



Developing a farm scale forecasting service for pests and diseases

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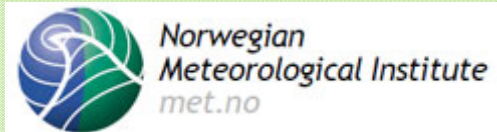
The forecasting service today

VIPS (Varsling Innen PlanteSkadegjørere)

- ▶ Decision support system for a range of diseases, pests and weeds

- ▶ Input

- Data from 80 weather stations
- Weather prognosis



- Biological observations

A screenshot of the VIPS web application interface. The page has a green header with the VIPS logo and navigation tabs for "Varsling", "Klimadata", "Informasjon", "Hjelp", and "Demofilm". A central map of Norway shows weather station locations. To the right, there are sections for "Førstefunn (Abonner)", "Fagmeldinger", "Driftsmeldinger", and "Snarveier". The "Snarveier" section lists various crop-related topics like "Korn og oljevekster", "Potet og grønnsaker", and "Frukt og bær". At the bottom, there are settings for "Instillinger" and a "Lagre kart og kultur" button.

www.vips-landbruk.no



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

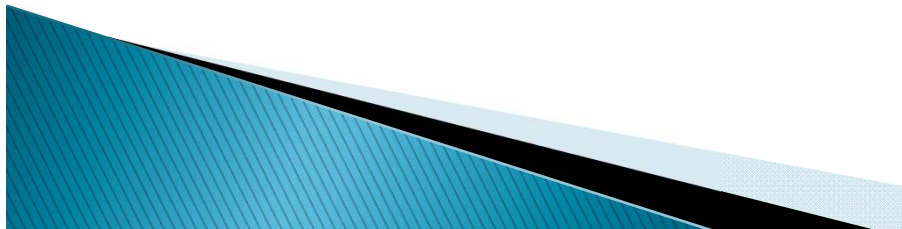
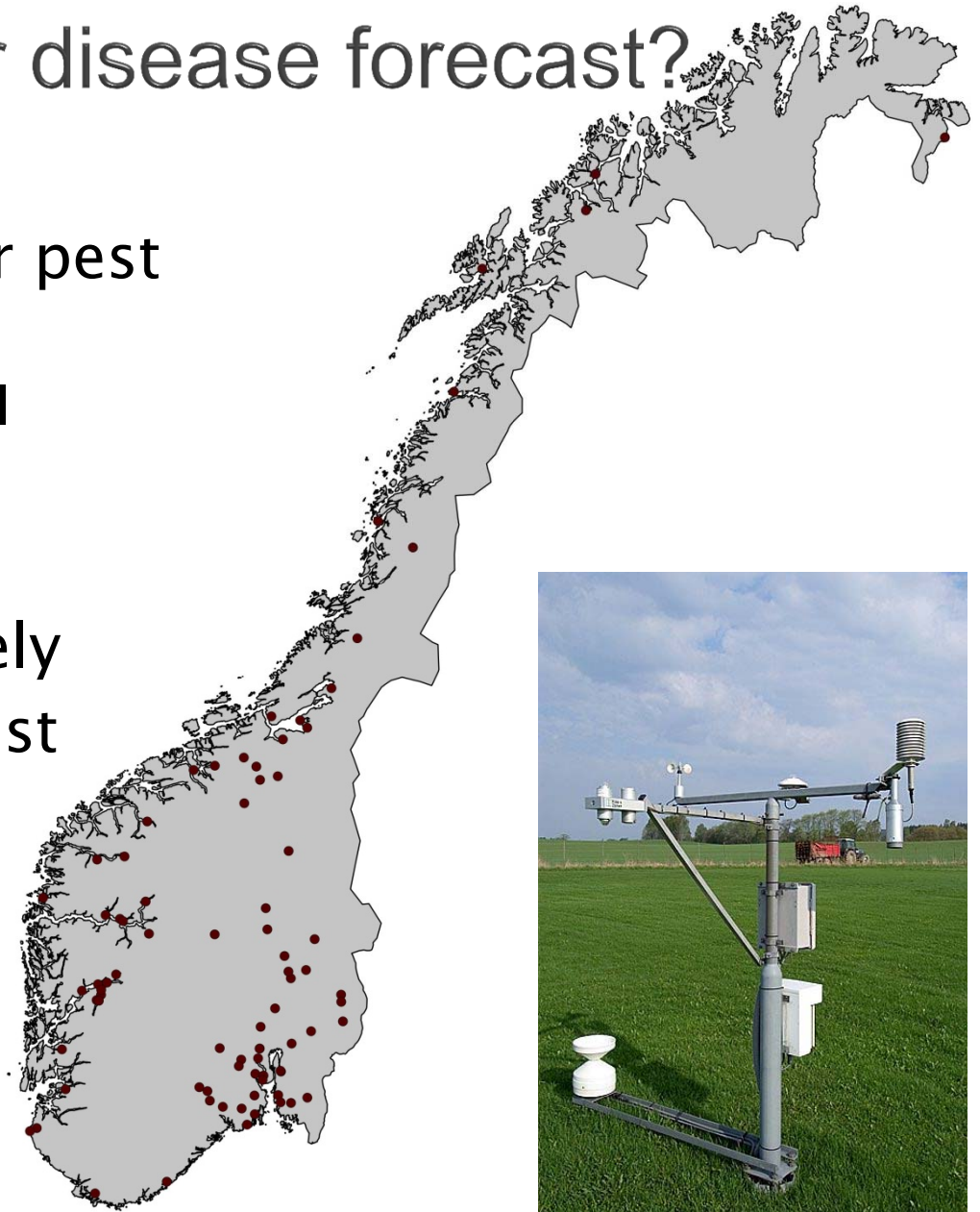




