Developing a farm scale forecasting service for pests and diseases

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Bioforsk

Norwegian Institute for Agricultural and Environmental Research

The forecasting service today

VIPS (Varsling Innen PlanteSkadegjørere)

- Desicion support system for a range of diseases, pests and weeds
- Input
  - Data from 80 weather stations
  - Weather prognosis

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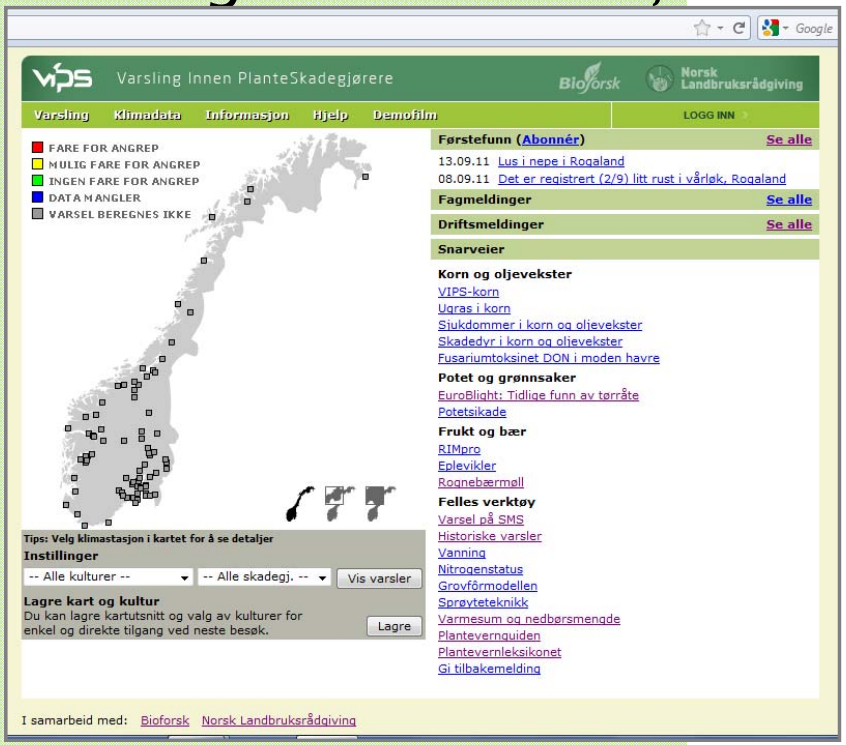
  - Biological observations



www.vips-landbruk.no

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How good is a pest or disease forecast?

- Reliability of disease or pest forecasts depend on
  - Robust forecasting model
  - Relevant weather data
- Many farms are remotely located from the nearest weather station

