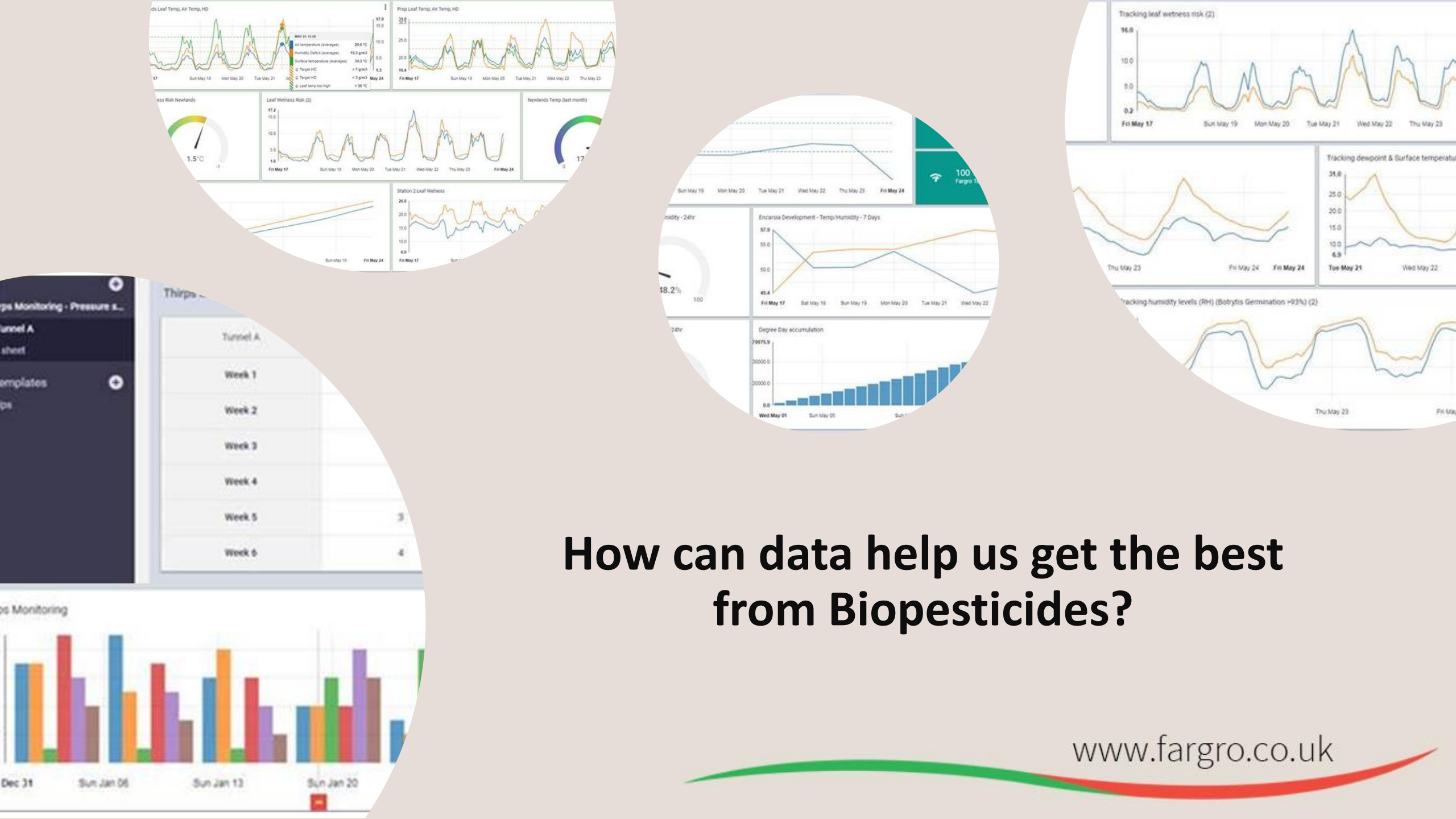




SmartIPM - Data Driven
Decisions

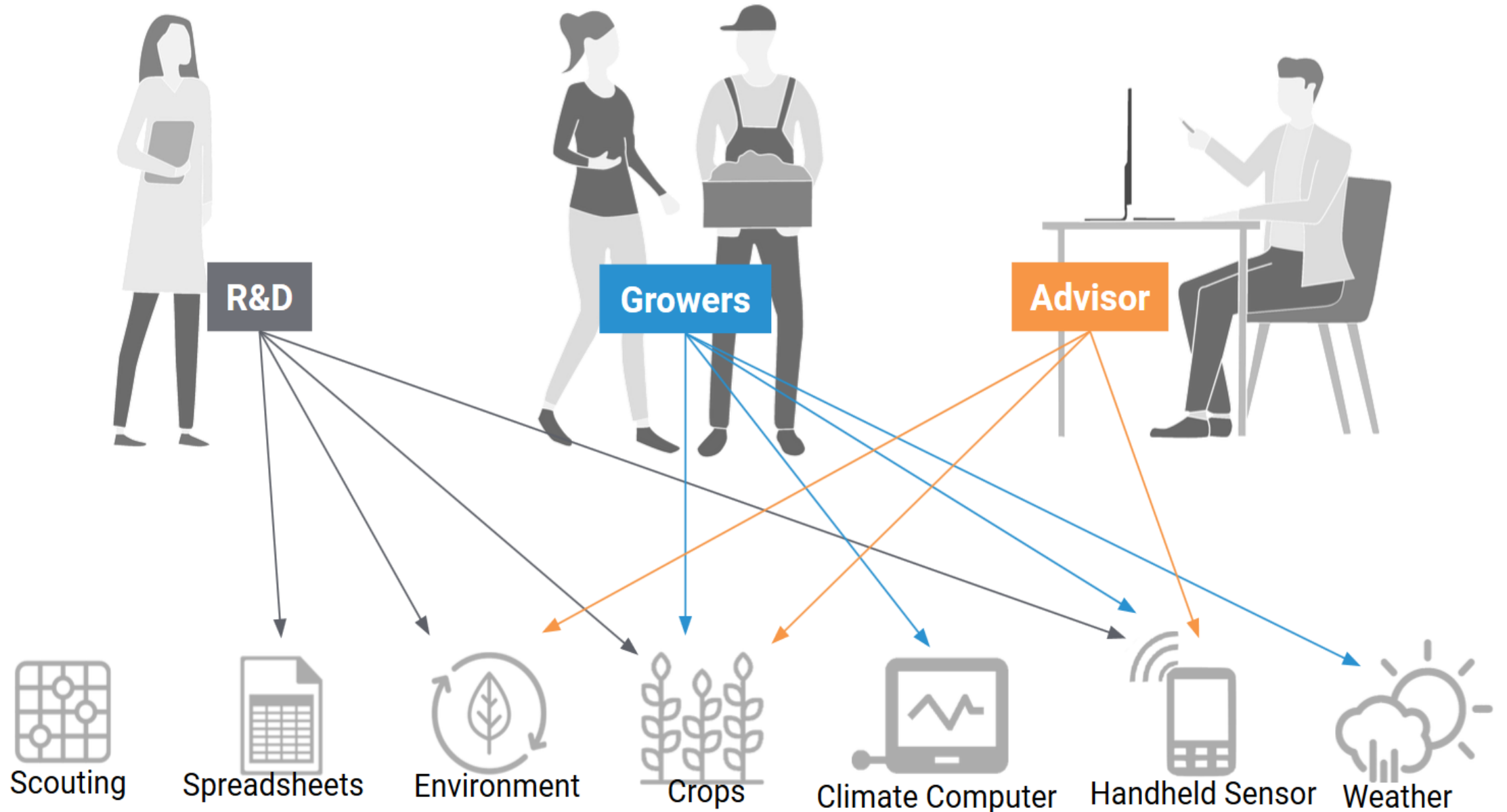
Ant Surrage
Technical development
specialist
Fargro



How can data help us get the best from Biopesticides?

www.fargro.co.uk

From data silos...

