Current use and development of expert weather-based phenological models for managing OSR pests in autumn and spring
Expert disease & pest prediction models

- expert use by farmers and advisors
- expert services in cooperation with Bayer
- New countries 2017

validated by users since >20 yrs in many European markets
Do the consultation with expert

Variety
Infestation
GS
Previous spraying,...

Weather data + forecast

Diseases: Infection probabilities

Pests: Phenology (migration, egg-laying, larvae)

• Treatment need
• Treatment date
• Product choice (dose rate, price)

Cost savings + efficient disease/pest control
Consultation - examples

Winter oilseed rape: Schemann

Pollen beetle

Within the next few days stronger migration is likely.

<table>
<thead>
<tr>
<th>Beetles per plant</th>
<th>Crop development</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3</td>
<td></td>
</tr>
<tr>
<td>2-3</td>
<td>bad</td>
</tr>
<tr>
<td>None of the cases listed applies.</td>
<td></td>
</tr>
</tbody>
</table>

Cabbage stem weevil

As yet no or only a few insect pest have finished their egg deposition; in the following days optimal conditions are expected.

<table>
<thead>
<tr>
<th>Infestation (yellow trap)</th>
<th>Crop development</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 50 weevils</td>
<td></td>
</tr>
<tr>
<td>30 to 50 weevils</td>
<td></td>
</tr>
<tr>
<td>None of the cases listed applies.</td>
<td></td>
</tr>
</tbody>
</table>

Cabbage seed weevil / Pod midge

Up to now there was no migration. A consultation is not necessary.
Rediscover your fields with SCOUTING

**SCOUTING** is a mobile application that enables you to...

...do **fast** and **convenient scouting** and **document** your results.

...**recognize** and **identify** in-field **stress** by simply taking a picture with your smartphone camera.

...**share** your **insights** within the **SCOUTING community** to **react faster** on spreading pests and diseases.
COMPONENTS THAT WILL BE INTEGRATED IN THE FIRST VERSION OF THE Bayer SCOUTING APP in 2017

SCOUTING currently consists of six key components:

- Weed scouting
- Insect monitoring
- Disease recognition
- Nutrient estimation
- Yield estimation
- Leaf damage detection

- Determines **weeds** in seconds
- Helps to make the right **weed management** decisions
- Detects present **species** and population density
- Better pest management decisions
- Helps to **identify** a large range of diseases
- Supports **disease** and Diseases management
- Allows to **identify** nutrient deficiencies quickly
- Informs how the deficiency **affects** your crops
- Recommends on which and **how much nutrients** to apply
- Counts the the number of ears /m²
- **Calculates potential yield** of your fields
- Identifies damaged parts (either by insects or diseases)
- Calculates the % of affected parts
Evaluate yellow traps in seconds

Insect monitoring – what is it all about?

- Ease up the evaluation of yellow traps for you by simply taking a photo.
- Detect present species
- Population density.
- Gain a quick understanding of insect activity in your crops and fields to make better pest management decisions.
- Find your yellow traps easily by setting GPS marking points.
- Receive alarms when pests are spreading in nearby areas.

The app counts and classifies insects automatically
Timing Solutions for winter oilseed rape

Autumn

- Cabbage stem flea beetle (*Psylliodes chrysocephala*)
- Phoma leaf spot and growth regulators

Spring

- Rape stem weevil (*Ceutorhynchus napi*)
- Cabbage stem weevil (*Ceutorhynchus quadridens*)
- Pollen beetle (*Meligethes aeneus*)
- Cabbage seed weevil (*Ceuthorhynchus assimilis /obstrictus*)
- Pod midge (*Dasineura brassicae*)

Levels of consultation

1. Weather analysis for each pest & disease
2. Alerts for each pest & disease
3. Crop recommendation („complete solution‟)
Crop: timing autumn 2015
Timing: Cabbage stem weevil 2015
Timing: Cabbage stem weevil

Efficacy depends on treatment date!
Crop: timing spring 2015
exp. award in France!
“With 3 years of field trials we proved that expert. models are transferable to all regions in France. For example the models assess correctly the much earlier begin of migration of spring pests.”

Pollen beetle approved in UK!
“Performed reassuringly well in prompting monitoring that would detect breaches of spray thresholds for pollen beetle in OSR”

“Use of expert DSS could focus monitoring effort to when it is most needed.”

www.terresinovia.fr
expert. Partner since 2007
Coordinator Hubert Hebinger
Pest trials in Ukraine 2015 (BCS/IFC)

% of migration was covered by forecast

- Pollen beetle (100%)
- Rape stem weevil (100%)
- Cabbage stem weevil (97%)
- Cabbage seed weevil (100%)

Common practice  Untreated  Optimized with expert.
FaunaPhotonics: a company in Copenhagen, emerged from Lund University in Sweden.

FaunaPhotonics: a laser radar (LIDAR) product that can monitor (detect and identify) aerial fauna in real time. System can parameterize LIDAR signals into insect body size, wing size, wing beat frequency and … ensuring high species specificity.

**Advantages**

**Challenges/Questions**

Are we able to detect/identify key insect pests (e.g. pod midges or aphids or pollen beetles), small insects partly damaging already with low numbers/m²

Can we adapt the system for farm level use cases
Use Case: Oil seed rape flowering

Target
- Pod midges (small market volume)
- (Cabbage seed weevil)

Agricultural Practice, Monitoring, Modelling
- Flowering spray is extremely critical because of bees and natural enemies
- Pod midges are extremely damaging but only in some years
- Scouting/use of thresholds not practicable for farmers, tank mixtures with fungicides
- Expert models available for Pod midges

Advantages / Requirements / Setup Fauna Photonics
- Identification of risk periods, improvement for treatment decisions (more objective measurements of densities), Option for field zone sprays (limited flight distances of pod midges - different damaged zones in larger fields), Combination with bee activity scan is an add on value.
- In field scan (into crop canopy is necessary)
- Field boundary scan - Rotating stationary system

Test Setups
- Sampling of infested pods in June (Larvae), labor storage to capture midge hatch
- Visit fields during (midge activity) and after flowering (pod damages)
Farmers can...

... use crop protection products more accurately and sustainably and thus unleash the potential of their fields.

... identify field-specific stresses by simply taking a picture and remote sensing.

... comply better with official regulatory requirements.
Thank you!