Using Decision Support Systems to Combat Late Blight

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Across Europe a variety of Decision Support Systems are available to ensure efficient spraying
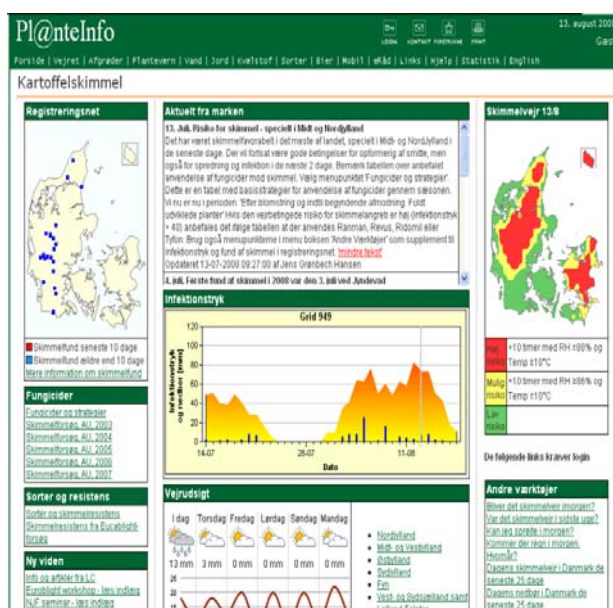
Decision Support Systems (DSS) integrate all relevant information to generate spray recommendations. While there is room for improvement in DSS, they operate at such a technically high level that we estimate any effect will be small. More can be gained by increasing the use of DSS (or parts of DSS) by farmers and advisers. It is important to understand that information from DSS will increase the efficacy of farmers' control strategies without increasing risk. In other words, DSS should primarily not aim at a large reduction in the number of sprays but should aim at effective control of late blight (including a large enough safety margin). DSS can also be used to justify the input of fungicides and as a source of advice in situations when the number of sprays (or product choice) is limited by legislation. ENDURE's Potato Case Study has considered all DSS in Europe, where all potato growing regions have one or more regional DSS available. Of course, growers and advisers will only use these DSS when they help to increase the efficacy of their control strategy. By timing the sprays in an optimal way, on average a reduction of one to two sprays per season can be achieved. Applying an effective preventive strategy can also avoid dramatic disease outbreaks that have to be stopped by using intensive spraying regimes. Information regarding all aspects of DSS can be transferred to other European potato growing regions.

Denmark: a joint approach

Information and decision support about the control of late blight is available via www.planteinfo.dk. Three partners jointly operate this system: the University of Aarhus (AU), the Danish Agricultural Advisory Service (DAAC) and the Danish Meteorological Institute (DMI). A dedicated web page integrates all the available information about late blight control, including tools such as monitoring of early attacks (similar to the UK's Fight against Blight campaign), weather-based late blight infection pressure, general weather information and forecast, regional blight weather and forecast, fungicide information (based on EuroBlight), cultivar database with information about late blight resistance based on methods from EucaBlight etc. Experts from DAAC and AU can include comments on the blight situation, report observations from the field and offer advice on how to use the tools available. The separate DSS components are not integrated to provide specific decisions on timing and fungicide type and dosage. However, PlanteInfo provides advice on some basic strategies for the control of late blight, and how the user can use the tools in

PlaneteInfo is the result of collaboration between scientists, advisers and meteorologists

PlanteInfo to make decisions about first spray, spray intervals, fungicide type and dosages, when to use systemic compounds and how to protect against tuber blight. Several components of the DSS were developed as part of an ongoing collaboration between the Nordic countries. The Web-blight monitoring network covering all countries around the Baltic Sea has been in operation since 2000. A Nordic test-and-development DSS called Blight Management is currently being used to test new ideas and applications before implementation in each country's own DSS.

France: single DSS for 2009

The French Plant Protection Service has issued late blight warnings since the mid 1960s. These were initially based on the Guntz-Divoux forecasting model, later complemented with the MILSOL model. More recently,

the French Plant Protection Service and ARVALIS have each developed a DSS, known as MILPV and MILDI-LIS respectively. MILPV is based on the MILSOL forecasting model, and includes an explicit tailoring of recommendations according to the levels and types of cultivar resistance. It also includes information on the regulatory and technical rules applicable to the products (www.srpv-centre.com). MILPV includes an organic version, where the recommendations take into account the specific constraints of organic production. MILPV has been used by some 150 to 200 growers for three years. MILDI-LIS is based on the Ullrich and Schrodter negative prognosis forecast, and also includes a tailoring of recommendations according to cultivar resistance (www.arvalisinstitutduvegetal.fr). MILDI-LIS has been used by 450 to 500 growers for four years. In 'normal' years, both DSS allow the number of sprays to be substantially reduced (between one and five or six, depending on cultivar resistance) compared to a standard once-a-week spraying schedule, with no decrease in control performance. In extreme years, such as 2007, with a very early and prolonged epidemic, these DSS make it possible to better time sprays. ARVALIS and the Plant Protection Service have since been working on a single DSS, which went online in 2009.

Italy: regional advice for Emilia-Romagna

To forecast the appraisal and evolution of late blight infections on potato and tomato crops in the Emilia-Romagna region (Servizio Fitosanitario Emilia-Romagna), two models based on climatic variables are applied: Model IPI (Indice Potenziale Infettivo) and Model MISP (Main Infection and Sporulation Period). Model IPI is informative about the occurrence of the disease and suggests if it is necessary (and when) to proceed with the initial treatment, based on a series of climatic parameters. It was set up in 1990 by the Servizio Fitosanitario Regionale in Emilia-Romagna and is integrated, for potato, by Model MISP, elaborated in Switzerland, which provides indications on the following infective events (www.regione.emilia-romagna.it).