Photo: H. Hovd and L. Rosef

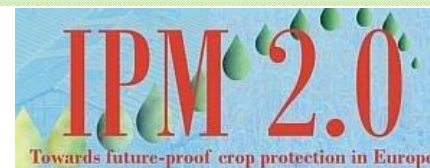
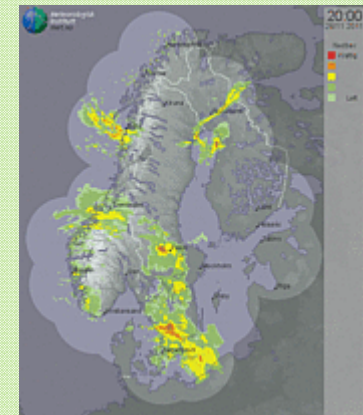
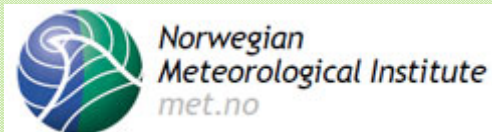
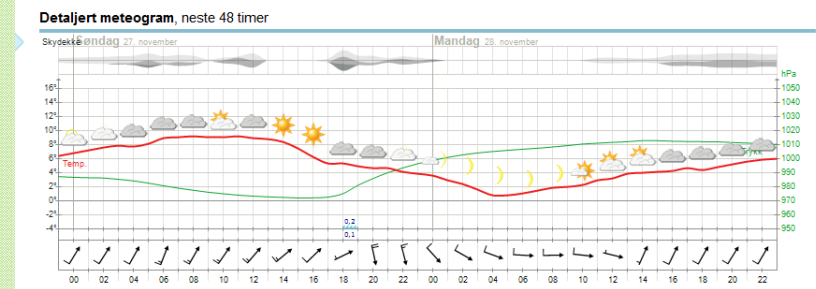


