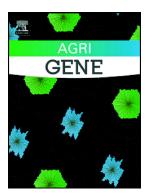
## Accepted Manuscript

Multiple R genes and phenolic compounds synthesis involved in the durable resistance to Phytophthora infestans in potato cv. Cooperation 88



Dahai Hao, Jie Yang, Weibiao Long, Jing Yi, Peter VanderZaag, Canhui Li

PII: DOI: Reference:	S2352-2151(18)30007-2 doi:10.1016/j.aggene.2018.04.001 AGGENE 68
To appear in:	
Received date:	8 December 2016

Revised date:6 April 2018Accepted date:10 April 2018

Please cite this article as: Dahai Hao, Jie Yang, Weibiao Long, Jing Yi, Peter VanderZaag, Canhui Li, Multiple R genes and phenolic compounds synthesis involved in the durable resistance to Phytophthora infestans in potato cv. Cooperation 88. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Aggene(2018), doi:10.1016/j.aggene.2018.04.001

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## ACCEPTED MANUSCRIPT

## Multiple R genes and phenolic compounds synthesis involved in the durable resistance to *Phytophthora infestans* in potato cv. Cooperation 88

Dahai Hao<sup>1,2</sup> . Jie Yang<sup>1</sup>. Weibiao Long<sup>1</sup>. Jing Yi<sup>1</sup>. Peter VanderZaag<sup>1</sup> . Canhui Li<sup>1</sup>

<sup>1</sup>Joint Academy of Potato Science, School of Life Science, Yunnan Normal University, Kunming, China.

<sup>2</sup>Engineering Research Center of Sustainable Development and Utilization of Biomass Energy, Ministry of Education, Key Laboratory of Biomass Energy and Environmental Biotechnology of Yunnan Province, Yunnan Normal University, Kunming, China

<sup>\*</sup>Corresponding author.

Abstract Late blight (LB), Phytophthora infestans (PI) as pathogen, is the most devastating disease limiting potato production globally. In the Tropic highlands it can reduce yields by more than 50%. Cooperation-88 (C88) is a potato variety with high levels of durable resistance to PI, even after being widely grown for over 20 years. To more fully understand the mechanism of the resistance to PI of this variety, we inoculated detached leaves of young C88 plants with PI isolate XA-4 (super race with vir 1-11). Samples of one day post pathogen inoculation (1 dpi), 3 dpi, 5 dpi and control treated with sterile water were collected and frozen with liquid nitrogen. Transcriptomes of these 4 samples were sequenced by the next-generation sequencing platform Illumina Hiseq 2000. Totally ~68 M clean reads were obtained. With the genome of S. phureja clone DM1-3 516R44 as reference, these clean reads were processed by GO analysis, KEGG pathway enrichment analysis and differential expression analysis. PI inoculation of C88 leaves resulted in the following: a) in the 3 pathogen inoculated samples, 3,950 were differentially regulated compared to those in the control; c) at 1 dpi increased expression genes were nearly double the number of decreased expression genes; d) 665 genes were differentially expressed in every treatments; e) gene expression levels in photosynthesis and the chloroplast were mostly diminished. The high durable late blight resistance C88 is composed of: a) 344 expressed R genes; b) 9 pathogenesis-related genes, particularly osmotin gene and endochitinase gene expressions increased dramatically with PI inoculation; c) Thirty genes for phenolic compounds synthesis expressions increased with PI inoculation from small to large multiples compared to the control; and d) R genes need pathogenesis proteins and phenolic compounds to have superior durable resistance to PI.

**Keywords** digital expression profiling; potato; Cooperation 88; late blight resistance; R genes; pathogenesis-related proteins; phenolic compounds

Abbreviation list 3GT: anthocyanidin 3-O-glucosyltransferase 5GT: anthocyanidin 5-O-glucosyltransferase A5AAT: anthocyanin 5-aromatic acyltransferase AAT: anthocyanin acyltransferase ACX1: acyl-CoA-oxidase 1 AGT: anthocyanin glucosyltransferase ANP: anthocyanin permease ANS: anthocyanidin synthase Download English Version:

## https://daneshyari.com/en/article/8634893

Download Persian Version:

https://daneshyari.com/article/8634893

Daneshyari.com