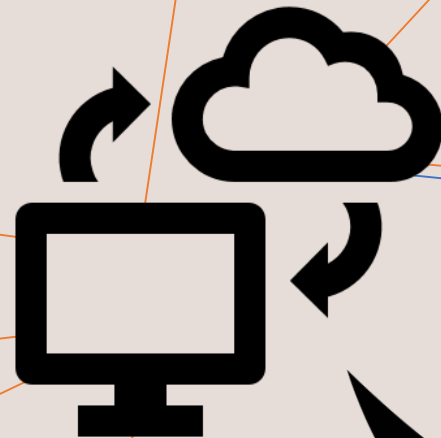
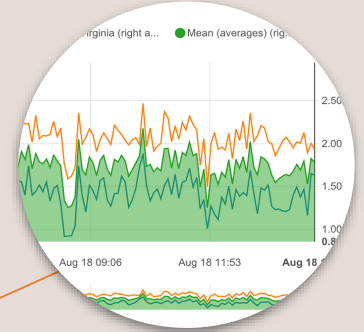
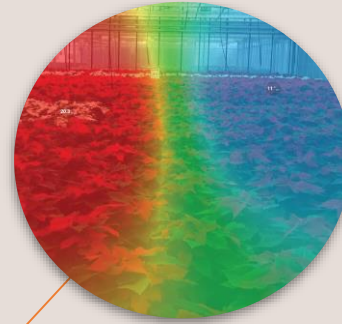
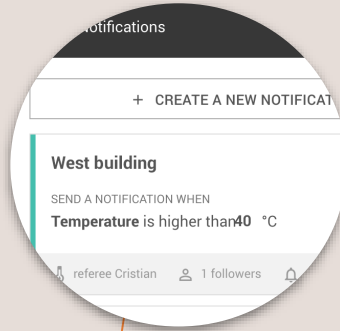
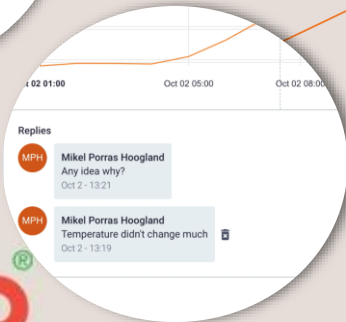
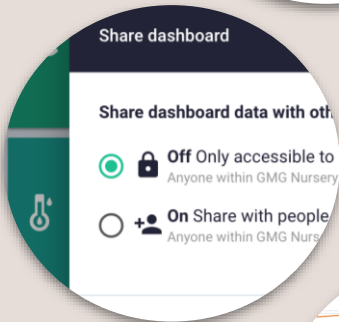
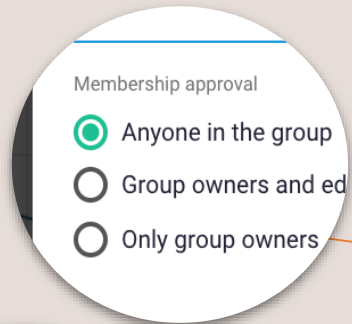


...to data platform and connectivity



“Old” IPM Programme

- Standardised programmes
- Not grower specific
- Not dynamic
- Reactive
- Little learnings



“New” IPM Programme

- Data based programme
- Highly specific, increasing over time
- Real-time, dynamic IPM programming
- Improved forecasting
- Data rich learnings
- Future proofing; AI, traceability...

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Measuring the microclimate

- How different is the environment your sensor is in compared to the crop?
- Now we can understand the environment at crop level for an individual plant.
- Better picture of the actual environmental conditions at crop level.
- An understanding of the nature of the stress through a plants life.
- Be better informed on how your biopesticide will perform.





The Importance of VPD in the Mircorclimate

- Microclimates showed significant variance horizontally along the production line.
 - VPD was circa 30%+ higher at early stage vs end of production.
 - Plants close to harvest were inactive for long periods of the day.
- Decisions to change irrigation schedule timing, increased fan speed has helped to reduce humidity.





Application Timing

- One key to successful efficacy is application timing.
- Being able to predict issues allows for more informed preventative application.
- Often biopesticides have far less curative effects than a conventional alternative.
- Some biopesticides are required to be applied at a set percentage of disease.
- For example AQ10 being applied at 5% powdery mildew

Powdery Mildew

- Powdery mildew turns up on most crops following a rapid change in environmental conditions.
- Rapid fluctuations in conditions are thought to be a trigger. Followed by a latent period followed by a development period.
- Latent and development phases are well defined, triggers less so.



AQ10

- *Ampelomyces quisqualis* is a hyper parasite
- Research last year by ADAS showed that if powdery mildew is not present AQ10s presences will be fleeting
- AQ10 should be applied at 3 - 5% Powdery Mildew
- However, if powdery mildew gets too advanced it can be equally difficult to control.
- Can we use predictive models to tell us level of risk/likelihood that 5% powdery mildew is present.





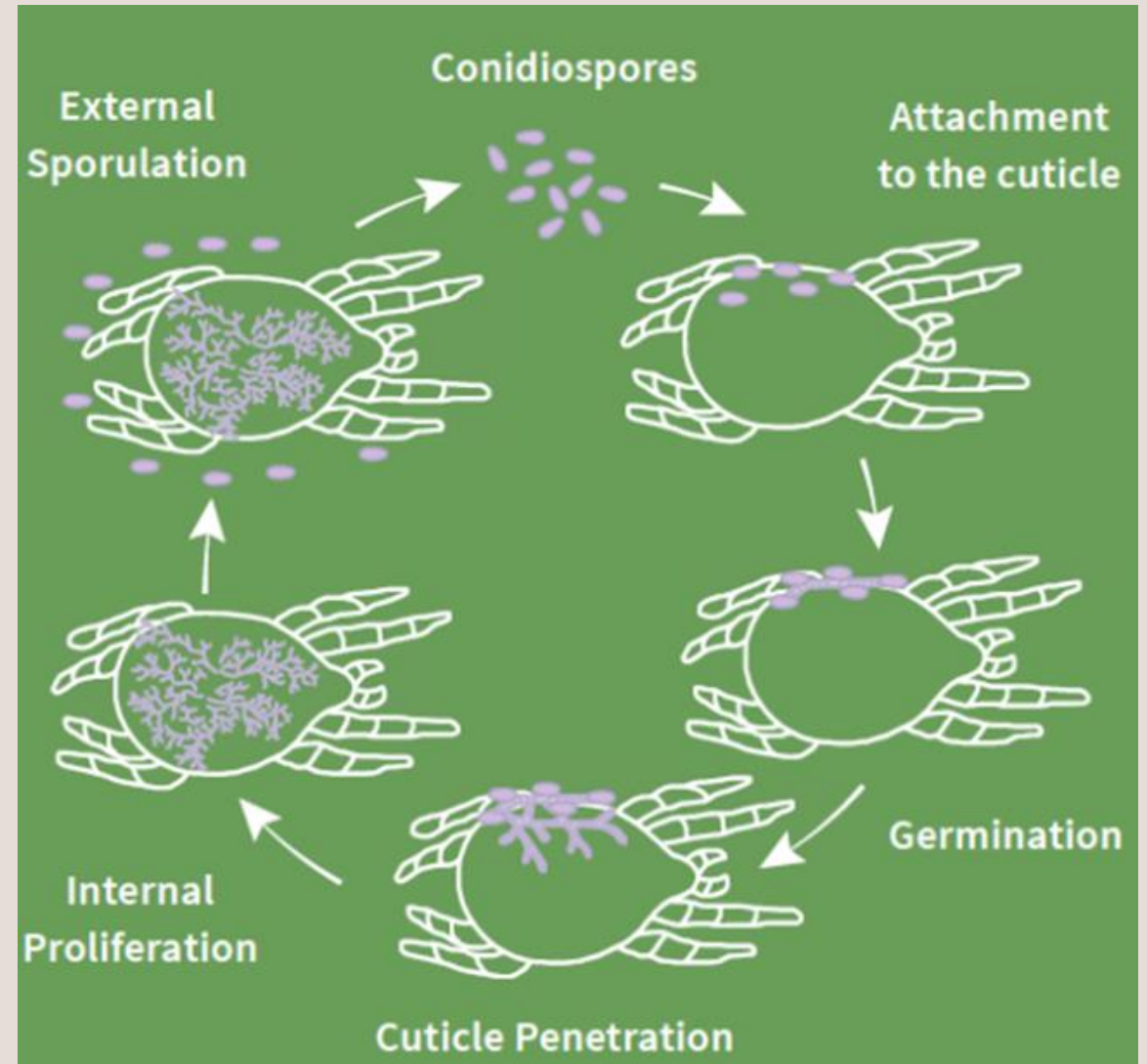
Model Refinement

- Is the fluctuation a trigger?
- How big does that fluctuation need to be?
- Can the predictive models be refined further?
- How can we display this information in a way growers will find helpful?



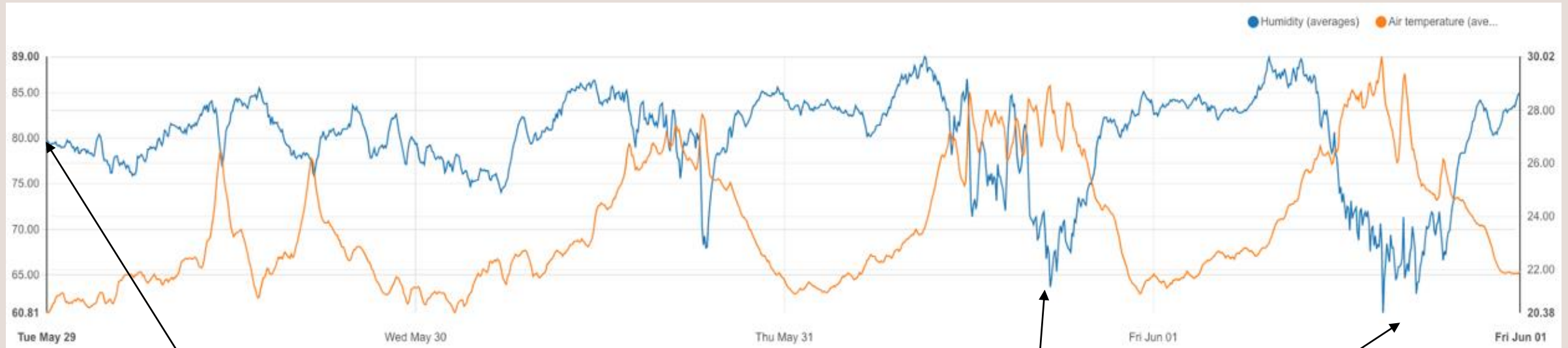
Naturalis – L *Beauveria bassiana*

- Above 60% RH
- Above 80% RH for sporulation
 - 20°C – 25°C
 - UV sensitive



Naturalis - L

Temperatures are consistently good for
B.bassiana

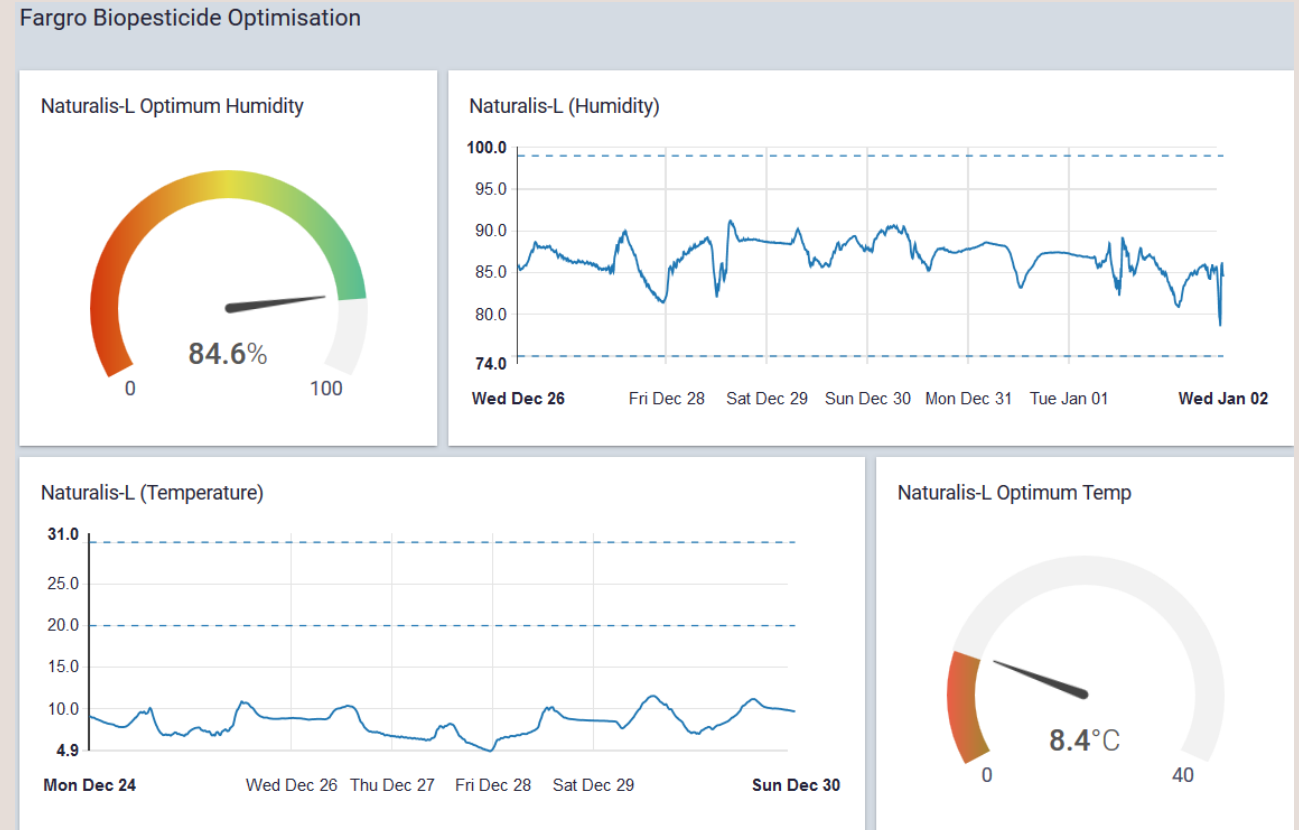


Good example of humidity
being regularly over the 80%
threshold

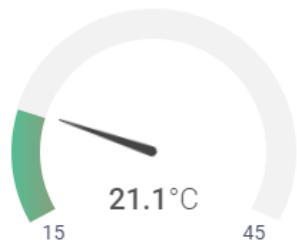
Reoccurring periods of low
humidity

Naturalis - L

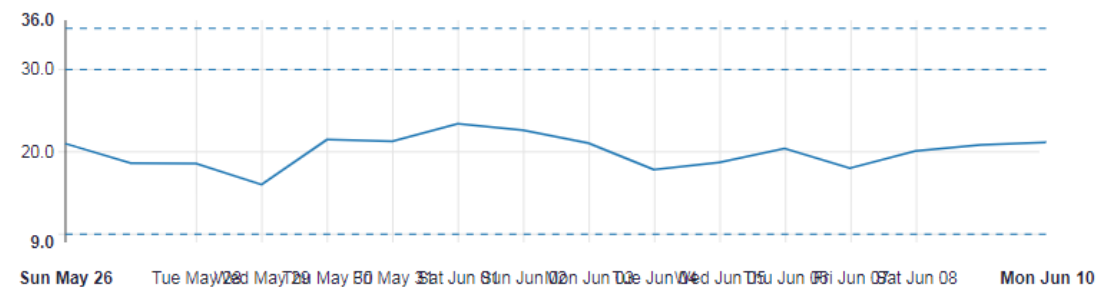
- Simple dashboard to inform growers
- Temperature/Humidity gauge to indicate best time for application
- Graphs to show conditions post application to inform the grower of the likelihood of *Beauveria bassiana* being present in the environment.



