Bio-Protection Symposium

managing pests: the future of biocontrol

# Biological control of leaf and fruit diseases

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Diseases of leaves and fruits can reduce yield and quality in field and glasshouse crops. Considering potential losses and amounts of fungicides applied for disease control, the major pathogen groups are rusts, powdery mildews, downy mildews, Botrytis spp., and Venturia spp. During the last decades, several hundreds of publication in scientific journals report on the biological control of leaf or fruit diseases. Antagonists belonging to approximately 20 different bacterial or fungal species have been tested successfully in crops. This led to the registration in Europe of almost ten commercial biocontrol products for control of leaf and fruit diseases. However, there is a lack of development of biocontrol agents for biotrophic pathogens such as rusts, powdery mildews and downy mildews including Phytophthora infestans. Such pathogens are difficult to handle in experiments and are host-specific so that the commercial markets are narrow. One key to success in biocontrol on aboveground plant parts is the adaptation of antagonists to the niche. Important ecological factors are rapid fluctuations of temperature and humidity, UV-irradiation, rain and possibly the presence of agrochemicals. Another key to success is the development of biocontrol agents in close collaboration with industries. It is important not to focus solely on field efficacy in the first steps of development but also to answer other commercially important questions, ranging from mass production and formulation to registration and market sizes. Biocontrol of Botrytis spp. (grey mould) by Ulocladium atrum and of Venturia inaequalis (apple scab) by Cladosporium cladosporioides will be discussed as examples.