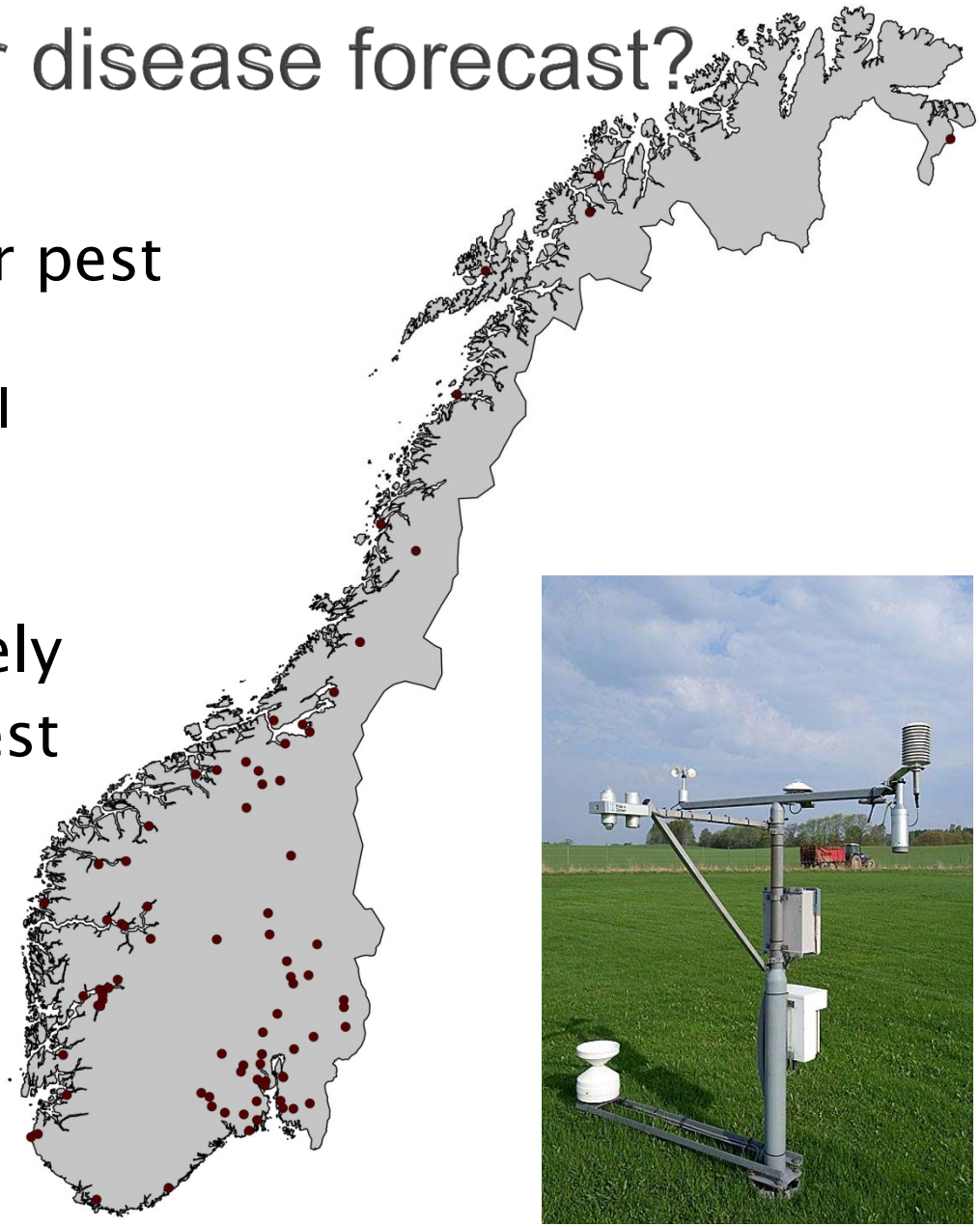

Photo: H. Hovd and L. Rosef

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How to get accurate weather data

- Weather stations at the farms
  - Expensive
- Interpolate weather conditions based on nearby weather stations
  - Research needed to produce 1 hour intervals
- Remote measuring with radar
- Short term weather forecasts can be used as replacement for measured data

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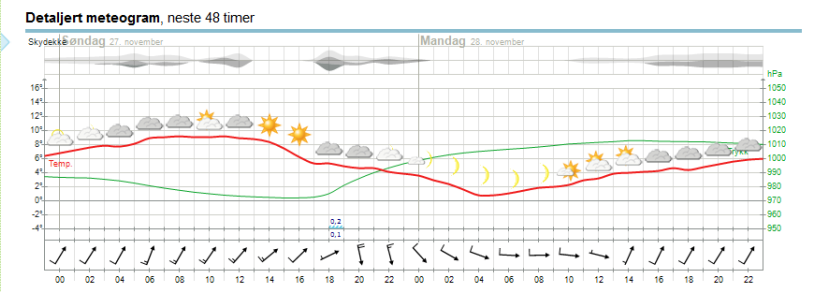
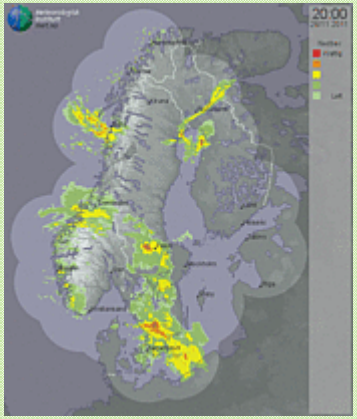
Weather forecasts and radar measurements

- Weather forecasts
  - 4x4 km in rural areas
  - 1 hour time scale



- Radar measured rainfall
  - 1x1 km
  - 15 min time scale



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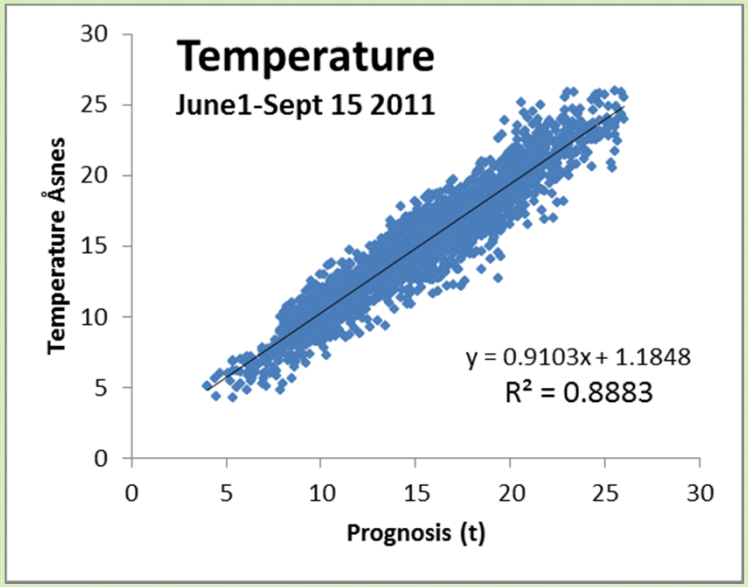
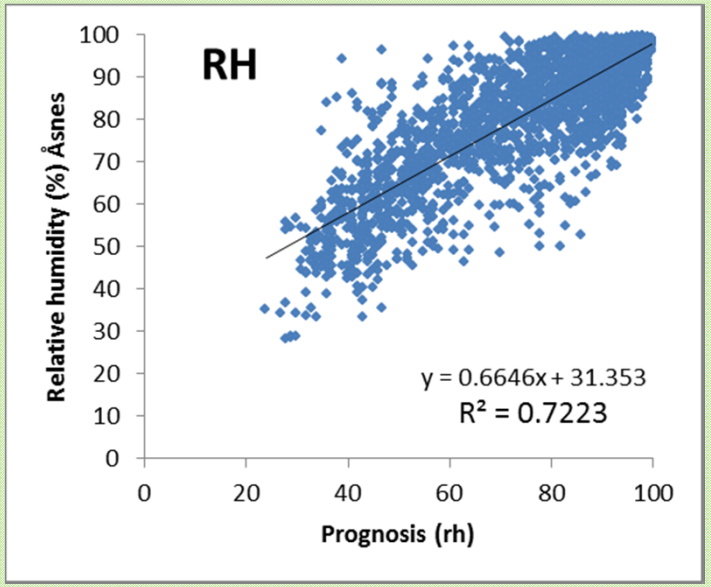
How accurate is the weather forecast?

