list of potentially used chemicals, sanitary status of field nearby environment (volunteers, allotment gardens, waste pile) are recorded into MilPV. Any met (mist, rainfall) and/or agronomical (irrigation) events are also recorded.



**Figure 3. MilPV Output** : *P. infestans* Risk Curves, the orange line is the threshold limit for treatment, on the left, for susceptible cv's (level 2.75), on the right, higher level (level 6) for resistant one.

	Département	22	29	56	Total Bretagne
Démarche Sanitaire	A1	100%	96%	75%	90%
	A2	0%	4%	25%	10%
Test de Résistance ou Metaxyl-M	sensible	25%	31%	75%	45%
	résistante	75%	69%	25%	55%

**Table 1 - *P. infestans* population analysis**: Isolation and biological characterization for material collected in 3 of the Brittany counties.

## Results

- **MilPV Outputs** : After updating climatic data, the model retrieves instantly risk curves (Fig.3) for every field/cv ; *P. infestans* risk threshold levels depend also on cv's resistance level. During the growing period, MILPV gives daily *P. infestans* risk and recommends a chemical treatment –or not, with a suggested choice of active ingredients. The grower is the final judge for action.

- **End-of-campaign Data** : For a given field, all biological events and technical operations can be traced down, ie disease or pest outbreaks, chemical treatments (what and when), irrigation, haulm destruction and harvest ; these data are fully saved and retrievable when necessary.

**General Info** : Besides daily and field-specific info issued by the personal DSS's, seed farmers are informed, by postal mail or fax or e-mail, of the regional sanitary situation via the Info Fax sheet (Fig.4).

In 2006, through intensive scouting 42 *P. infestans* isolates have been analysed (Tab.1). Almost 90 % of the isolates are from the A1 sexual type but 50 % are found to be metaxyl-resistant under lab conditions.

## Conclusions & Perspectives

In 2006, MilPV has been used by 20 seed potato growers in Brittany, successfully. At the first place, the tool helps the operator to chemically act according *P. infestans* actual risk in a given agroecological environment and EU agricultural regulations. It generates and saves all agricultural actions done on a given field, contributing to the endless need for traceability.

Being a tool in a constant dynamics of improvement (fate of any predictive model), the two biological variables, ie host (potato cv) and pathogen (*P. infestans* pop), calibrated in the model are under constant watch over and the use of the DSS is the best mean of improvement. Through *P. infestans* accurate monitoring, it is also an indirect control for efficacy of phytosanitary products.

Perspectives for 2007 are 1-) adding new met stations where potato fields are mostly concentrated and 2-) convincing new users to join the action.

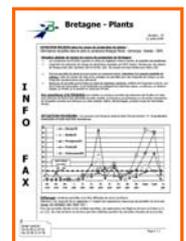
*Special thanks & recognition to farmers for their failless confidence and motivation*



**Picture 1.** Cimet meteorological station, located in a 15km- vicinity of potato fields.



**Figure 2.** MilPV Input "Cultivar List" : In a given area where MilPV is to be used, mostly grown cultivars are made available for farmers to choose and integrate in their personal set of data.



**Figure 4.** Info Fax Sheet Weekly technical bulletin with sanitary info (blight, aphids, ...) sent to all seed farmers