# Biological Control and Biomass Evaluation of *Botrytis cinerea*

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## Abstract

The efficacy of biocontrol agents is often judged by symptom development on inoculated plants. This process can involve long delays, as with Botrytis infection of kiwifruit and an alternative, quicker approach would be useful. When biocontrol is successful, then pathogen biomass is limited hence a means of measuring the biomass of a pathogen on/in a target substrate (plant material) could be used as a tool for rapid estimation of biocontrol efficiency.

Two yeast (*Enterobacter agglomerans, Enterobacter aerogenes*) and two bacteria (*Candida sake, Trichosporon pullulans*) with an already identified ability to attach to the surface of *Botrytis cinerea* and to reduce infection in tomato and kiwifruit, were evaluated for control of *B. cinerea* in bean, lettuce and rose in this study. Potential biological control and efficacy was assessed by measuring lesion size and percentage infection by *B. cinerea.*

An investigation of methods of conidial application of *B. cinerea* to these crops tissue showed that disease severity and incidence were increased by a high concentration of wet spore application to bean and dry spore application to lettuce and rose tissue. Each application technique was used as the standard technique for biocontrol experiments on the crop on which it was most efficient.

Three of the potential BCAs (*Enterobacter agglomerans, Enterobacter aerogenes, Trichosporon pullulans*) were found to reduce lesion size and percentage infection on all three crops at $20^0$C.

Biological control by bacterial BCAs, *Enterobacter agglomerans and Enterobacter aerogenes,* were demonstrated by applying them to bean tissue at the

time of inoculation with a suspension of $1x10^8$ conidia per ml of *B. cinerea*. These two bacteria and the yeast, *Trichosporon pullulans*, showed biological control when applied to lettuce and rose tissue one or two days after inoculation with dry spores of *B. cinerea*.

A potential rapid assessment of biocontrol efficiency of microorganisms has been demonstrated using Laser Scanning Confocal Microscope. A clear image of the fungal hyphae in the host tissue was produced in confocal microscopy by using glutaraldehyde as a fluorescent stain for *B. cinerea* hyphae. Biomass of *B. cinerea* at an early stage of infection in bean and lettuce tissues was successfully measured by computer analysis before and after application of yeast and bacterial biocontrol agents. BCAs application in both tissues prevented development of a large biomass of *B. cinerea*.

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