

The General Defense Reaction (GDR) Which Determines the Degree of Susceptibility in Pepper

Eszter Szarka - Primordium Ltd; Budapest, Hungary

Janos Szarka - Primordium Ltd; Budapest, Hungary

Gabor Csillery - Budakert Ltd; Budapest, Hungary

- Esasem Spa.; Casaleone, Italy

In Hungary the most dangerous pepper pathogenes

- *Tobamo viruses* (TMV, ToMV, PMMoV)
- *Tospo virus* (TSWV)
- Bacterial leaf spot (*Xanthomonas v.*)

Specific resistance genes

- Tobamo virus: *L1, L3, L4*
- Tospo virus: *Tsw*
- *Xanthomonas vesicatoria*: *Bs1, Bs2, Bs3*

All of them cause *hypersensitive reaction* if the leaves are infected by pathogene

We know and we also use these monogenic, dominant **specific resistance** genes in our breeding program.

We preferred the **quick and characteristic reaction**.

This phenomenon was effected on us for 25 years.

Revolutionary new ways in plant pathology and in resistance breeding

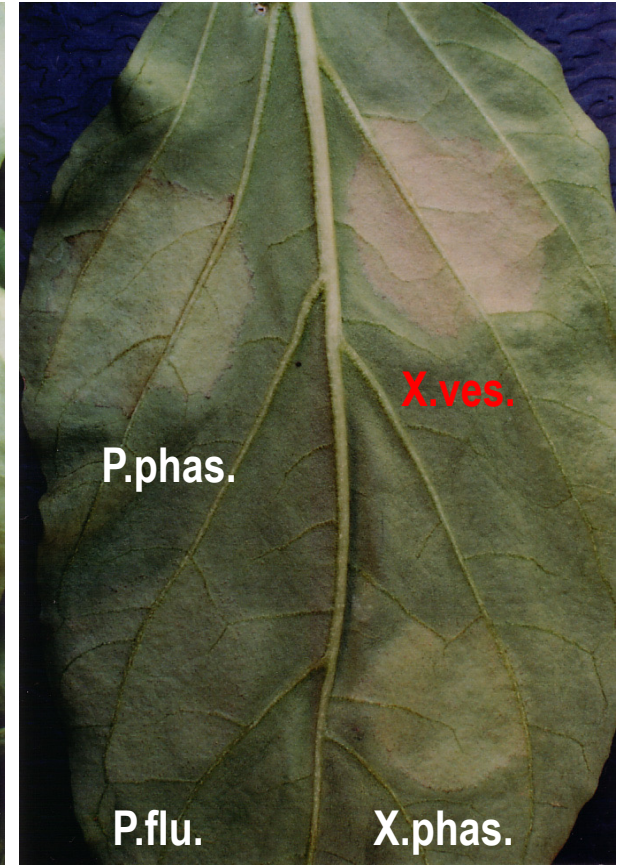
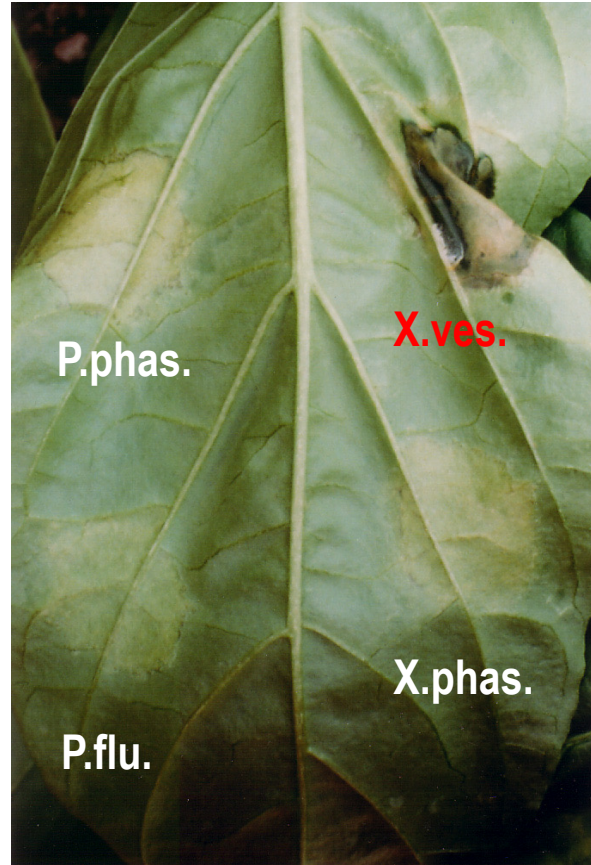
- general defense system – gene symbol: *gds*
monogenic, recessive,
no hypersensitive reaction against
Xanthomonas v.
- General Defense Reaction – symbol: GDR
effective against other pathogens