- Temperature and RH at weather station Åsnes plotted against weather prognosis
  - Hourly values during June 1– Sept 15 2011





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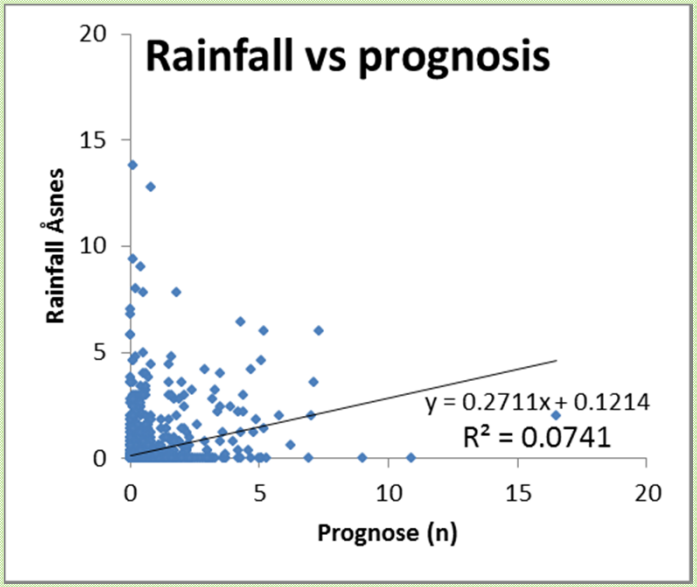
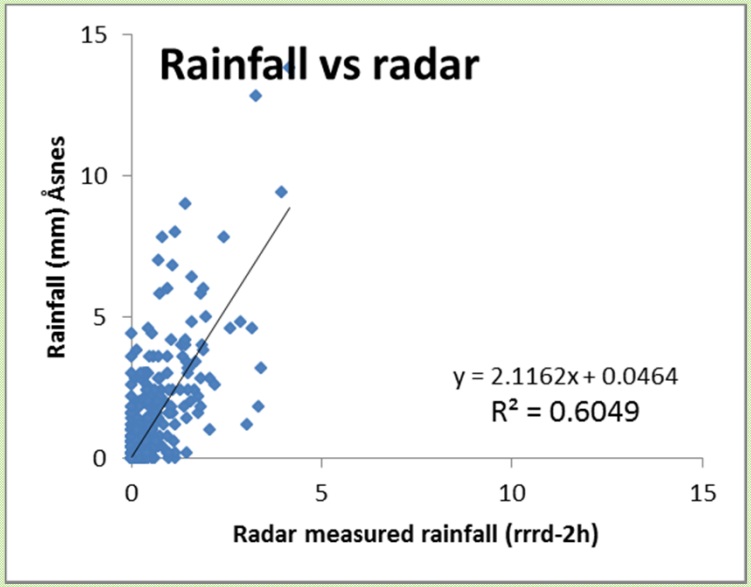
How accurate is the weather forecast?

- True rainfall at weather station Åsnes plotted against weather prognosis and radar measured rainfall
  - Hourly values during June 1– Sept 15 2011