How to get accurate weather data

- ▶ 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

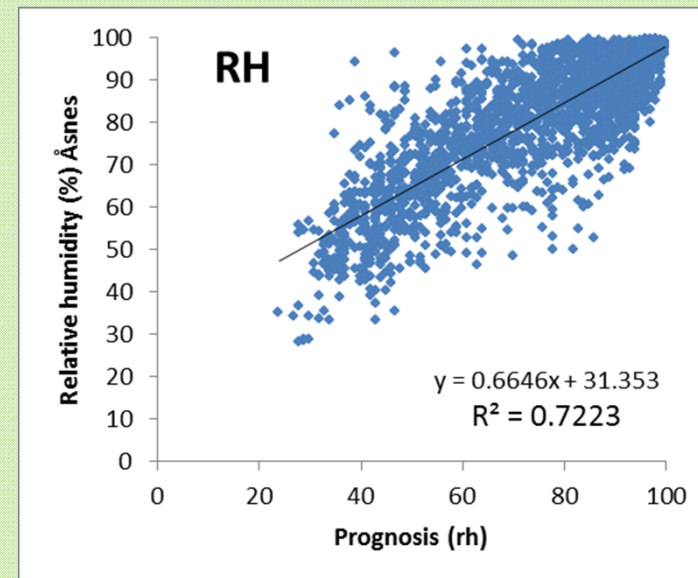
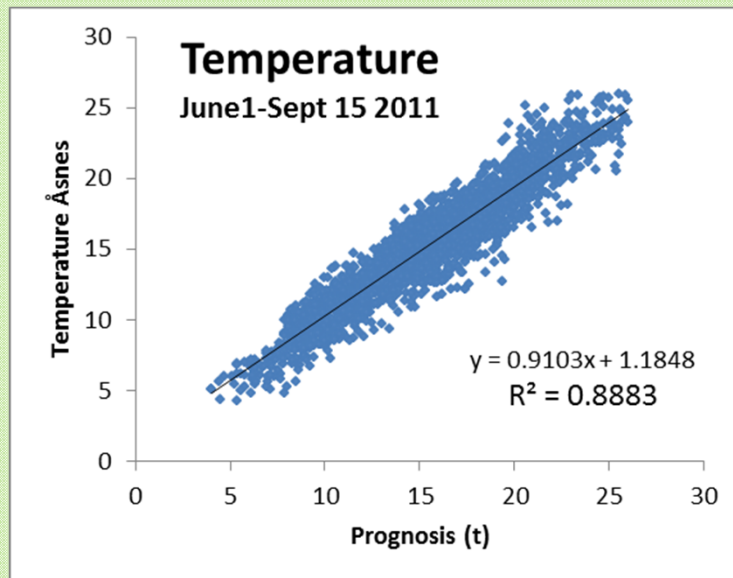
Weather forecasts and radar measurements

- ▶ Weather forecasts
 - 4x4 km in rural areas
 - 1 hour time scale
- ▶ Radar measured rainfall
 - 1x1 km
 - 15 min time scale



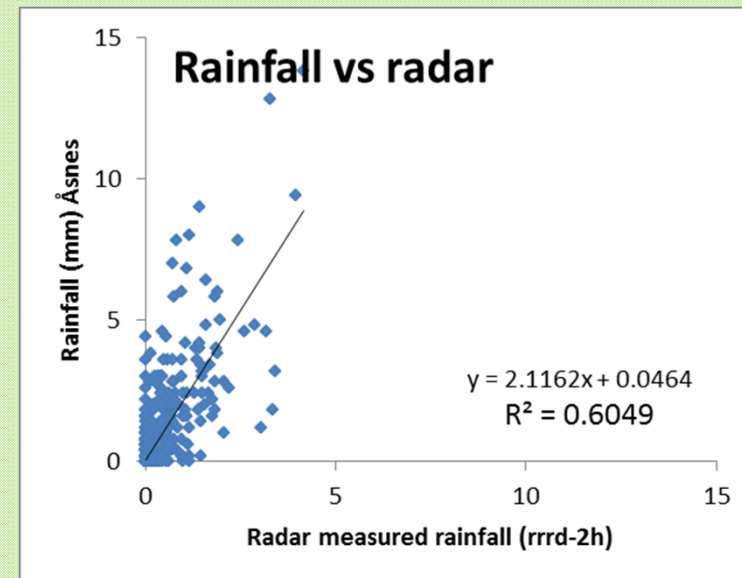
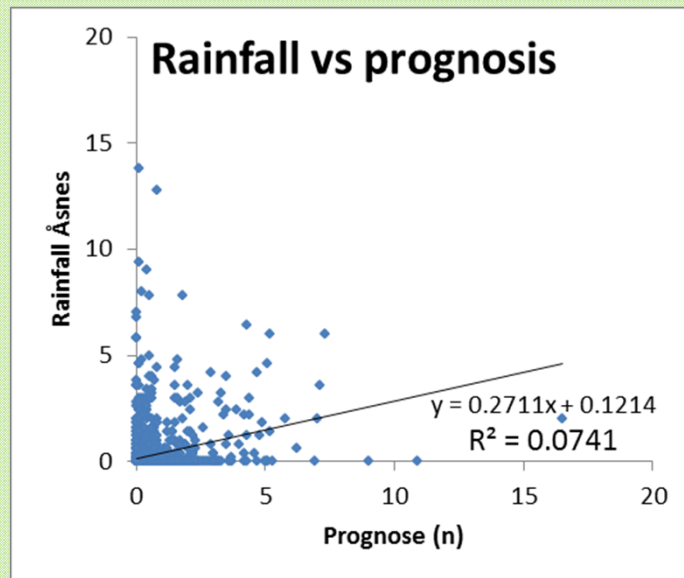
How accurate is the weather forecast?