Interaction between different pathogen species and pepper (infection by injection)



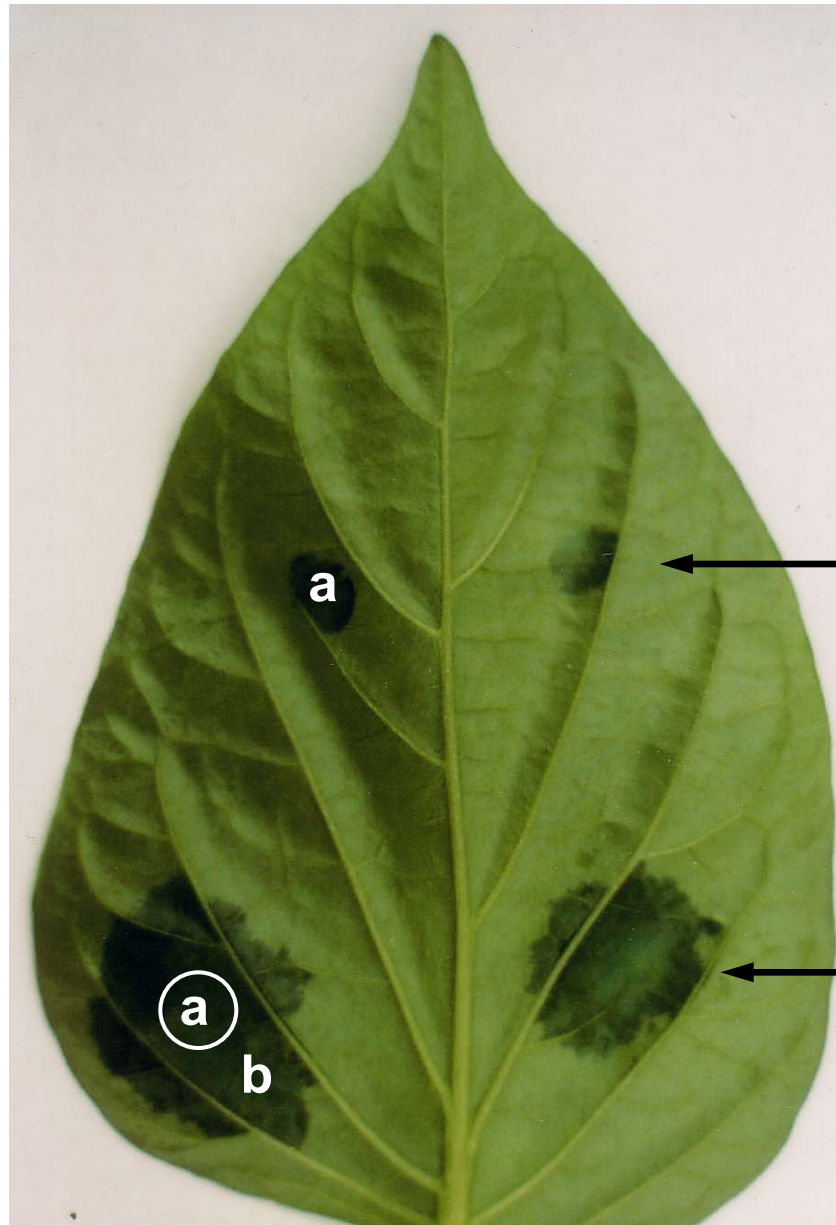
**Interaction between different pathogen species and
pepper lines with different level General Defense Reaction (GDR)
(infection by injection)**



