Transcriptome analysis of root-knot nematode (Meloidogyne incognita)-infected tomato (Solanum lycopersicum) roots reveals complex gene expression profiles and metabolic networks of both host and nematode during susceptible and resistance responses - DTU Orbit (24/10/2018)

Transcriptome analysis of root-knot nematode (Meloidogyne incognita)-infected tomato (Solanum lycopersicum) roots reveals complex gene expression profiles and metabolic networks of both host and nematode during susceptible and resistance responses

Root knot nematodes (RKNs, Meloidogyne incognita) are economically important endoparasites having a wide-host range. We have taken a comprehensive transcriptomic approach to investigate the expression of both tomato and RKN genes in tomato roots at five infection time intervals from susceptible plants and two infection time intervals from resistant plants, grown under soil conditions. Differentially expressed genes during susceptible (1827-tomato, 462-RKN) and resistance (25-tomato, 160-RKN) interactions were identified. In susceptible responses, tomato genes involved in cell wall structure, development, primary and secondary metabolites and defense signalling pathways along with RKN genes involved in host parasitism, development and defense are discussed. In resistance responses, tomato genes involved in secondary metabolite and hormone-mediated defense responses along with RKN genes involved in starvation stress-induced apoptosis are discussed. Also, forty novel differentially expressed RKN genes encoding secretory proteins were identified. Our findings, for the first time, provide novel insights into temporal regulation of genes involved in various biological processes from tomato and RKN simultaneously during susceptible and resistance responses, and reveals involvement of a complex network of biosynthetic pathways during disease development.

General information
State: Published
Organisations: Department of Bio and Health Informatics, Department of Biotechnology and Biomedicine, Metagenomics, Disease Intelligence and Molecular Evolution, University of Delhi
Contributors: Shukla, N., Yadav, R., Kaur, P., Rasmussen, S., Goel, S., Agarwal, M., Jagannath, A., Gupta, R., Kumar, A.
Pages: 615-633
Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: Molecular Plant Pathology
Volume: 19
Issue number: 3
ISSN (Print): 1464-6722
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 4.2 SJR 1.932 SNIP 1.537
Web of Science (2017): Impact factor 4.188
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.45 SJR 1.942 SNIP 1.57
Web of Science (2016): Impact factor 4.697
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 4.68 SJR 2.167 SNIP 1.633
Web of Science (2015): Impact factor 4.335
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 4.48 SJR 2.065 SNIP 1.688
Web of Science (2014): Impact factor 4.724
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 4.7 SJR 2.096 SNIP 1.631
Web of Science (2013): Impact factor 4.485
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 4.09 SJR 1.766 SNIP 1.587
Web of Science (2012): Impact factor 3.877
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes