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Postinfection Activity of Early Blight Fungicides

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Introduction

The objective of this study was to compare the postinfectional activity of selected early blight fungicides. Fungicides are most effective if applications are carried out prior to infection (protective mode of action). But in practice, the early blight fungicide management mostly occurscurative, because the infection take place before the first treatment is done. Two sets of different experiments were carried out. The first determined the effectiveness of selected fungicides in field trials. The second quantified the curative activity of selected fungicides applied 12 and 24 hours after inoculation in greenhouse experiments.

Materials and methods

Field trial

Field trials were carried out within 2009 and 2011 at Kirchheim near Munich. Trials were designed as a randomized complete block and were replicated four times. Potato trials were carried out using the variety Maxilla. Field trials were all naturally infected by early blight (EB). To prevent the development of late blight, the fungicide Ranman® (400 g cyazofamid/l) was applied as a cover spray at a dose of 0.2 l /ha every 8 to 10 days. As the disease progress of EB was not affected by the use of Ranman® early blight was allowed to develop naturally during the course of the growing season. Fungicide treatments (Tab. 1) were carried out once after exceeding the disease severity (% infected leaf area) of 25%.

Greenhouse trial

The trial was carried out using the cultivar Kuras grown in pots. The plants were inoculated by spraying an *Alternaria solani* spore suspension (5 x 10^4 sporangia per ml). The plant were incubated at 20°C and 12 hours photoperiode. 12 and 24 hours after inoculation plants were sprayed to runoff with selected fungicides (Tab. 1). Plants were again placed in a incubation chamber to provide symptome development.

Tab. 1: Fungicide features

Fungicide	Active ingredient (a.i.)	Amount of a.i. (g/l, g/kg)	Dosage tested in the field (l,kg/ha)	Dosage tested in the greenhouse (l,kg/ha)
Ortiva	Azoxystrobin	250	0,5	0,25
Signum	Boscalid + Pyraclostrobin	267 + 67	0,25	0,125
Cantus	Boscalid	500		0,25
Dithane Neo Tec	Mancozeb	750	2	1
Score	Difenoconazol	250		0,25

Results

Field trial

The three tested fungicides (Ortiva, Signum, Dithane Neo Tec) showed no efficacy in controllingearly blight in the field applied at a disease level of 25%. The disease development in the treated plots were not significantly different to the untreated control plot in all years.

Greenhouse trial

The study showed different curative effects of the tested fungicides (Fig. 1). Except for Dithane Neo Tec, all tested fungicides reduced the disease development by more than 90% applied 12 hours after inoculation. A reduction of the efficacy is shown for all tested fungicides after prolonging the time of the curative treatment from 12 to 24 hours.

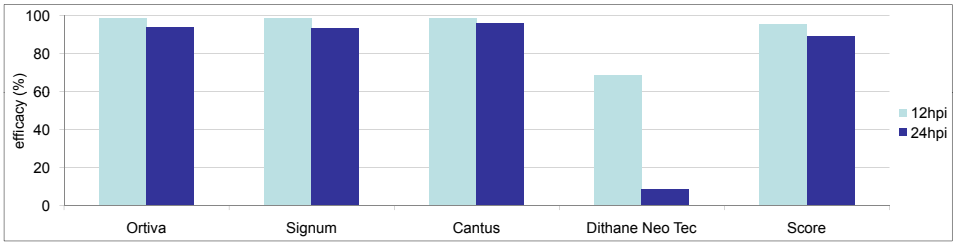

Fig 1: Efficacy of different fungicide treatments 12 and 24 hours after artifical inoculation (hpi) with *Alternaria solani* in a greenhouse trial.

Conclusion and outlook

The results of this study indicated that all tested fungicides have a curative activity under controlled conditions. But in the field under curative and eradicative conditions a threshold value of 25% disease severity for the first early blight specific fungicide treatment was not functional.

In the future further trials are necessary to get a database for DSS modelling with the aim to optimise the control of early blight by the use of fungicides.