Practical Experiences of Integrated Control of *Phytophthora infestans* in the Swedish Potato Field Trials in 2011-2018

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Objective
In order to develop the implementation and knowledge of integrated pest management (IPM) regarding control of potato late blight (Phytophthora infestans) the role of fungicide applications have been studied, mainly within the use of different decision support systems (DSS), as well as the importance of cultivars. Another part of this work has been to make DSS for potato late blight available to Swedish farmers and advisors.

Results and Discussion
- The three DSS tested reduced fungicide applications with up to 20-30% within the field trials with retained effect on late blight, compared to weekly full dose sprays (Fig. 1).
- Timing of fungicide applications, both at high- and low late blight risk turned out to be a very important factor on late blight attacks, more important than the number of spraysings and dosage.
- Delaying the first spray of the season was one way to reduce fungicide applications.
- Prolonged spraying intervals and/or reduced doses can be used successfully to reduce fungicide applications, yet with retained effect on late blight.
- Using DSS there is a risk of technical problems that can obstruct and devastate the use of the systems.
- The three DSS tested differ, e.g., due to the labour intensity needed, availability and reliability they can attract different growers in different areas.
- The late blight resistance of different cultivars varies, which can be used to reduce fungicide amendments.
- A combination of reduced doses and more-resistant cultivars has turned out to be favorable in reducing the total amount of fungicide with retained effect on late blight.

Materials and methods
Fungicide doses, fungicide strategies and timing are important parts of integrated control and significant within the use of DSS. This has been studied in the Swedish potato field trials in 2011-2018, in total 20 trials. Three different DSS, Orset, VIPs and Skimmerstyrt, have been tested and evaluated. Within these studies the importance of resistance to late blight of different cultivars were also studied. Skimmerstyrt and VIPs have been tested and made available for Swedish farmers and advisors by the Swedish Board of Agriculture in collaboration with Aarhus University and the Norwegian Institute of Bioeconomy Research, respectively.

Conclusions
- Well-functioning DSS to control potato late blight has shown to be a valuable IPM tool with both environmental and economic benefits.
- Cultivars, fungicide doses, fungicide strategies and timing can affect late blight attacks significantly. In combination they can be used within a DSS to create a robust way to handle potato late blight.
- Due to the risk of technical problems using DSS, it is of utmost importance that the user handles the DSS as a support in combination with the users own experience and observations.
- User friendly DSS is very important for the extent of use.
- Various DSS work in diverse ways and can attract different users based on preferences and other individual preferences.
- During the last years the DSS Skimmerstyrt and VIPs have been made available to Swedish farmers and advisors by the Swedish Board of Agriculture, to test and evaluate the use of the programs.
- In southern Sweden about 50% of the potato growers now use either Skimmerstyrt and/or VIPs with the aim to reduce fungicide use with 50%.