

Control of Early and Late Potato Blight: Experiences and views from practice in Denmark

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In the following, late blight control of potatoes for starch production will be described. Potato varieties for processing and the fresh marketed are normally more susceptible to *Phytophthora* and the preventive treatment is therefore mostly more intensive.

The control strategy is based on one weekly treatment of only two products; Revus (mandipropamid) and Ranman Top (cyazofamid). In Denmark, these fungicides can be used six times each in a season, and this means that Shirlan (fluazinam) will be used 1-2 times, in total 13-14 weekly sprays. In normal or low risk periods, the recommended dose is basically half dose, and in periods with high risk, the dose will be raised to 75 percent of normal dose. Full dose can sometimes be used, but normally farmers will rather mix the lower dose of a preventive product with a full dose of a curative product e.g. Cymoxanil or Proxanil (propamocarb+cymoxanil) in case of visual infections or high infection pressure from the neighboring fields.

To define periods with high or low pressure, the tool "Infection Pressure" in the Danish disease support system "Skimmelstyring" has been developed. It can be used free of charge from the website: www.landbrugsinfo.dk, where also the registration net for late blight and other tools as daily risk values, weather radar, precipitation, humidity etc. can be found.

At AKV Langholt, we once or twice a week send an e-mail to our potato growers, where we inform about infection incidence and severity, a forecast for infection pressure and our recommended dose and fungicide. More than 90% of the farmers use this information before they make their own decisions.

Infection pressure is calculated as a five-day sum of daily risk hours. However, in the future, we will focus more on the daily risk values. The basic strategy will be: If the risk hours at the day of treatment or the day before are longer than 10 hours, cymoxanil will be added to the basic preventive products, as this curative product has a kickback effect on infections for approximately 24 hours.

Other improvements in the nearest future will be better control of the nitrogen application. We have observed a higher incidence and severity of late blight in fields (and trial plots) with a rapid

new growth of the canopy due to high nitrogen input. Lower application of nitrogen, test for nitrogen content in the petioles, and split application of nitrogen could be one of the solutions.

In the longer term (5-10 years), the change from susceptible to highly resistant varieties will be a way of controlling *Phytophthora* with less fungicide input. In 2018, five percent of the area of starch potatoes for AKV Langholt will be grown with highly resistant varieties, and onward this area will increase. However, we need to develop a strategy which will delay or protect the single gene resistance in these new varieties.

Early blight is a much bigger challenge. Fungicide resistance and reduced sensitivity against both strobilurins and boscalid (SDHI) is an increasing problem. The occurrence of the mutant type F129L seems now to be the majority all isolates sampled in Danish fields. We know that longer crop rotation and optimal nitrogen application are practical tools which to some degree can be used in the control of early blight but we have still no clear sustainable control strategy both from an economical and efficacy point of view.

A better involvement of the farmers in the decision for both late blight and early blight control is important. They need to be more flexible and willing to deviate from their first choice of variety and fungicide, crop rotation etc. All this to minimize the risk of a breakdown of variety resistances, because this will be our main tool in the prevention of plant diseases and economical loss in European potato production in the future.