Low level GDR

High level GDR

The effect of injuries of plant cells on the operation of the GDR

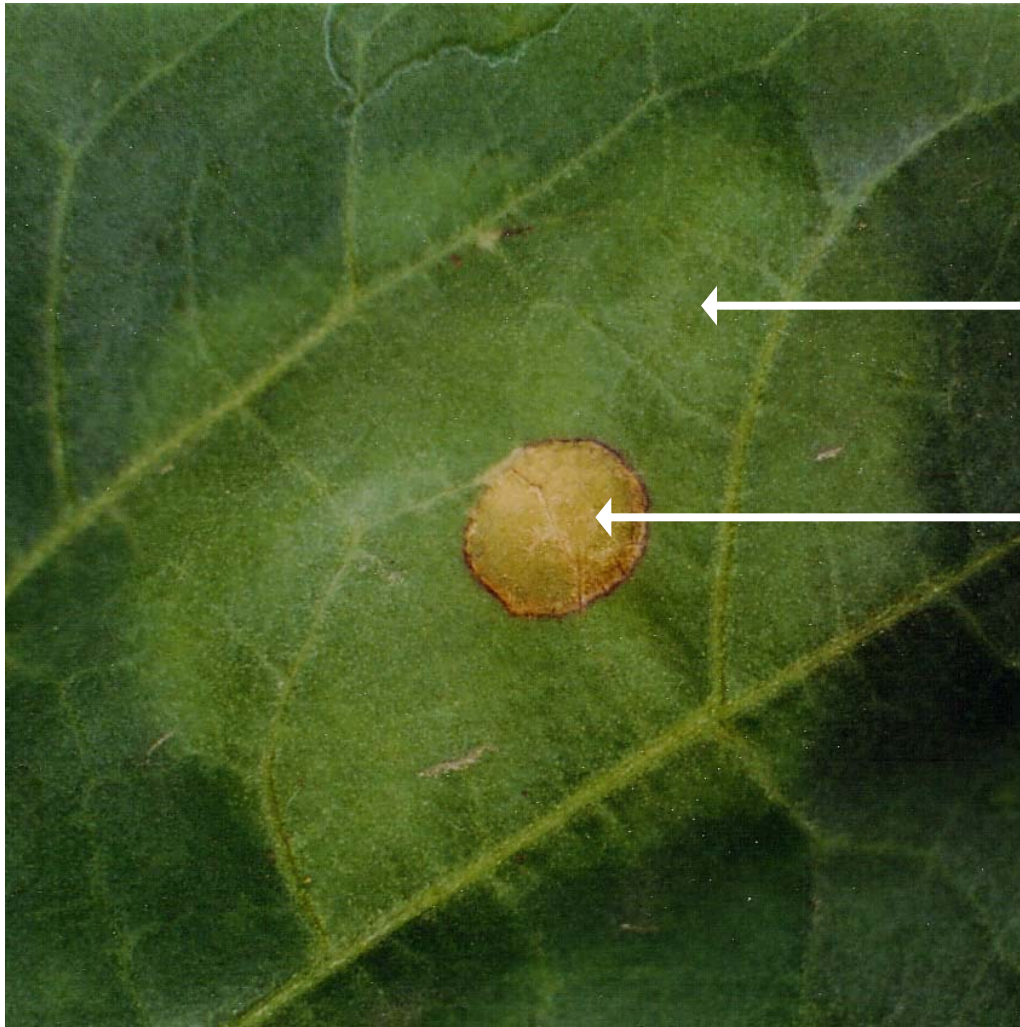


mechanical
pressure (a)

then

infection (b)