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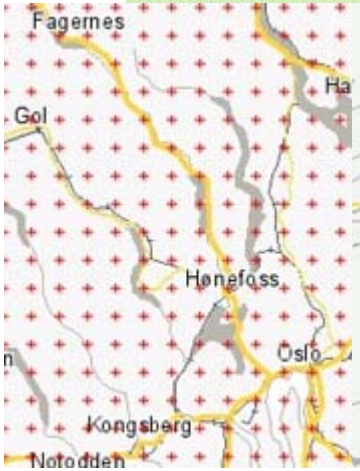
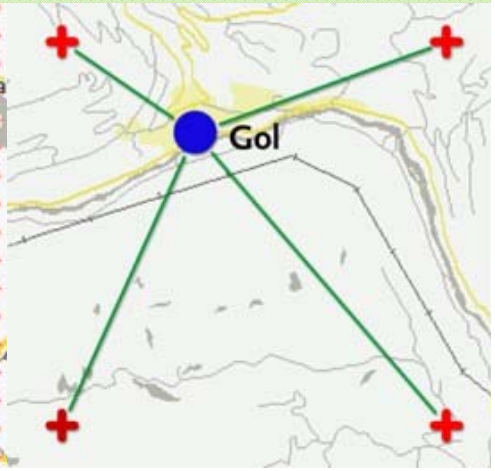
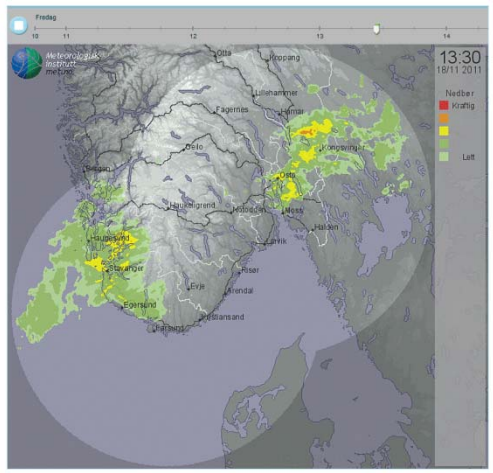
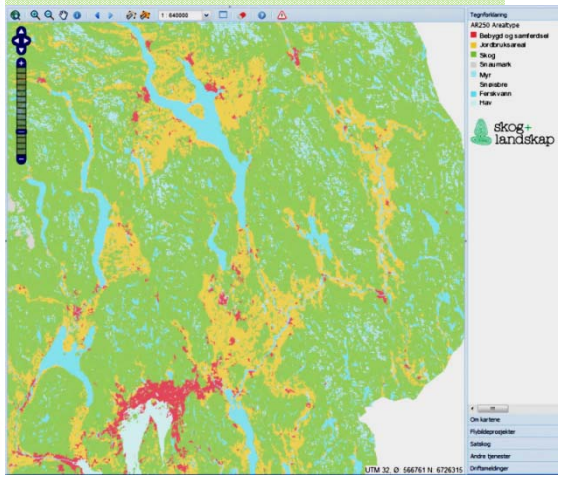
Farm scale forecasting

- Adapt weather forecasts to individual farm sites
  - Weather prognosis for rainfall is less accurate than for temperature, wind, air humidity and radiation
- Esimated rainfall will be based on radar measurements
- Data limited to farmland







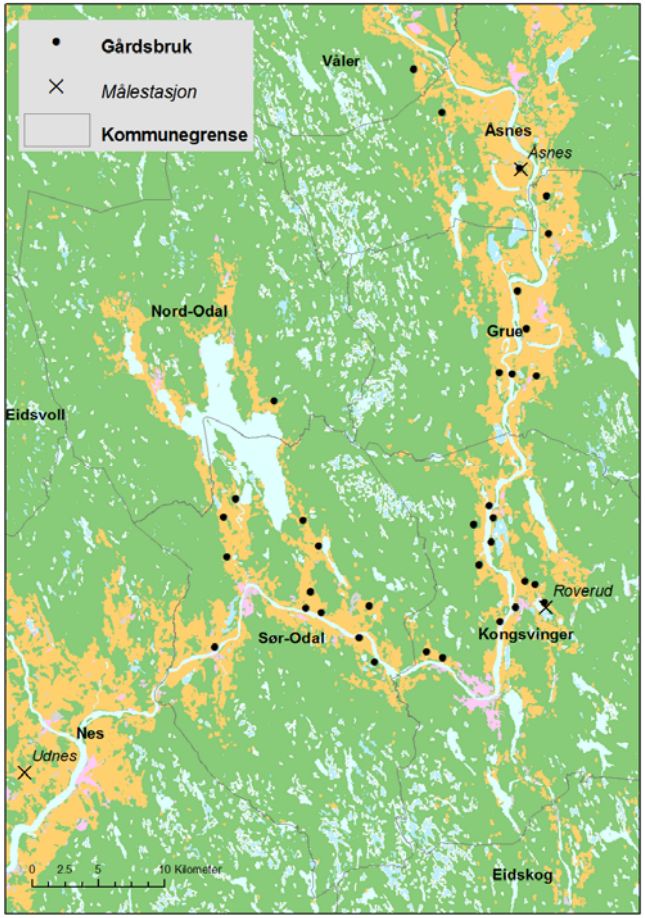


www.yr.no

Farm scale forecasting

Pilot project 2010–2011

- Area of interest:
  Solør– Odal
- Important region for potato and cereal production
- Weather prognosis set up at 35 farms



