

MCB PLANT BIOLOGY SEMINAR SERIES F2009

Paul Goodwin,

Department of Environmental Biology, University of Guelph

“Systemic acquired resistance and induced systemic resistance against foliar diseases of *Agrostis stolonifera* and *Nicotiana benthamiana*””

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ABSTRACT:

Both systemic acquired resistance (SAR) and induced systemic resistance (ISR) were effective against anthracnose caused by *Colletotrichum orbiculare* in *Nicotiana benthamiana*. SAR was activated by benzothiadiazole (BTH), which is a functional analog of salicylic acid, and ISR was activated by (2R,3R)-butanediol, which is a microbial-derived volatile organic compound, or PC1, which is a mixture of isoparaffins. BTH, (2R,3R)-butanediol and PC1 reduced the number of lesions per leaf area of *C. orbiculare* by 98%, 77% and 81%, respectively. Foliar application of BTH also induced expression of the pathogenesis-related (PR) genes, NbPR-1a, NbPR-3Q and acidic NbPR-5, and soil application of (2R,3R)-butanediol or PC1 primed expression of NbPRb-1b, basic NbPR-2 and NbPR-5dB. BTH also activated resistance against dollar spot caused by *Sclerotinia homoeocarpa* in *Agrostis stolonifera*, reducing the percentage of diseased leaves by 50%, but BTH did not activate resistance against diseases caused by *Microdochium nivale*, or *Rhizoctonia solani*. However, application of either (2R,3R)-butanediol or PC1 reduced the diseased leaf area by 20 to 40% for *M. nivale*, *R. solani* or *S. homoeocarpa*. In *A. stolonifera*, expression of the jasmonate-related genes, AsAOS1 and AsOPR4, and the PR gene, AsGns5 was primed by both (2R,3R)-butanediol and PC1, while BTH did not affect the expression of homologs in *A. stolonifera* of BTH-inducible genes identified in other monocots, the WCI-2 lipoxygenase or the BCI-4 putative calcium-binding EF-hand.

Contact Annette Nassuth (anassuth@uoguelph.ca) should you wish to meet with the seminar speaker