Netherlands: complete advisory service

PLANT-Plus was developed and is marketed by Dacom Plant Service BV (www.dacom.nl), supplying information about the optimum time to spray and the type of fungicide to use. The model takes as a starting point the protection offered to the crop by the previous spraying, in combination with the risk of disease infections occurring. The calculation is clearly presented for each step of the way, using a graph and a report. With inputs of weather data such as temperature, wind speed, rainfall and humidity combined with inputs from the grower on crop conditions, PLANT-Plus calculates when an infection will occur. This results in crop protection advice: when to apply a new spray and what type of chemical to use. ProPhy is developed and marketed by Opticrop (www.opticrop.nl). Local weather stations and regional weather forecasts are used to identify critical conditions for the development of blight. The duration of the protection of the crop through using fungicides is calculated. The duration of this protection depends on the fungicide used, dose rate, varietal resistance, rain-fastness of the fungicide, disease pressure and growth of the crop. In combining weather and fungicidal protection a recommendation is calculated: a preventive spray is necessary as soon as critical conditions are expected in combination with an insufficient level of fungicidal protection of the crop. The system provides the grower with complete advice (yes or no to spraying, product choice and dose rate). It is estimated that of approximately 10,000 potato growers in the Netherlands, 30% use one of these DSS, either a PC-version or through fax, phone and internet. As a part of the Masterplan Phytophthora, every grower and adviser in the Netherlands receives by telephone a message during the growing season when a critical period for late blight development is expected. In 2007 information about critical weather and blight-infected fields was also provided at www.kennisakker.nl.

Poland: NegFry for all farmers

NegFry has been developed in field experiments in a few agricultural institutes (IHAR-Bonin, IUNG-Pulawy and IOR-Poznan) and in the fields of the protection services since 2001, following a joint project with the University of Aarhus. The model supplies information about the optimum time to spray and the type of fungicide to use. A start date for protection is accessible to all farmers via the internet (www.dss.iung.pulawy.pl), based on nearest synoptic weather station data and calculated by NegFry.

Gebruik van beslissingsondersteunende systemen tegen aardappelziekte

Samenvatting

Beslissingsondersteunende systemen (BOS) integreren alle relevante informatie voor het opstellen van spuitadviezen en er is veel te winnen met een verdere toepassing ervan. BOS-systemen verhogen de effectiviteit van bestrijdingsstrategieën zonder verhoging van het risico. Ze kunnen ook worden gebruikt om fungicidengebruik te rechtvaardigen en als adviesbron in situaties waarin het aantal bespuitingen of de middelenkeuze door wetgeving beperkt is. ENDURE's Aardappel Case Study heeft alle BOS-systemen in Europa onderzocht, waar aardappelteeltgebieden beschikken over één of meer BOS-systemen. Ze kunnen de effectiviteit van bestrijdingsstrategieën verhogen. Daarnaast kunnen optimale bespuitingstijdstippen gemiddeld een beparing van één of twee bespuitingen per seizoen opleveren. Toepassing van een effectieve preventieve strategie kan ook dramatische ziekteuitbraken voorkomen die anders moeten worden tegengegaan met intensieve bespuitingsregimes. Deze folder gaat na welke BOS-systemen er momenteel in gebruik zijn in Denemarken, Frankrijk, Italië, Nederland en Polen en wat de directe toekomst is van deze systemen. Het Deense system (www.planteinfo.dk) is bijvoorbeeld onderdeel van het bredere Web-blight monitoring netwerk dat alle landen rond de Baltische Zee omvat. Een Noord-Europees test-en-ontwikkelings BOS-systeem, onder de naam Blight Management, wordt momenteel gebruikt om nieuwe toepassingen te testen voor invoering in het eigen BOS-systeem van elk land. In Frankrijk hebben de plantenziektenkundige dienst en ARVALIS beide een BOS-systeem ontwikkeld maar ze werken nu samen aan één BOS-systeem dat vanaf 2009 online gaat.

Voor nadere informatie kunt u contact opnemen met:

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Over ENDURE

ENDURE is het Europees Netwerk voor de Duurzame Toepassing van Gewasbeschermingsstrategieën. ENDURE is een 'Network of Excellence' (NoE) met twee hoofddoelstellingen: herstructurering van Europees onderzoek en ontwikkeling op het gebied van gewasbeschermingsmiddelen en het ontwikkelen van ENDURE tot wereldleider in de ontwikkeling en toepassing van duurzame bestrijdingsstrategieën door middel van:

> Opbouw van een blijvende onderzoeksgemeenschap op het gebied van gewasbescherming
> Eindgebruikers voorzien van een bredere reeks korte-termijn oplossingen
> Ontwikkeling van een holistische benadering van duurzame gewasbescherming
> Volgen van en informeren over veranderingen in het gewasbeschermingsbeleid.

Achttien organisaties in 10 Europese landen hebben zich voor vier jaar verbonden aan ENDURE (2007-2010), met financiële steun van het Zesde Kaderprogramma, prioriteit 5: Voedselkwaliteit en Veiligheid, van de Europese Commissie.

Website and ENDURE Information Centre:

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