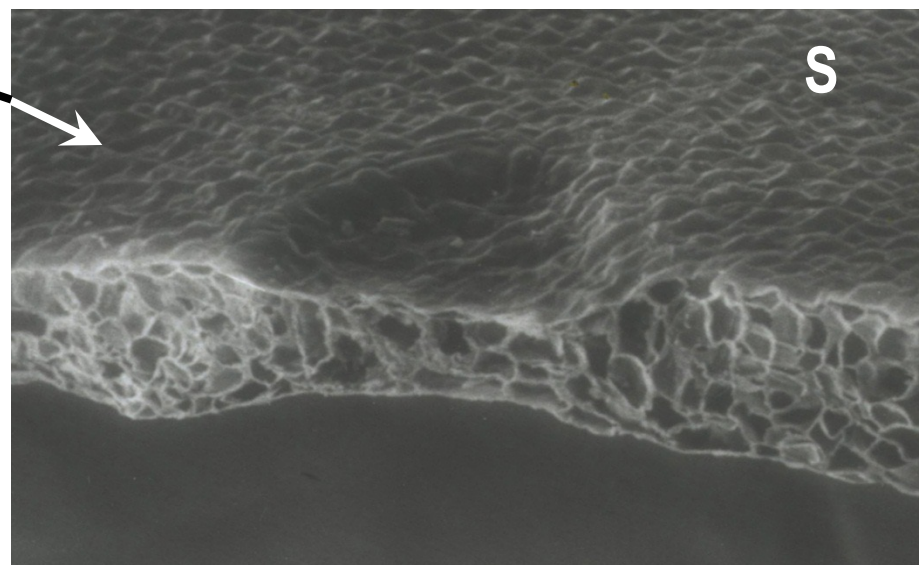
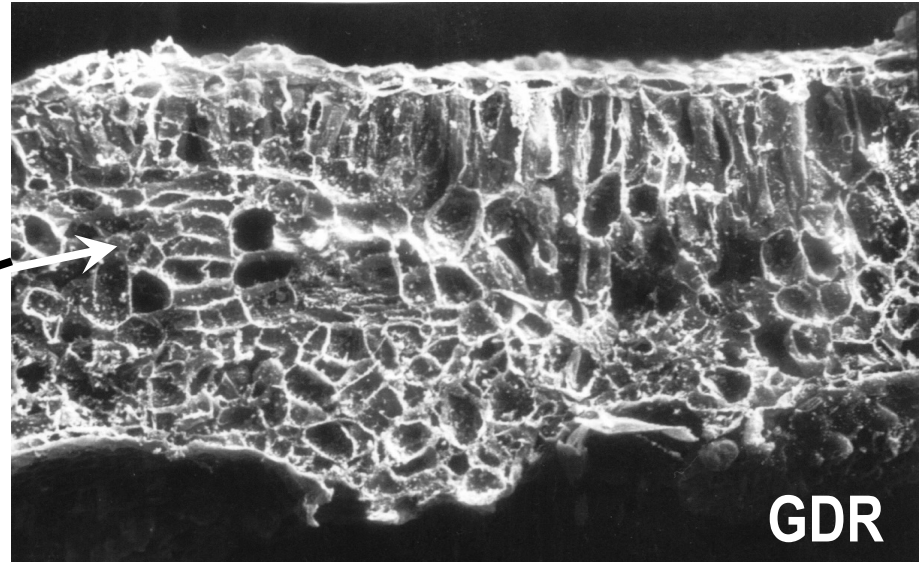
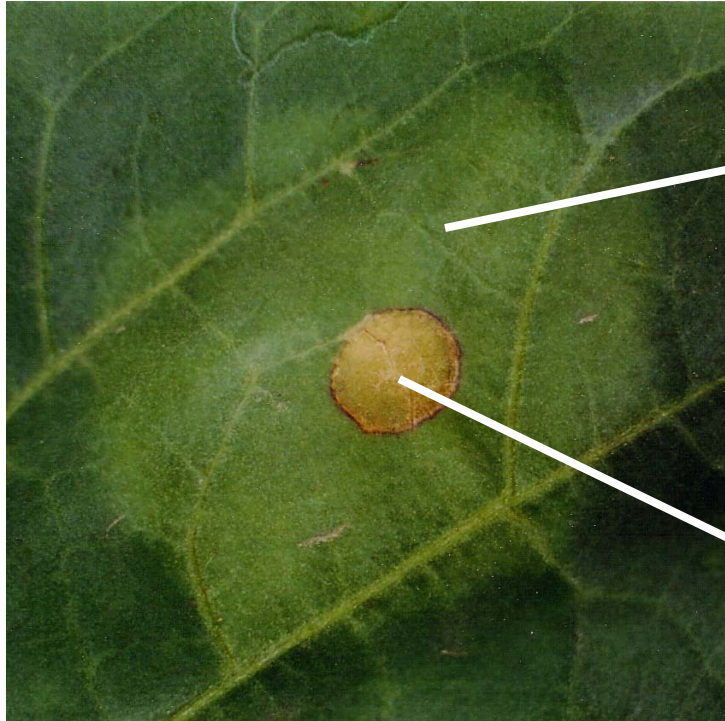
The effect of injuries of plant cells on the operation of the GDR



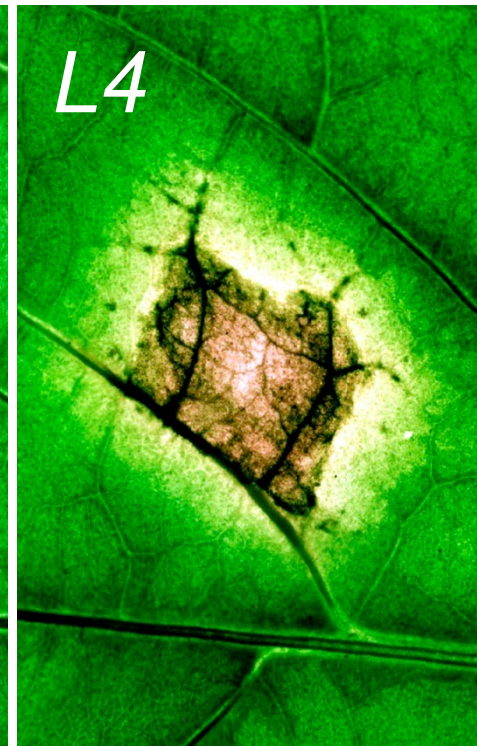
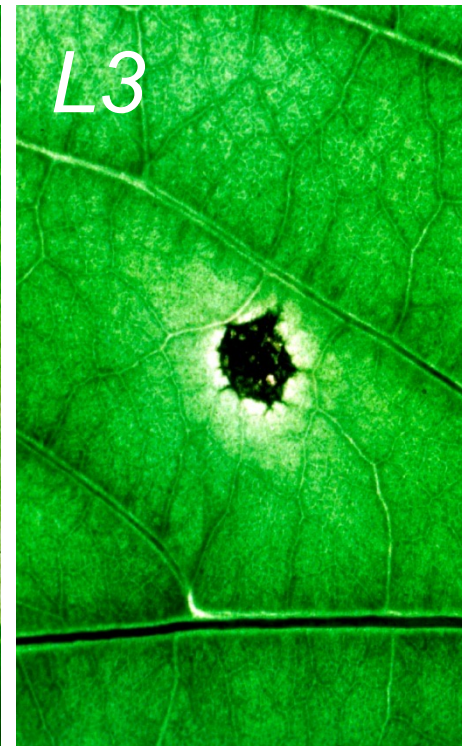
Reaction referring to the GDR

Water-soaking patch referring to susceptibility

The General Defense Reaction (GDR) and susceptibility (S) on microscopic level



Tobamoviruses (TMV, ToMV, PMMV):
 L^1 , L^2 , L^3 , L^4 alleles of L gene (artificial infection)



