

Expression of selected potato R genes in incompatible and compatible interaction with *P. infestans* isolates



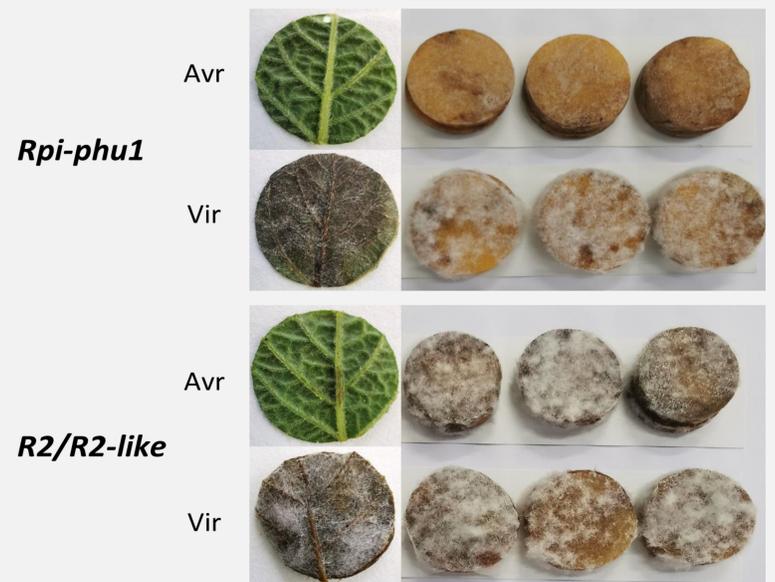
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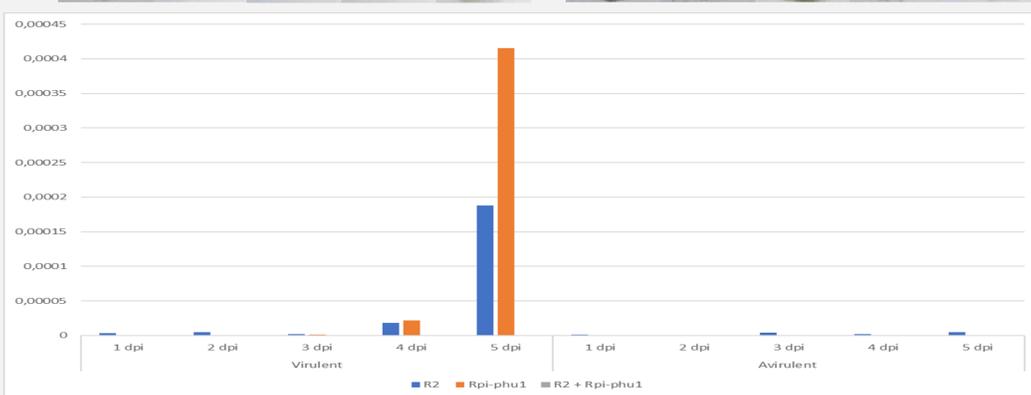
Late blight (LB) caused by *Phytophthora infestans* is the serious obstacle to potato production worldwide. The most effective way to reduce its negative impact is growing of potato cultivars that are resistant to LB. Resistance breeding is based mainly on the resistance (R) genes identified in *Solanum* species. These R genes encode proteins that directly or indirectly detect effector proteins produced by the pathogen. This leads to the activation of effector-triggered immunity (ETI) and results in typical hypersensitive response (HR).

P. infestans infects foliage as well as tubers of potato. Relationship between resistance of tubers and foliage against *P. infestans* remains unclear and foliage resistance does not guarantee tuber resistance.

In the case of interaction with compatible races of the pathogen some R genes (*Rpi-phu1*) provides effective protection of foliage and tubers while other (*R2*) fails in tuber resistance. One of the hypothetical explanation of this phenomenon are differences in level of expressions of such genes. Here we present just quick overview of preliminary results of our researches aimed to verify this hypothesis.



For our researches, we selected non-transgenic plants of cultivar Bzura (*R2/R2-like*), potato clones TG 97-411 (*Rpi-phu1*) and DC 69 (*R2* and *Rpi-phu1*). Leaflets and tuber slices of these cultivars were inoculated with virulent and avirulent races of *P. infestans* to assess its resistance and measure relative level of *R2* and *Rpi-phu1* genes expression before and 1-5 days post inoculation (dpi).



Level of relative expression of *Rpi-phu1* and *R2* gene in potato foliage in incompatible and compatible interaction with *P. infestans* at 1 – 5 dpi.

In all tested cultivars, leaflets inoculated with avirulent races of the pathogen show no symptoms or only very small necroses typical for HR. Leaflets inoculated with virulent isolates show also very small necrosis in 1dpi, but later symptoms of infection increase rapidly (especially at 4 dpi and 5 dpi).

Such situation is also reflected in the level of relative expression of the studied genes.

In the case of compatible interactions (inoculation with avirulent races) we do not observe significant differences in expression of both genes during all five days of the experiment. In the case of incompatible interaction (inoculation with virulent races of *P. infestans*) significant increase of relative expression of *Rpi-phu1* as well as *R2* genes was observed at 4 dpi and 5 dpi.



The next step in of our study will be to compare the levels of relative expression of *R2* and *Rpi-phu1* genes in tuber slices during incompatible and compatible interactions with *P. infestans* races.

