



Review in Advance first posted online
on June 5, 2015. (Changes may
still occur before final publication
online and in print.)

Quantitative Resistance to Biotrophic Filamentous Plant Pathogens: Concepts, Misconceptions, and Mechanisms

Rients E. Niks,¹ Xiaoquan Qi,² and Thierry C. Marcel³

¹Laboratory of Plant Breeding, Wageningen University and Research Centre,
6700 AJ Wageningen, The Netherlands; email: rients.niks@wur.nl

²Institute of Botany, Chinese Academy of Sciences, Nanxincun 20, Fragrant Hill,
Beijing 100093, China; email: xqi@ibcas.ac.cn

³INRA, UMR1290, BIOGER, F-78850 Thiverval-Grignon, France; AgroParisTech,
UMR1290, BIOGER, F-78850 Thiverval-Grignon, France;
email: thierry.marcel@versailles.inra.fr

Annu. Rev. Phytopathol. 2015. 53:21.1–21.26

The *Annual Review of Phytopathology* is online at
phyto.annualreviews.org

This article's doi:
10.1146/annurev-phyto-080614-115928

Copyright © 2015 by Annual Reviews.
All rights reserved

Keywords

partial resistance, effector targets, durability, basal resistance, mechanisms

Abstract

Quantitative resistance (QR) refers to a resistance that is phenotypically incomplete and is based on the joined effect of several genes, each contributing quantitatively to the level of plant defense. Often, QR remains durably effective, which is the primary driver behind the interest in it. The various terms that are used to refer to QR, such as field resistance, adult plant resistance, and basal resistance, reflect the many properties attributed to it. In this article, we discuss aspects connected to those attributions, in particular the hypothesis that much of the QR to biotrophic filamentous pathogens is basal resistance, i.e., poor suppression of PAMP-triggered defense by effectors. We discuss what role effectors play in suppressing defense or improving access to nutrients. Based on the functions of the few plant proteins identified as involved in QR, vesicle trafficking and protein/metabolite transportation are likely to be common physiological processes relevant to QR.