Farm scale forecasting

Pilot project 2010–2011

- Potato late blight
- Fusarium/mycotoxins in oats


Photo: Å. Bjørnstad


Photo: A. Hermansen

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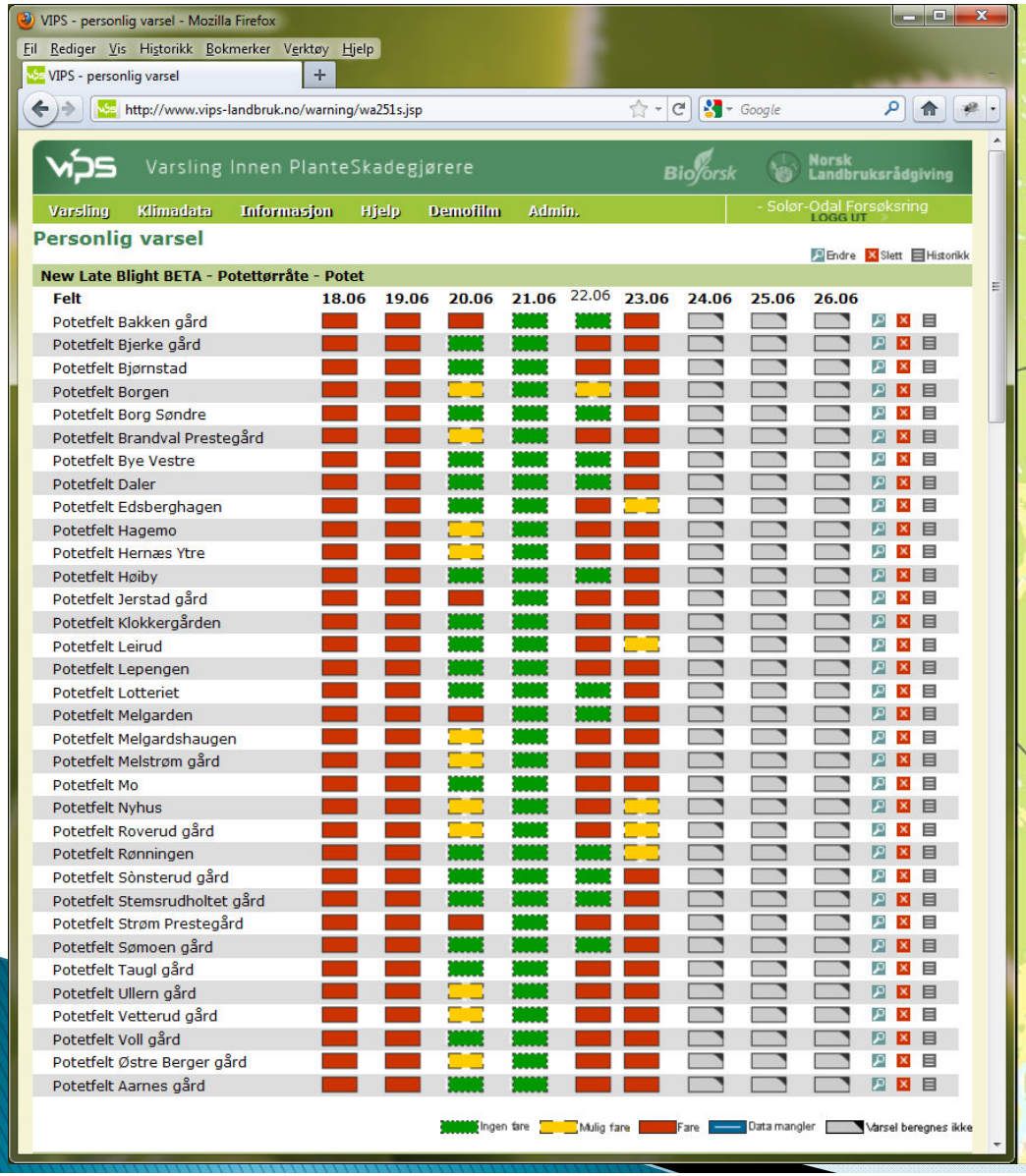
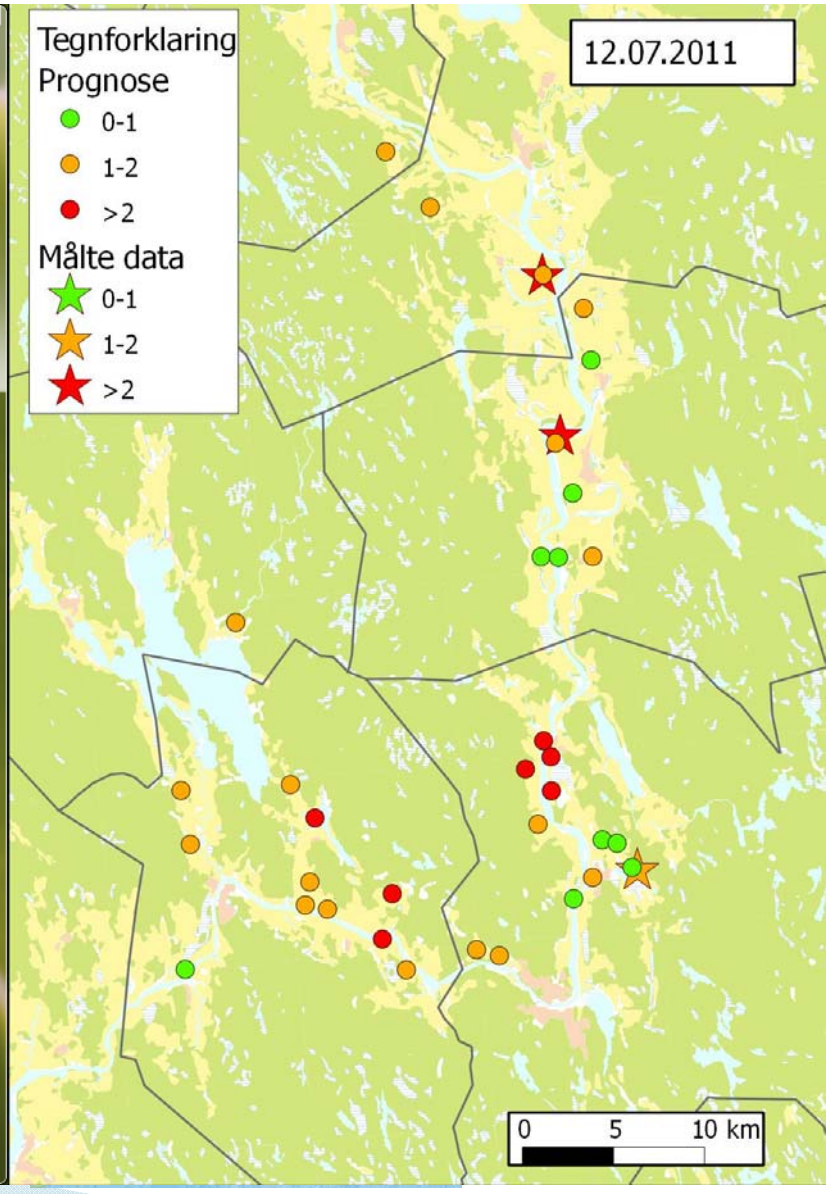
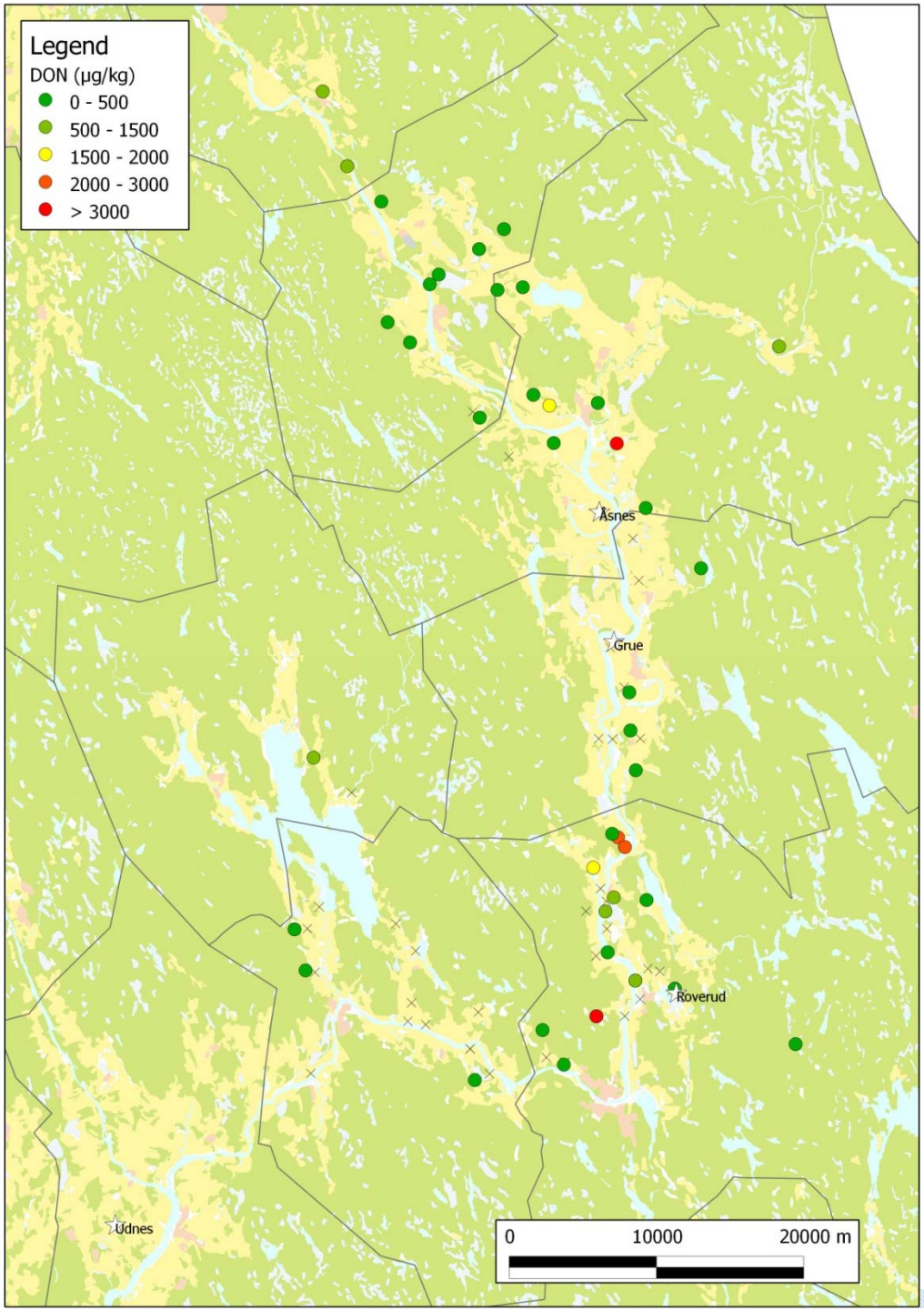
Forecasting potato late blight