**Tospovirus (TSWV): *Tsw* gene
(artificial infection)**



***Xanthomonas vesicatoria* bacterium : *Bs-1*, *Bs-2*, *Bs-3* genes
(artificial infection)**



Bs-1



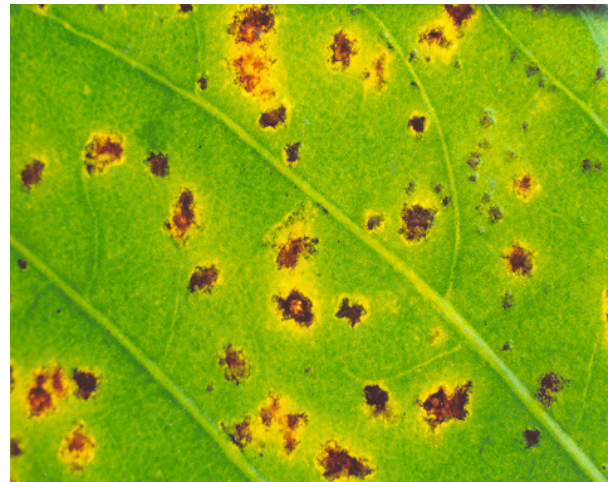
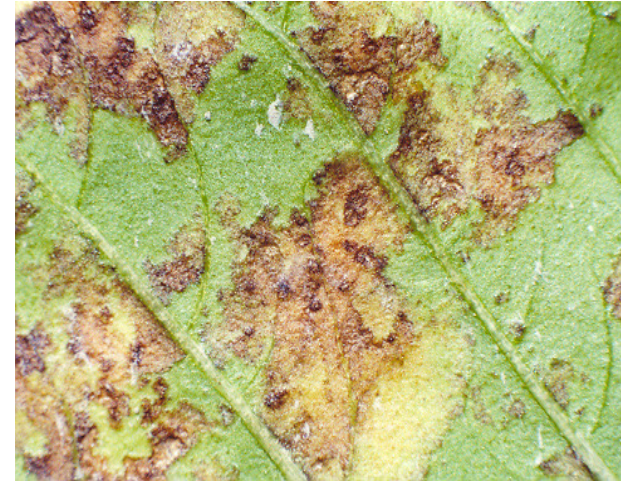
Bs-2



Bs-3

Reactions of pepper lines - containing the *Bs-2* resistance gene - in the case of DIFFERENTLY RAINY AND COLD WEATHER

Increasing humidity, decreasing temperature →

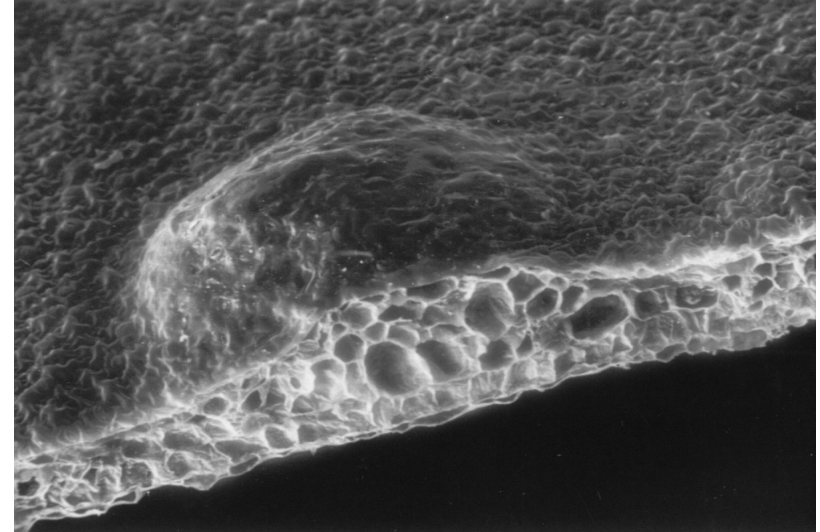
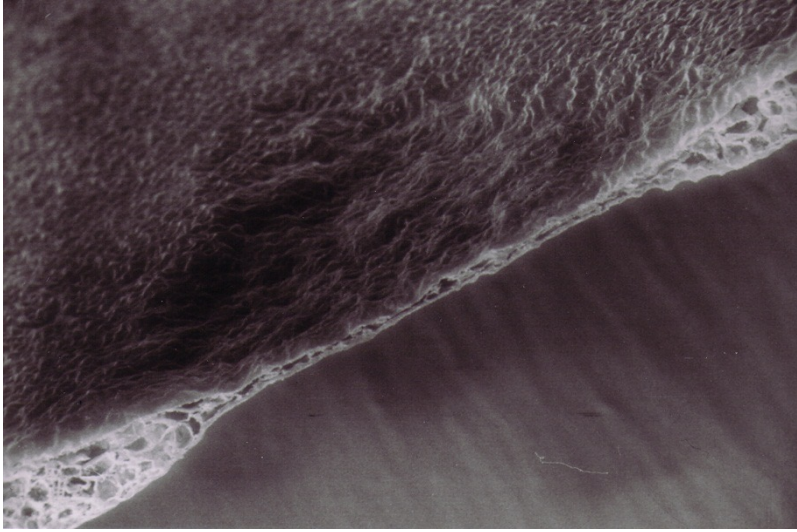