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



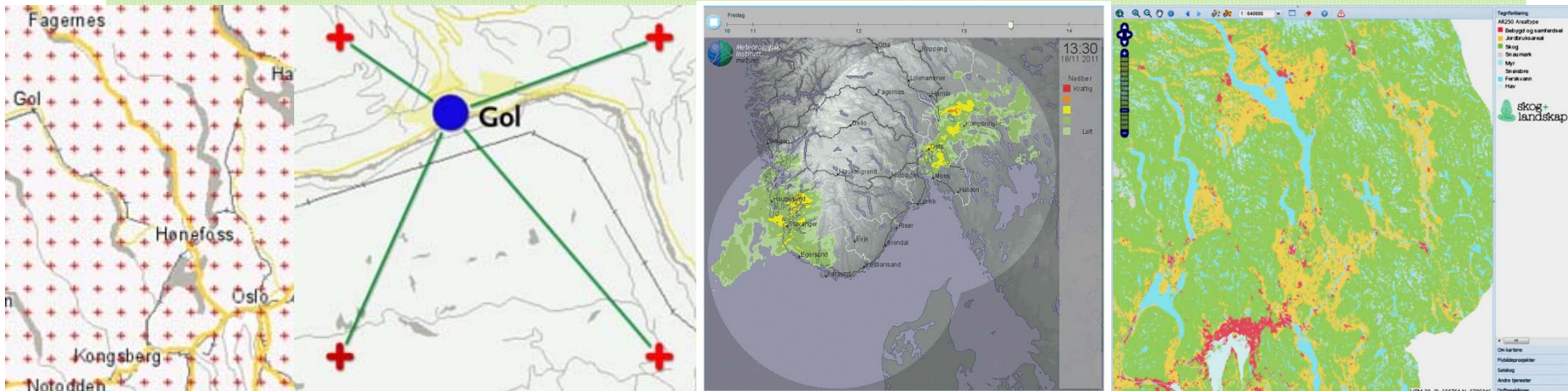
How accurate is the weather forecast?

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



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
- ▶ Estimated rainfall will be based on radar measurements
- ▶ Data limited to farmland



