EXPRESSION PROFILING OF SUSCEPTIBILITY GENES REVEALS THEIR ROLE IN CULTIVAR-DEPENDENT RESPONSE TO *PHYTOPHTHORA INFESTANS* IN POTATO

R. KHALID [1], M.A. ALI [1], A. KHAN [2], B. TABASSUM *[1]

[1] School of Biological Sciences, University of the Punjab, Lahore, 54590, Pakistan

[2] Department of Microbiology, Balochistan University of Information Technology, Engineering and Management Sciences, Quetta, 87300, Pakistan

E-mail: ridakhalidpulhr@gmail.com, akhtaralimuhammad@gmail.com, anwarleo2003@gmail.com, bushratabassum.sbs@pu.edu.pk

* Corresponding author: Tabassum B., e-mail: bushratabassum.sbs@pu.edu.pk

Phytophthora infestans is a highly destructive oomycete for Solanum tuberosum (potato), causing late blight disease with significant yield losses worldwide. While resistance (R) genes and targeted editing of susceptibility (S) genes have been widely investigated for disease management, the functional dynamics of S-genes during infection are less understood. In this study, we investigated cultivar-dependent differences in late blight susceptibility and the expression of S-genes during different infection stages. Desiree was the most susceptible cultivar, followed by Lady Rosetta, Sante, Cardinal, Asterix, Coroda, and Mozika. While no visual tuber blight symptoms were observed, infected plants produced a significantly higher number of smaller-sized tubers, which suggests the impact of foliage late blight. Among the candidate S-genes, expression analysis revealed that St-DMR6, St-PMR4, and St-CESA3 underwent consistent early induction (5 dpi) across all susceptible cultivars. However, by 15 dpi, expression patterns became cultivar-specific; induction was sustained in Cardinal and Desiree but suppressed in Coroda and Lady Rosetta. The early induction of S-gene(s) at 5 dpi likely depicts facilitated pathogen colonization, while sustained expression at 15 dpi indicated a stable role during later stages of infection. Our findings highlight the critical involvement of S-genes, particularly St-PMR4, in mediating cultivar-specific susceptibility to P. infestans *and provide potential targets for developing late blight-resistant potato through genome editing.*

Key words: *Phytophthora infestans, Solanum tuberosum (potato), Late Blight, Susceptibility Genes, Quantitative PCR.*

ПРОФІЛЮВАННЯ ЕКСПРЕСІЇ ГЕНІВ СПРИЙНЯТЛИВОСТІ РОЗКРИВАЄ ЇХНЮ РОЛЬ У ЗАЛЕЖНОСТІ РЕАКЦІЇ НА *PHYTOPHTHORA INFESTANS* ВІД СОРТУ КАРТОПЛІ

Phytophthora infestans — це дуже руйнівний ооміцет для *Solanum tuberosum* (картоплі), який викликає фітофтороз і значні втрати врожаю в усьому світі. Хоча для боротьби з хворобою було проведено глибокі дослідження генів резистентності (R) та цільового редагування генів сприйнятливості (S), функціональна динаміка генів S під час інфікування є менш вивченою. У цьому дослідженні ми вивчали сортозалежні відмінності у сприйнятливості до фітофторозу та експресію генів S на різних стадіях інфікування. Desiree виявився найбільш сприйнятливим сортом, за ним слідували *Lady Rosetta*, *Sante*, *Cardinal*, *Asterix*, *Coroda* та *Mozika*. Хоча візуальних симптомів фітофторозу бульб не спостерігалося, інфіковані рослини давали значно більшу кількість бульб меншого розміру, що свідчить про вплив фітофторозу листя. Серед кандидатів у гени S аналіз експресії показав, що *St-DMR6*, *St-PMR4* та *St-CESA3* зазнавали послідовної ранньої індукції (5 дпі) у всіх сприйнятливих сортах. Однак до 15 дпі патерни експресії стали специфічними для сортів; індукція зберігалася у сортів *Cardinal* і *Desiree*, але пригнічувалася у сортів *Coroda* і *Lady Rosetta*. Раннє індукування S-генів на 5 дпі, ймовірно, свідчить про полегшену колонізацію патогену, тоді як стійка експресія на 15 дпі вказує на стабільну роль на пізніх стадіях інфекції. Наші висновки підкреслюють важливу роль S-генів, зокрема *St-PMR4*, у посередництві сприйнятливості до *P. infestans,* специфічної для сорту, і надають потенційні цілі для розробки картоплі, стійкої до фітофторозу, шляхом редагування геному.

Ключові слова: *Phytophthora infestans, Solanum tuberosum* (картопля), фітофтороз, гени сприйнятливості, кількісна ПЛР.

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Received October 09, 2025
Received January 27, 2026
Accepted May 18, 2026