Symptoms of *Xanthomonas vesicatoria* on pepper lines in the case of natural (A) and artificial (B) infection

HR

High level GDR

A



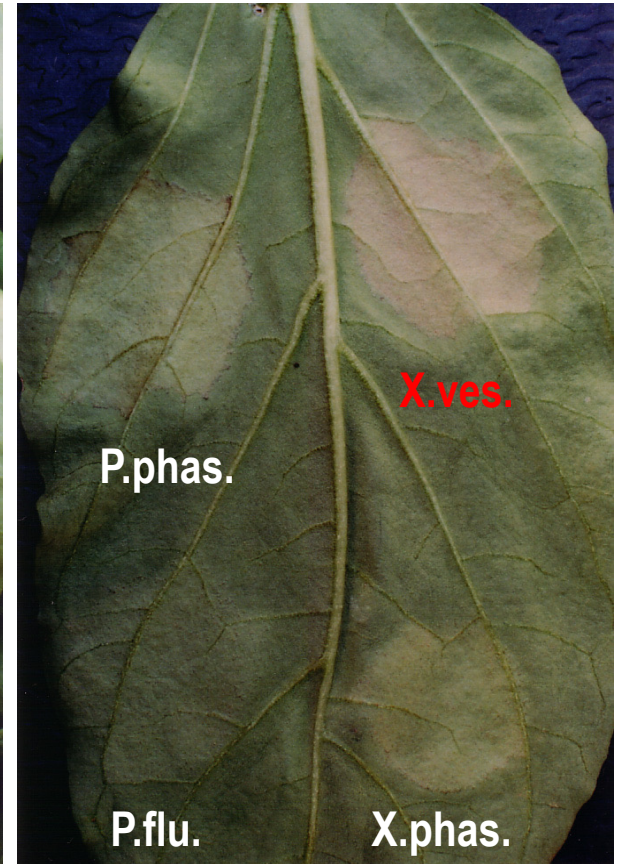
B



The high level of GDR and the specific resistance gene together cause **double defense system** which is the most powerful protection for the plant.

Genetists, pathologists, breeders!

Check the GDR level of your lines!!!



Low level GDR

High level GDR

This poster was presented at the XIVth Eucarpia Meeting in Valencia

Which is the resistant response?

Tissue alterations developed
as consequences of identical infections



Please vote!

According as which reaction you consider to be the manifestation of resistance
please put an 'X' in one of the empty squares of field A or B!

A	B																														
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Authors:

Gábor Csillery Budakert Ltd., Hungary csilleryg@vipmail.hu
Eszter Szarka Primordium Ltd., Hungary jszarka@freemail.hu
Janos Szarka Primordium Ltd., Hungary janos.szarka@t-online.hu