

# Two types of resistance to late blight in potato

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## The interest of using genetic resistance

Potato late blight is currently managed using fungicides. IFT (Frequency Treatment Index) is often above 10 ([www.agreste.agriculture.gouv](http://www.agreste.agriculture.gouv)).

Genetic resistance to late blight is one of the tools that can be used to control the disease while decreasing the use of fungicides.

Two types of resistance can be distinguished : specific resistance and partial resistance. Both are characterised by differences in the evolution of symptoms. One is known to be overcome more or less rapidly, the other one is supposed to be more durable.

## Specific resistance are monogenic and rapidly overcome

An efficient specific resistance is characterized by no symptom at all (figure 1).

Breeding for this type of resistance is quite easy in adapted conditions, because it means breeding for the presence of only one gene (figure 2).



Figure 1: Foliage destruction relatively to the time for plants harboring different types of R genes (RS: specific resistance)

However, these genes are more or less rapidly overcome by the pathogen. The loss of efficiency of R2 gene is illustrated on figure 3.

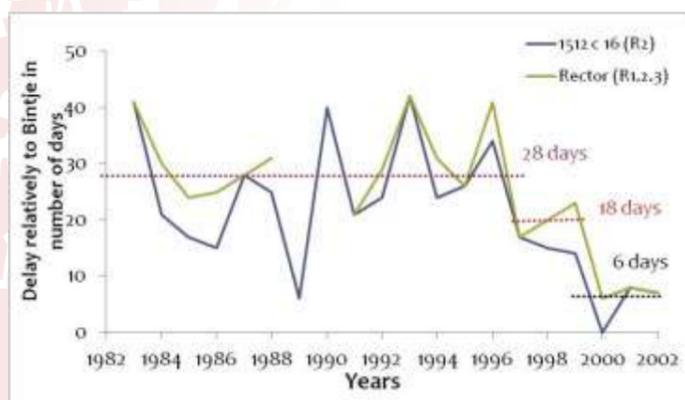


Figure 3: Loss of efficiency of R2 gene.

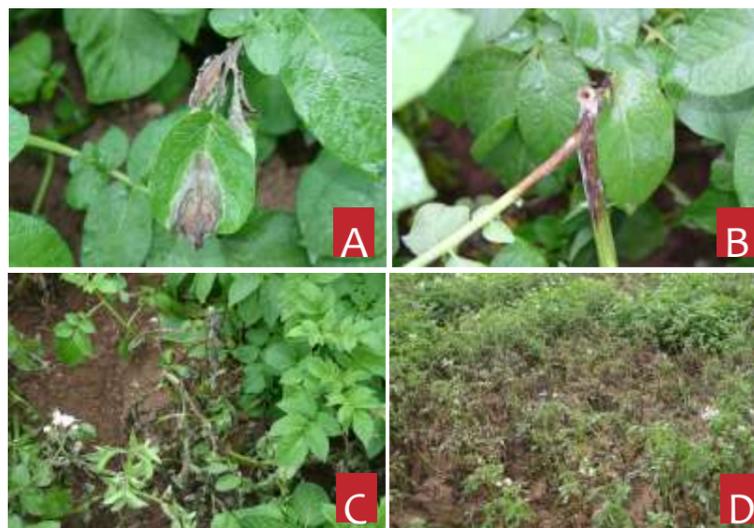
Delay of the contamination calculated relatively to the first symptom observed on Bintje in number of days in Ploudaniel (France, 29) from 1983 to 2002.

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## Late blight symptoms



A: symptoms on leaves, B: symptoms on stems, C: plant destruction, D: focus of infection in the field

## Partial resistance could be less easily overcome

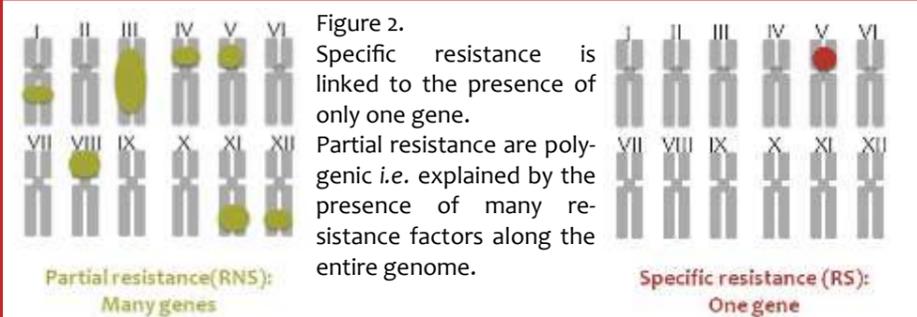
Partial resistance is characterised by a decrease of the disease evolution on the plant (figure 4).

Breeding for this type of resistance is difficult because numerous genes are involved (figure 2).

By analogy, selection of isolates able to overcome numerous genes is also more difficult. This explains the hypothesis made that partial resistance should be less easily overcome than specific ones.



Figure 4 Foliage destruction relatively to the time for plants harboring partial resistance only (RNS) or in combination with specific resistance (RS)



## Work in progress on partial resistance

Breeding for partial resistance is difficult using traditional methods. In collaboration with Inra, FN3PT has conducted a research program since 2003 aiming at exploring the potential of molecular markers to breed for late blight resistance.

One of the aims of the potato group of UMR Igepp is to search for partial resistance main components and to look for new resistance sources in wild species related to cultivated potato.