

Nach aktuellen Untersuchungen existieren auch in Deutschland bereits mutierte Isolate. Um die Wirksamkeit der Fungizid-Anwendung im Feld auch in Zukunft sicher zu stellen ist ein sinnvolles Fungizid-Management notwendig. Darüber hinaus sind weitere effektive Bekämpfungsmöglichkeiten zu erarbeiten, um im Sinne des „Integrierten Pflanzenschutzes“ die Anwendung von chemischen Wirkstoffen auf ein Minimum zu reduzieren.

Im Rahmen eines integrierten Ansatzes werden in Feld- und Gewächshausversuchen der TU München alternative bzw. unterstützende Maßnahmen zur Bekämpfung der Dürffleckenkrankheit an Kartoffeln untersucht. Da *Alternaria solani* oft im Zusammenhang mit niedrigem Stickstoff-Status der Pflanze beschrieben wird, wird der Einfluss der Düngung auf den Epidemieverlauf untersucht. Besonderes Augenmerk liegt hierbei auf Düngemitteln mit fungizider Teilwirkung. Neben der visuellen Bonitur soll die Quantifizierung der beiden Schaderreger mit Hilfe molekularer Methoden durchgeführt werden. Mikroskopische Beobachtungen sollen Aufschluss darüber geben, ob die Bestandesführung einen Einfluss auf die Entwicklung der Pathogene *Alternaria solani* und *Alternaria alternata* bzw. auf die Abwehr der Pflanze hat.

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Disease-orientated threshold values as tool for effective early blight control in potatoes

Schwellenkonzept zur integrierten Bekämpfung von Alternaria an Kartoffeln

Early blight (EB) can be found in many potato growing regions of the world and belongs to one of the most common and widespread diseases in potatoes. Due to the high adaptability of the causing agent, EB has the potential to become a serious threat for potato cultivation. Epidemics of EB evoked by *Alternaria* species can cause significant economic damage to potato production if not adequately controlled. Fungicides of various chemical groups are currently used in Germany to control EB in potatoes. Until recently, only protectant fungicides were available for the suppression of *Alternaria* species. Since 2007 and 2008, respectively, strobilurine fungicides like azoxystrobin or boscalid in mixture with pyraclostrobin have been registered for control of EB.

The aim of this work was to incorporate a reduced fungicide strategy into EB management and to combine methods to reduce fungicide use in potatoes. Criteria to optimize the timing of fungicide applications against EB have not yet been established for potatoes in Germany, nor have studies examined the effectiveness of varying threshold values on control of EB disease.

Control thresholds formed the basis for the timing of fungicide sprays in order to optimize EB control. Chosen thresholds corresponded to certain stages of the disease progress. EB specific treatments were applied after exceeding threshold values. Fungicide applications were initiated based on different levels of disease incidence (DI) and disease severity (DS). Subsequent treatments were applied according to disease progress in different leaf levels (middle and upper leaf level) of plants.

According to our observations, EB appeared as primary foliar disease in potatoes. Heavy EB epidemics occurred in all years of investigation. A stronger increase in disease severity was predominately observed for leaves from the middle and upper leaf sections. Rapid increase in leaf necrosis weakened potato foliage and reduced photosynthetic area.

Targeted applications at defined times of the disease progress led to effective control of EB. The timing effect for spray initiation and subsequent fungicide application could clearly be seen throughout the years. The adaptation of disease control according to leaf section-specific thresholds enabled improvement of EB control compared to unspecific treatments. Already two to three disease orientated fungicide applications resulted in a significant reduction in disease severity and adequate disease control.

The estimation of potato yield showed that the failure of EB control resulted in yield losses. However, timing of treatments was crucial for the achievement of high starch yields. Our data show that the timing of fungicide treatments influenced progress of EB as well as yield. Fungicide applications, which were not adapted to actual disease development increased leaf necrosis, which resulted in reduced green leaf area and lower starch yields.

Investigation on EB progress demonstrated the importance of fungicide use for the control of EB in the production of potatoes. The implementation of control thresholds helped to improve EB control and to prevent yield losses. By this, EB treatments could be restricted to the most necessary. The development of disease-orientated threshold values as criteria for timing of fungicide applications can be seen as an important tool for farmers to reduce EB epidemics.