Fusarium/mycotoxins in oats

DON concentration in about 40 samples of oat (cv. Belinda, prev. crop oats) collected from farmers' fields 2010

Corresponding data on weather (local and nearest weather station) and cultivation practice collected for each sample

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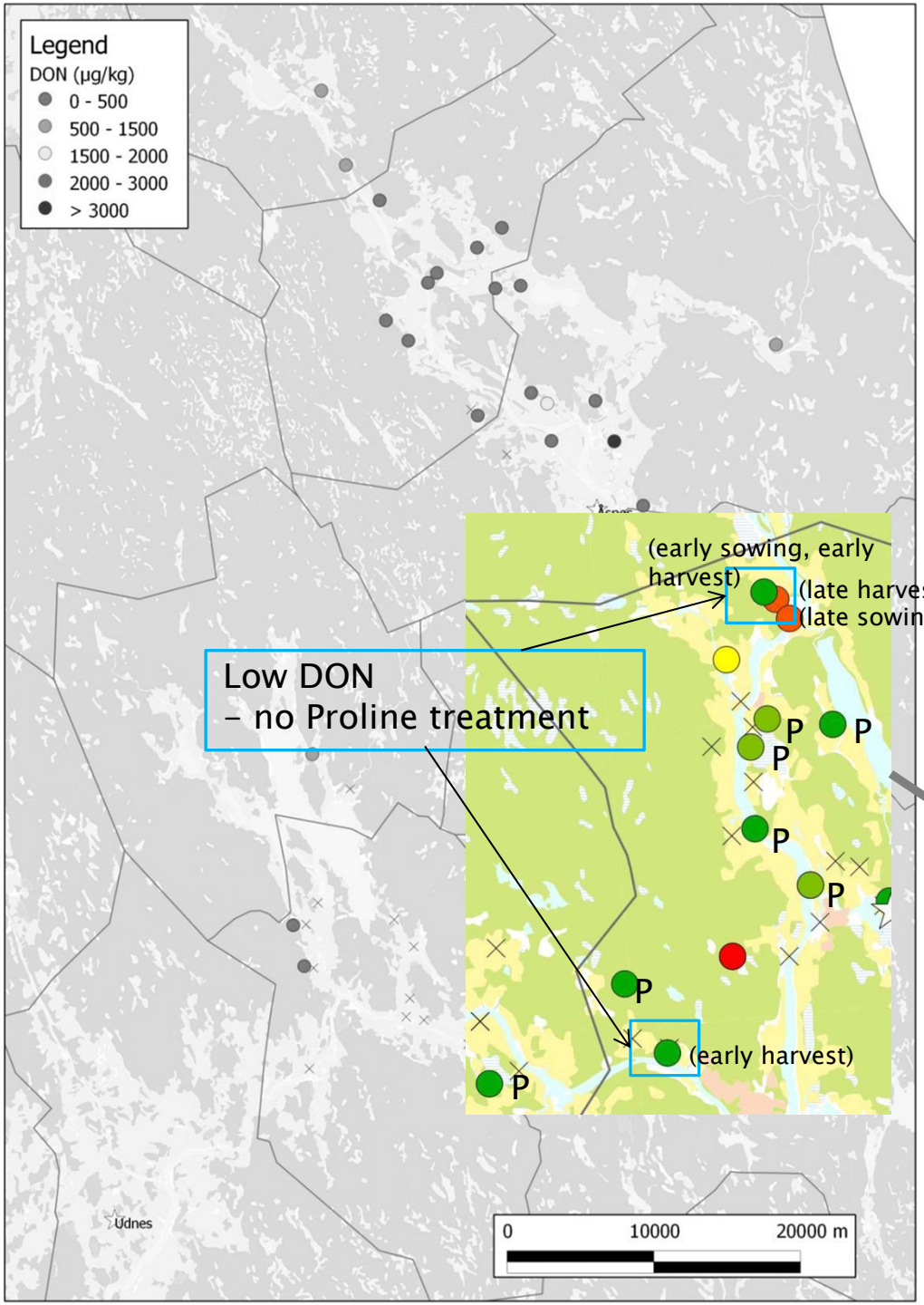
Fusarium/mycotoxins in oats