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



Forecasting potato late blight

VIPS - personlig varsel - Mozilla Firefox

http://www.vips-landbruk.no/warning/wa251s.jsp

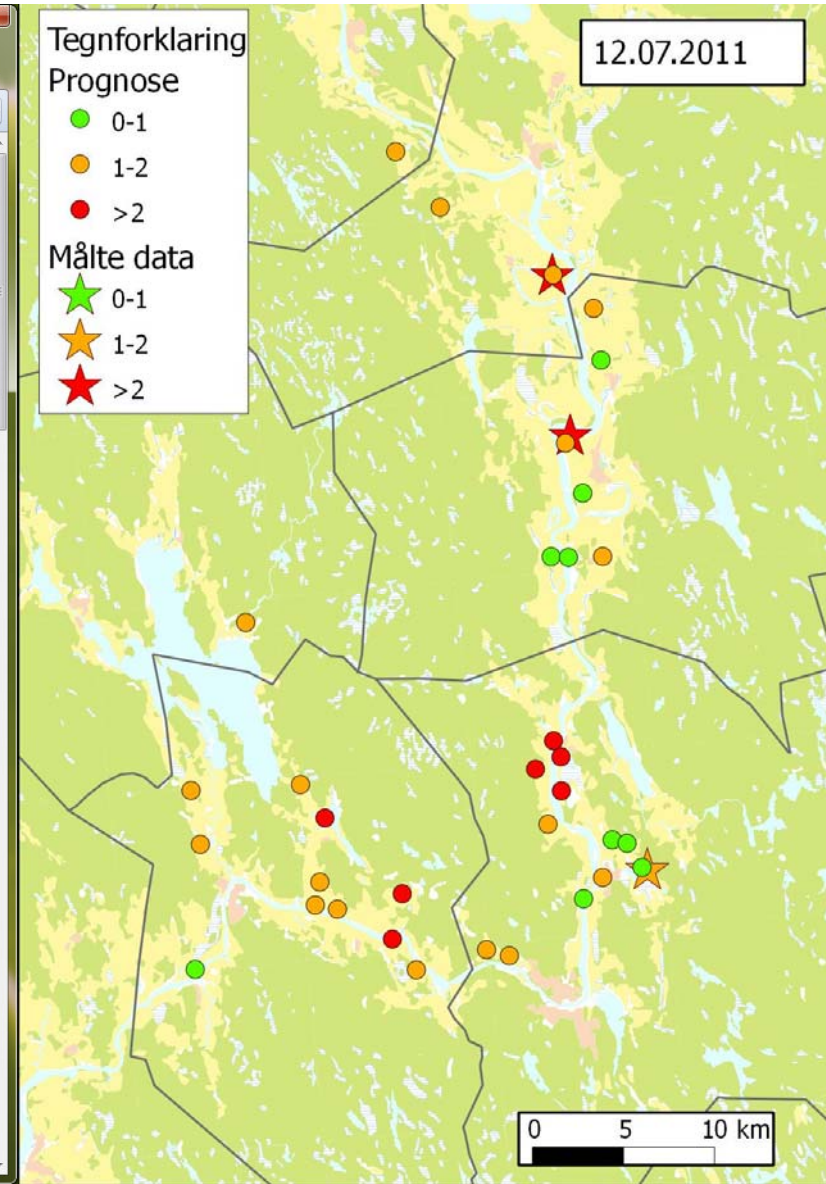
Varsling Innen PlanteSkadegjøre

Personlig varsel

New Late Blight BETA - Potettorråde - Potet

Felt	18.06	19.06	20.06	21.06	22.06	23.06	24.06	25.06	26.06
Potetfelt Bakken gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Bjerke gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Bjørnstad	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Borgen	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Borg Søndre	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Brandval Prestegård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Bye Vestre	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Daler	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Edsberghagen	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Hagemo	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Hernæs Ytre	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Høyby	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Jerstad gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Klokkegården	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Leirud	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Lepengen	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Lotteriet	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Melgarden	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Melgardshaugen	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Melstrøm gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Mo	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Nyhus	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Roverud gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Rønningen	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Sønsterud gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Stemsrudholtet gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Strøm Prestegård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Sømoen gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Taugl gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Ullem gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Vetterud gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Voll gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Østre Berger gård	☐	☐	☐	☐	☐	☐	☐	☐	☐
Potetfelt Aarnes gård	☐	☐	☐	☐	☐	☐	☐	☐	☐

