Mileo® - the French Potato Late Blight DSS: continuous improvement over the past decade!

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Mileo® is a web-based, on-farm DSS available to potato growers to control potato late blight (LB), in France. It results from a collaboration between ARVALIS and the Ministry of Agriculture (SRAL Nord-Pas de Calais). The 2 pre-existing DSS’s (MLPV and Mildi-LIS) have been fused, in 2009, into an optimized tool, entirely reviewed and up-dated in order to better meet national demand and help farmers to comply with EU regulations.

With Mileo® (see www.mileo.fr), the fungicide application on potato crops is triggered, according a real-time LB risk assessment taking into account environmental data (climatic and disease pressure), agronomical data such as cultivar’s LB resistance and crop health practices for the potato field as chemical input and irrigation.

Mileo® : model description & action thresholds

The most significant improvements ...

Comparative analysis of computed VS observed data for a continuous adjustment that takes into account:

- Genetic evolution (virulence & chem-resistance) of LB populations (Corbière, pers comm)
- Better quantification of primary inoculum sources (in progress ; Ticky et al, 2012)
- Effect of low temperatures (<6-8°C) on the germination of the spores taking into account
- Incubation length better calibrated according to temperature,
- More accurate value for “produced spores” for successive LB cycles
- Integration of cultivar resistance to LB, (updated European Catalog)
- Integration of weather forecast : • 3 days

Mileo® : a tool to follow up LB epidemics

For a better understanding of environmental impact on LB epidemics, Mileo® is a very useful tool for comparing data (x=cumulated f(Log nb of spores)) over years and per site (Figure 3). The same data analysis can be performed to characterize LB epidemics in different sites in a given year.

Mileo® - new version - is an amalgamated model initially based on the epidemiological model Guntz-Divoux then implemented for hourly quantitative assessment of contamination index through the model Milso by calculating the number of live spores available on the crop foliage.

More recently, the fused model was revised and set up as 4 different compartments (Figure 1) strictly simulating the different steps of a LB epidemiological cycle, from contamination to dispersal as well as the overlapping successive cycles.

Required input variables are hourly temperature, relative humidity and rainfall. Additional environmental data (crop growth rate, cultivar, disease pressure, irrigation) are daily updated & contribute to the set up of action thresholds: treat or not, and what to treat with (Figure 2).

Mileo® : a tool for the National Crop Surveillance - BSV

For this purpose, a simplified version of Mileo® is used as a weekly LB risk analysis giving LB alerts at the level of a region. No treatment recommendation is given. The criteria of the number of potential LB generations according local met data allows the comparison of disease progression between regions.

Some Figures for 2012

In 2012, the total amount of connections …
- for extension and technical teams, was … 21
- for individual potato growers, … 410
- 380 different plots (field x cultivar x met station) were supervised, equivalent to … 20.000 ha, and representing all types of potato crops: earlys, fresh/ware, processing, starch and seeds; in most of the potato growing Regions: Nord-Pas de Calais, Picardy, Brittany, Beauce, Alsace and Champagne.

The tool has also been recently experimented in Tunisia and Canada.