DON concentration in about 40 samples of oat (cv. Belinda, prev. crop oats) collected from farmers' fields 2010

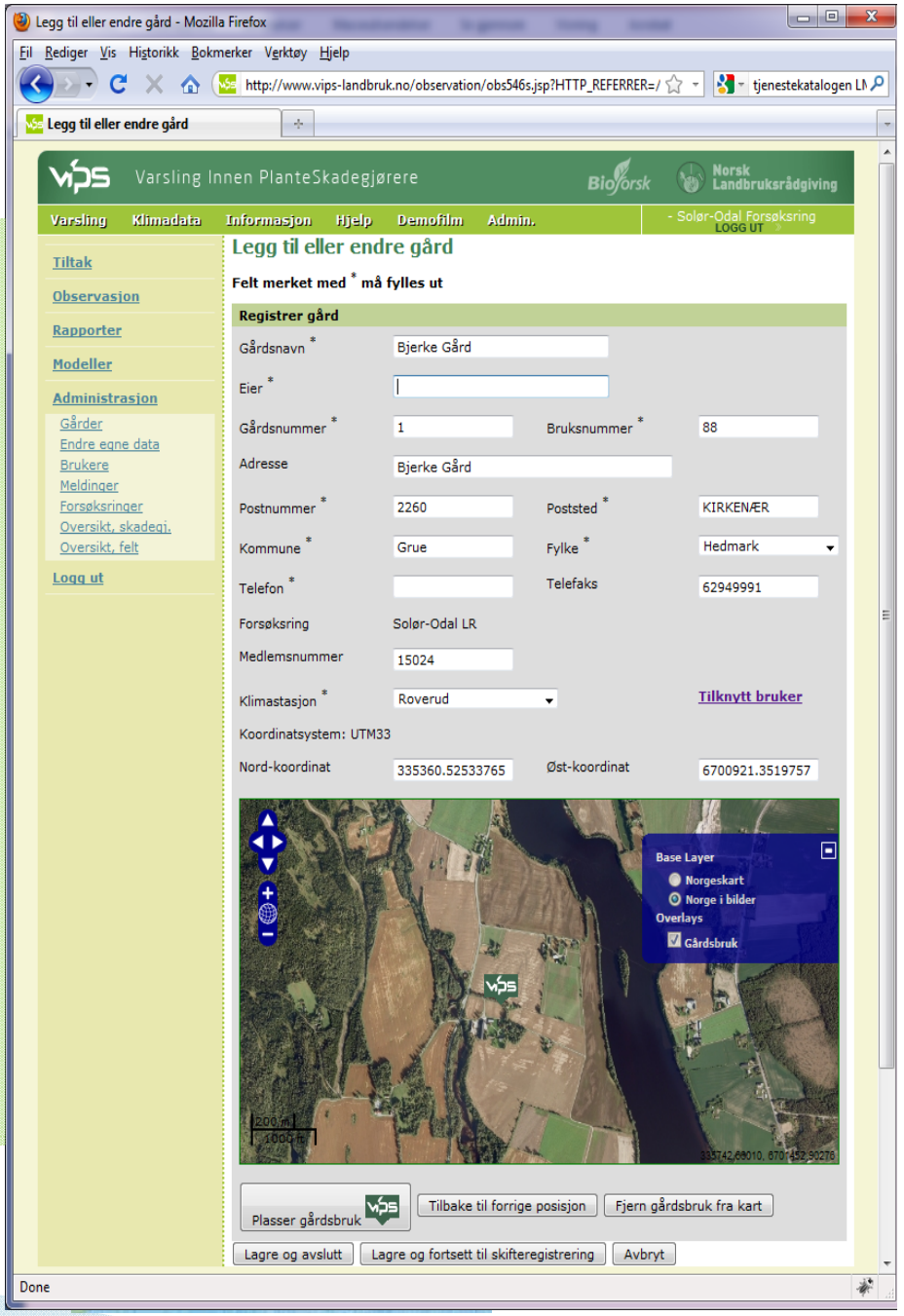
Corresponding data on weather (local and nearest weather station) and cultivation practice collected for each sample

Local variation in DON concentration

P= Proline treated during flowering

Farm scale forecasting in the future

- Adapt weather prognosis and radar measured rainfall
- Starting with Eastern Norway in 2013(?)
- Promote a sence of ownership and personal interest in the forecasting systems



Thank you for your attention!

This project is funded by the Norwegian Ministry of Agriculture and Food, as part of the action-plan for reduced risk in use of pesticides

Photo: E. Fløistad