Reducing Primary Inoculum Sources of Late Blight

Résumé

Dans une stratégie de lutte intégrée contre le mildiou de la pomme de terre, La première étape vise à réduire les sources primaires d'inoculum. Ce guide identifie les moyens les plus adéquats pour réduire ce risque.
Dans plusieurs pays européens, il a été démontré que la plupart du temps, les épidémies débutent à partir de plants contaminés dans les tas de déchets. Aux Pays-Bas, une réglementation oblige les agriculteurs à couvrir les tas d'une bâche en plastique noir avant le 15 avril.
Les semences contaminées sont une autre source majeure d'inoculum et l'utilisation de tubercules certifiés devrait être de mise autant que possible.
Les tests de contamination sur tubercules restent problématiques, ce guide apporte des conseils pour les mettre en œuvre.
Les oospores sont une autre menace, surtout en condition de rotations courtes, et les repousses de pomme de terre, courantes dans les pays à hivers doux, doivent être maîtrisées, même si cela semble difficile et exigeant en main-d'œuvre. En effet, tout porte à croire qu'en 2007, les repousses contaminées ont été la première source de contamination alors qu'auparavant, elles ne faisaient qu'accélérer l'épidémie.
En culture précoce sous film de polyéthylène, ce guide recommande l'application de fongicides (avec adjuvants) afin de protéger les feuillages. L'application doit être accompagnée de mesures comme l'avertissement des cultivateurs voisins lors du retrait des films, afin qu'ils appliquent un fongicide immédiatement.

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About ENDURE

ENDURE is the European Network for the Durable Exploitation of Crop Protection Strategies. ENDURE is a Network of Excellence (NoE) with two key objectives: restructuring European research and development on the use of plant protection products, and establishing ENDURE as a world leader in the development and implementation of sustainable pest control strategies through:

- Building a lasting crop protection research community
- Providing end-users with a broader range of short-term solutions
- Developing a holistic approach to sustainable pest management
- Taking stock of and informing plant protection policy changes.

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Website and ENDURE Information Centre

www.endure-network.eu

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From Science to Field
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Reducing Primary Inoculum Sources of Late Blight

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Reducing Primary Inoculum Sources of Late Blight

The first step in an integrated control strategy is reducing the primary sources of inoculum

In a number of European countries it has been shown that in most years blight epidemics caused by *Phytophthora infestans* (late blight) start from infected plants on dumps. In the Netherlands, for example, a regulation exists that forces growers to cover dumps with black plastic before April 15 each year. (www.productschapakkerbouw.nl). And in the UK the influence of dumps on the late blight epidemic is an important part of the Fight against Blight campaign (www.potato.org.uk). It is difficult to quantify the effect on late blight of eliminating dumps, but maybe the time between the first appearance of blight in a region and the appearance in production fields could be used as an indication of the influence of eliminating dumps.

Infested seed potatoes

There is no doubt that infested seed tubers are a major inoculum source. In the Netherlands a survey of early infections between 2003 and 2005 showed that epidemics were driven by infested seed in 39% of the cases investigated. It is recommended that certified seed be used but this is no guarantee that the seed will be completely free from blight since blight can be latently present in the seed tubers. Furthermore, in Poland for example, the availability of certified seed is limited.
It is technically possible (through polymerase chain reaction or PCR) to detect latent infections in seed tubers. The problem is, however, that when just one in 10,000 tubers is infected, this is sufficient to create a primary inoculum source. With such a low frequency of occurrence it becomes almost impossible to find it in any sample of a reasonable size. It might also be possible that infected tubers not only infect a plant that grows from this tuber but can also infect daughter tubers without infecting above-ground plant parts. In order to assess the risk for the occurrence of latently infected tubers, it is recommended that a survey be made of the growing season in which the seed potatoes were grown. The incidence of late blight in the crop and the choice of the fungicides and their timing will provide information that can be used to assess the risk for the occurrence of latently infected tubers.

Oospores are a threat

Oospores are readily produced in unsprayed crops and volunteer potatoes. A survey in the Netherlands of early infections between 2003 and 2005 showed that the epidemics were driven by oospores in 18% of the cases investigated. Usually, these were found in the starch growing region in the north-east of the country.
Especially with short crop rotation schemes, oospores are a threatening primary inoculum source. Sandy and clay soils contaminated with oospores remained infectious for 48 and 34 months respectively. In the starch potato region, potatoes are usually grown every two or three years. Moreover, late blight control at the end of the growing season is not strictly carried out. As a consequence, oospores can survive in the soil until the next potato crop.
Usually the ratio of the A1 and A2 mating types in the same field is used as an indication for the (possible) occurrence of oospores. Monitoring for both mating types can help to assess the risk for the occurrence of oospores. There are still a lot of questions regarding oospores. It has been stated that the best way to reduce the influence of oospores is to prevent the development of late blight in the previous crop and to control volunteers (in which oospores can form abundantly).

Volunteers must be controlled

Volunteer potatoes can be readily found in European countries with mild winters. Volunteers are self-set potatoes from a previous commercial crop growing as weeds in other crops. In the same way as potatoes in dumps, they may carry blight inoculum and, if they survive the winter conditions, can act as a primary infection source.
Equally important is the fact that they are not protected by fungicide sprays so the developing foliage may be infected at any time during the season and become an ongoing source of inoculum to nearby crops. Volunteers tend to emerge and senesce over long periods of time making it difficult to achieve good control with herbicides.
Usually, the role of volunteers is to accelerate the epidemic rather than to serve as a primary inoculum source. But in 2007 there were strong indications that infected volunteers also acted as primary infection sources. To reduce their role in producing inoculum, volunteers must be controlled. Depending on the crop in which the volunteers occur, control is usually difficult and labour-intensive.

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A row of potatoes that was not harvested in the previous year produces many volunteers. © Huub Schepers, WUR.

Reducing risk from covered crops

Early crops covered with perforated polythene can act as a source of inoculum for neighboring potato fields: first outbreaks are regularly reported to originate from polythene-covered crops. Usually, late blight is not controlled under polythene and if primary inoculum sources are present in the field, infection is discovered only when the polythene is lifted.
Spraying fungicides (plus adjuvants) over polythene-covered crops results in a certain level of protection of the potato leaves. Combining this strategy with warning neighboring growers when the cover is removed, removing the cover in dry sunny weather and immediately spraying the crop after removal of the cover, will help to reduce the impact of covered crops as an early infection source.

Spraying over covered crops partially protects potatoes against blight. © Huub Schepers, WUR.