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APOPLASTIC POLYAMINE OXIDATION PLAYS DIFFERENT ROLES IN LOCAL RESPONSES OF TOBACCO TO INFECTION BY THE NECROTROPHIC FUNGUS *Sclerotinia sclerotiorum* AND THE BIOTROPHIC BACTERIUM *Pseudomonas viridiflava*

Marina M, Maiale SJ, Rossi FR, Romero MF, Rivas EI, Gárriz A, Ruiz OA and Pieckenstain FL. IIB-INTECH/UNSAM-CONICET, Argentina.

The role of polyamine (PA) metabolism in tobacco (*Nicotiana tabacum*) defense against pathogens with contrasting pathogenic strategies was evaluated. Infection by the necrotrophic fungus *Sclerotinia sclerotiorum* resulted in increased arginine decarboxylase expression and activity in host tissues, as well as putrescine and spermine accumulation in leaf apoplast. Enhancement of leaf PA levels, either by using transgenic plants or infiltration with exogenous PAs, led to increased necrosis due to infection by *S. sclerotiorum*. Specific inhibition of diamine and polyamine oxidases (DAO and PAO) attenuated the PA-induced enhancement of leaf necrosis during fungal infection. When tobacco responses to infection by the biotrophic bacterium *Pseudomonas viridiflava* were investigated, an increase of apoplastic spermine levels was detected. Enhancement of host PA levels by the above-described experimental approaches strongly decreased *in planta* bacterial growth, an effect that was blocked by a PAO inhibitor.

It can be concluded that accumulation and further oxidation of free PAs in the leaf apoplast of tobacco plants occurs in a similar, although not identical way during tobacco defense against infection by microorganisms with contrasting pathogenesis strategies. This response affects pathogen's ability to colonize host tissues and results detrimental for plant defense against necrotrophic pathogens that feed on necrotic tissue and, on the contrary, plays a beneficial role in defense against biotrophic pathogens that depend on living tissue for successful host colonization. Thus, apoplastic PAs play important roles in plant-pathogen interactions, and modulation of host PA levels, particularly in the leaf apoplast, may lead to significant changes in host susceptibility to different kinds of pathogens.

Key words: Polyamines, plant pathogens, local defence response.

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