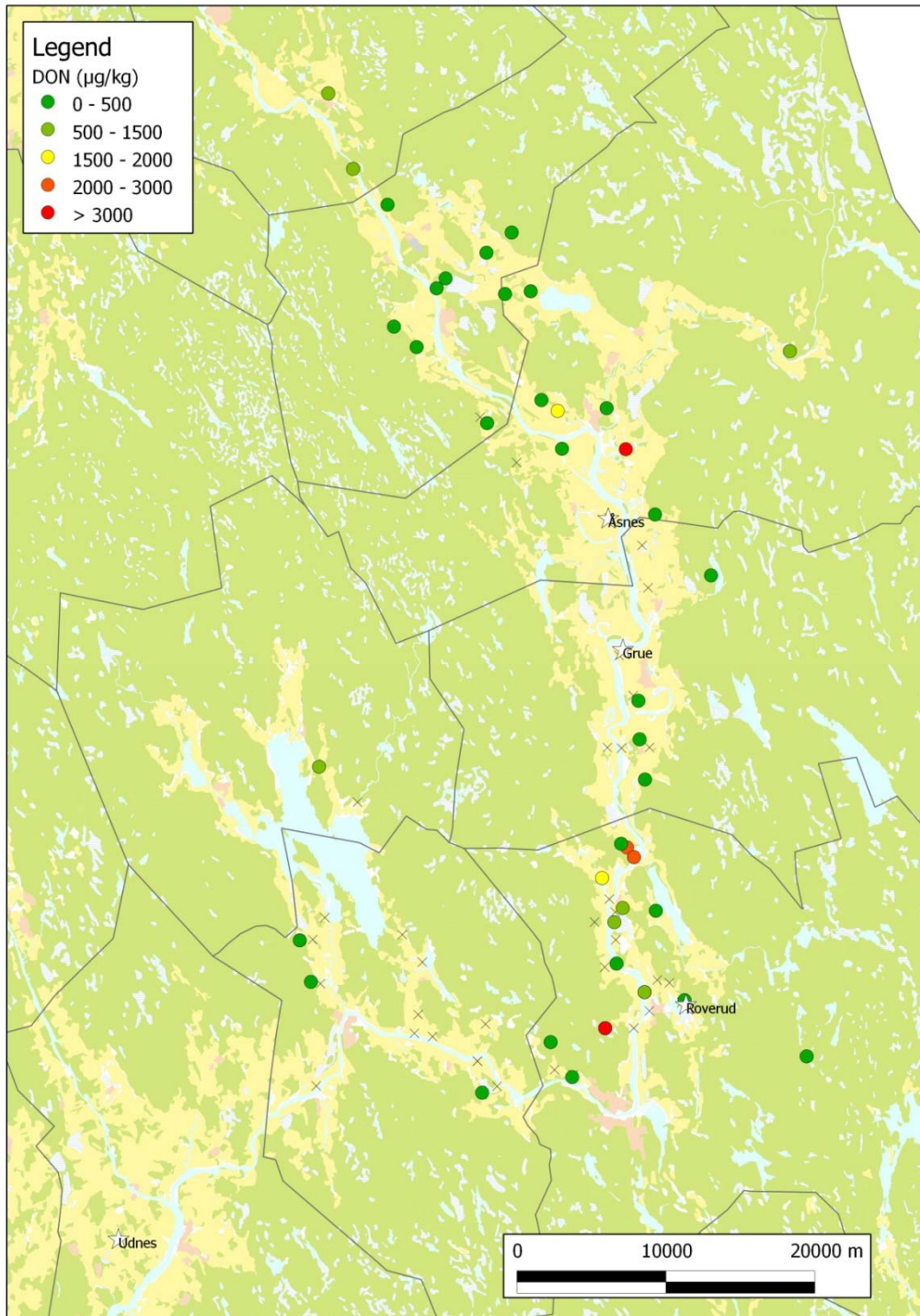
☐ Ingen fare ☐ Mulig fare ☐ Fare ☐ Data mangler ☐ Varsel beregnes ikke



