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Biocontrol of *Botrytis cinerea* on tomato crops in Italy and France with *Pseudomonas fluorescens* and *Trichoderma harzianum*

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A rifamycin resistant strain of *Pseudomonas fluorescens* biovar 5 and a vinchlozolin and benomyl resistant strain of *Trichoderma harzianum* were tested on greenhouse tomato crops in Italy and France to compare their efficiency against *B. cinerea* and survival under different environmental and cultural conditions.

In Italy, the microorganisms were applied as sprays on the whole plants at seven day intervals to evaluate their efficacy to protect the fruits and leaves. Both *T. harzianum* and *P. fluorescens* significantly reduced disease incidence on fruits in the presence of a very high disease pressure (4,5 rotted fruits/ plant in the control plots two months after inoculation with *B. cinerea*). The protection offered by the two biocontrol agents was 25-30%. The best results were obtained with the mixture of procymidone + thiram, with an efficiency of about 70%.

In France, the microorganisms and *B. cinerea* were applied once as a spray on leaves and on 4 cm-long petiole stubs after deleafing. The two agents did not reduce significantly the incidence of the disease on leaves but the attacks were very low even on the controls plots (8% of leaf surface infected by *B. cinerea* one month after inoculation). On petiole stubs, their efficacy was higher but declined with time. However, the length of infected stubs was reduced significantly by the two biocontrol agents even after 51 days after inoculation. The incidence of stem cankers and the length of the cankers were significantly smaller, even after 88 days after inoculation, when the two microorganisms were applied on the petiole stubs. As in Italy, the best control of the disease was obtained with the chemical treatment, in this case diethofencarb and carbendazim (Sumico).

In the survival trials with *P. fluorescens* and *T. harzianum*, the results showed that these microorganisms colonize and survive on the organs where they were applied (leaves in Italy and petiole stubs in France). In Italy, *P. fluorescens* was able to persist between two treatments (one week) and the population increased in the phyllosphere of tomato plants during the whole experiment. *T. harzianum* also survived between two treatments, but the population decreased over time. In France, the two microorganisms were applied once on petiole stubs and their survival was studied during 21 days. The population of *P. fluorescens* increased during 48 hours after inoculation and then decreased to a level similar to that on the day of inoculation. On the contrary, the population of *T. harzianum* declined with time.

In conclusion, the two biocontrol agents tested performed interestingly under different experimental conditions, showing that they can be successfully applied in different environmental and cultural conditions. Both *P. fluorescens* and *T. harzianum* may play a role in the control of grey mould of tomato in the mediterranean area.