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



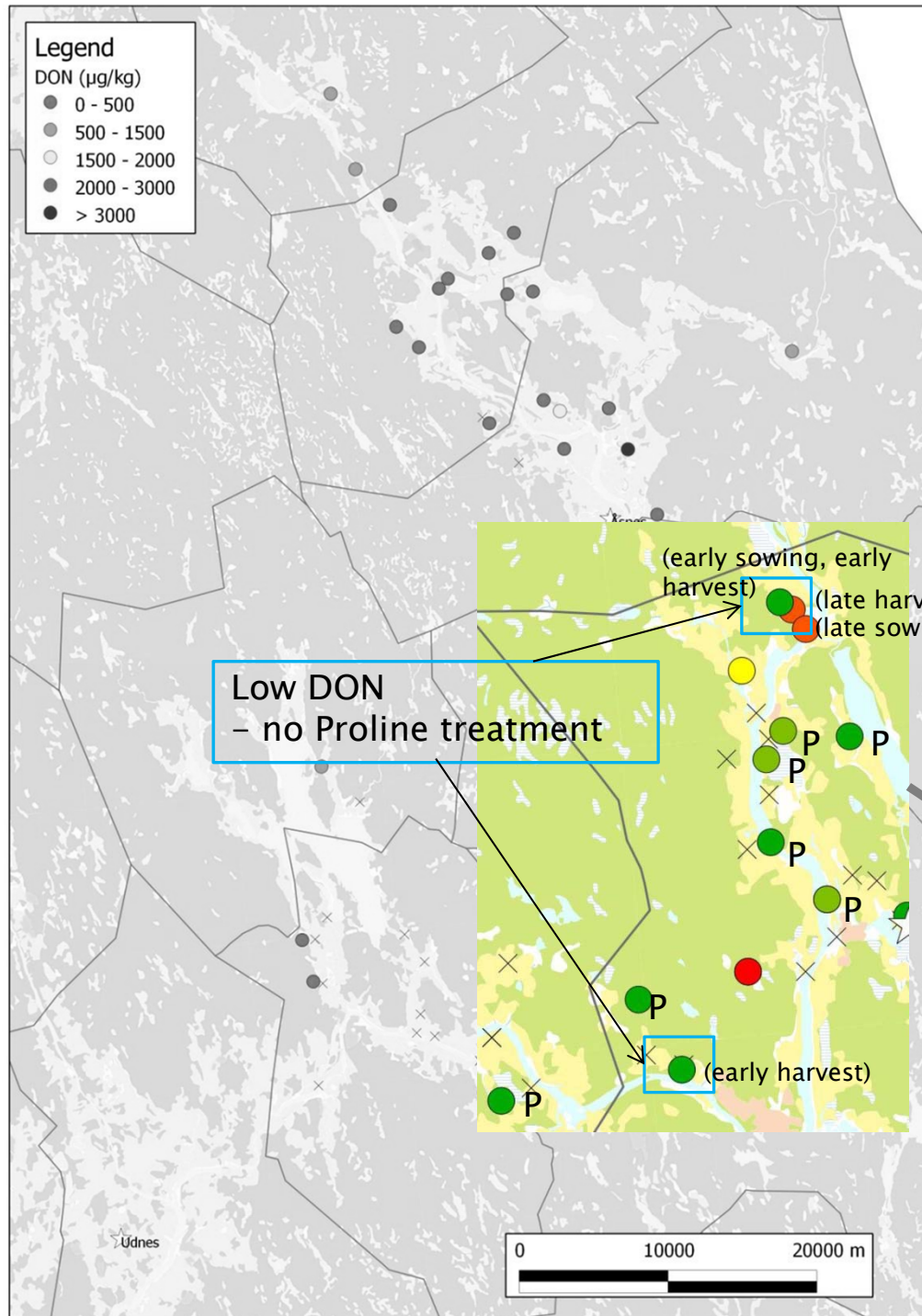
Fusarium/mycotoxins in oats

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 sense of ownership and personal interest in the forecasting systems

The screenshot shows a web browser window titled "Legg til eller endre gård - Mozilla Firefox". The address bar shows the URL: http://www.vips-landbruk.no/observation/obs546s.jsp?HTTP_REFERERER=/. The page header includes the VIPS logo and navigation links: "Varsling", "Klimadata", "Informasjon", "Hjelp", "Demofilm", "Admin.". The main content area is titled "Legg til eller endre gård" and contains a form for entering farm details. The form fields include:

- Gårdsnavn *: Bjerke Gård
- Eier *
- Gårdsnummer *: 1
- Bruksnummer *: 88
- Adresse: Bjerke Gård
- Postnummer *: 2260
- Poststed *: KIRKENØR
- Kommune *: Grue
- Fylke *: Hedmark
- Telefon *
- Telefaks: 62949991
- Forsøksring: Solør-Odal LR
- Medlemsnummer: 15024
- Klimastasjon *: Roverud
- Koordinatsystem: UTM33
- Nord-koordinat: 335360.52533765
- Øst-koordinat: 6700921.3519757

Below the form is a map showing the farm's location. The map includes a scale bar (0 to 200 m), a north arrow, and a legend for "Base Layer" with options: "Norgeskart", "Norge i bilder", "Overlays", and "Gårdsbruk" (checked). At the bottom of the map area are buttons: "Plasser gårdsbruk", "Tilbake til forrige posisjon", and "Fjern gårdsbruk fra kart". The footer of the page contains buttons: "Lagre og avslutt", "Lagre og fortsett til skifterregistrering", and "Avbryt".

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

Handlingsplan for redusert risiko ved bruk av
plantevernmidler (2010 - 2014)

Vedtatt av Landbruks- og matdepartementet 18. september 2009