Thrips life cycle speed



F. occidentalis Development (Egg-Adult, 9 days at 30, 40 days at 15)



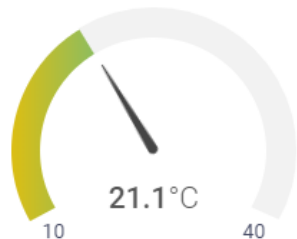
21.2 °C 52.5 %
Temp/Humidity



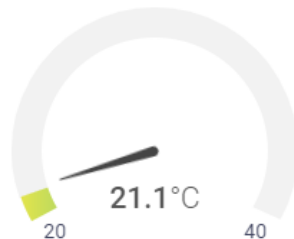
100 %
Fargro Technical 1

last 7 days

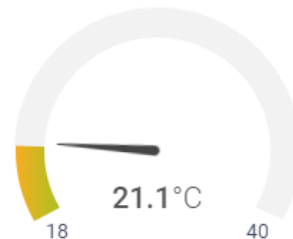
O. laevigatus development



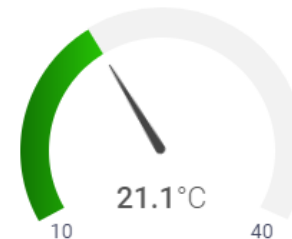
A. montdorensis development



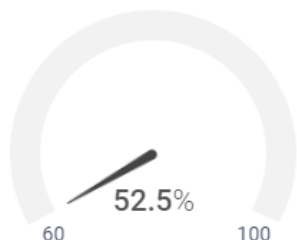
Swirskii development



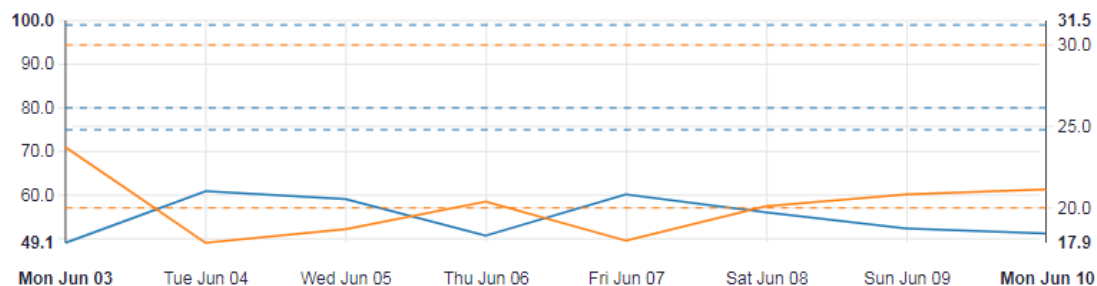
N.Cucumeris Development



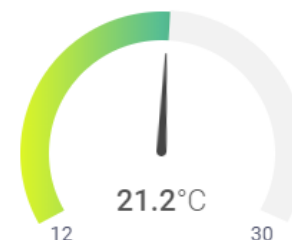
Naturalis-L optimum humidity



Naturalis-L Development



Naturalis - L optimum temperature

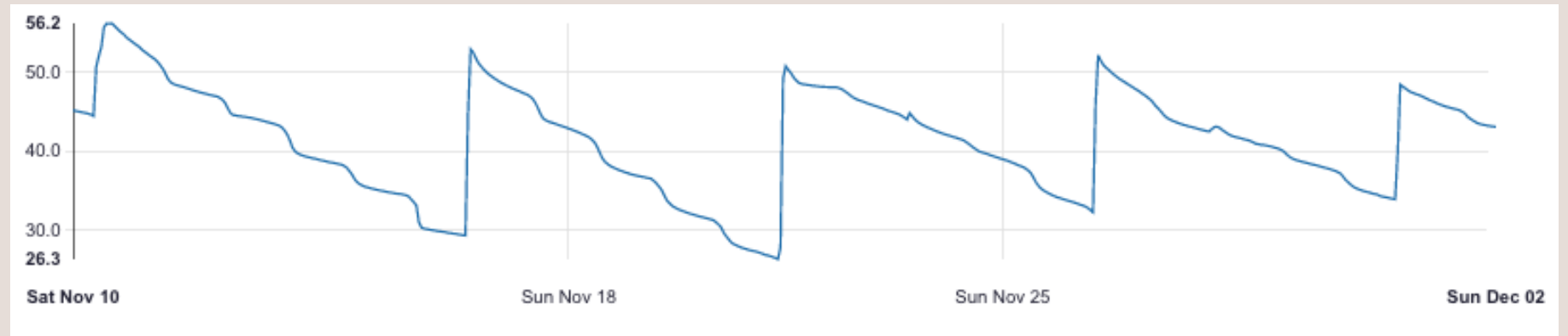


“No Robots here” just data driven humans

Old strategy



New strategy
using real-time
charts & alerts



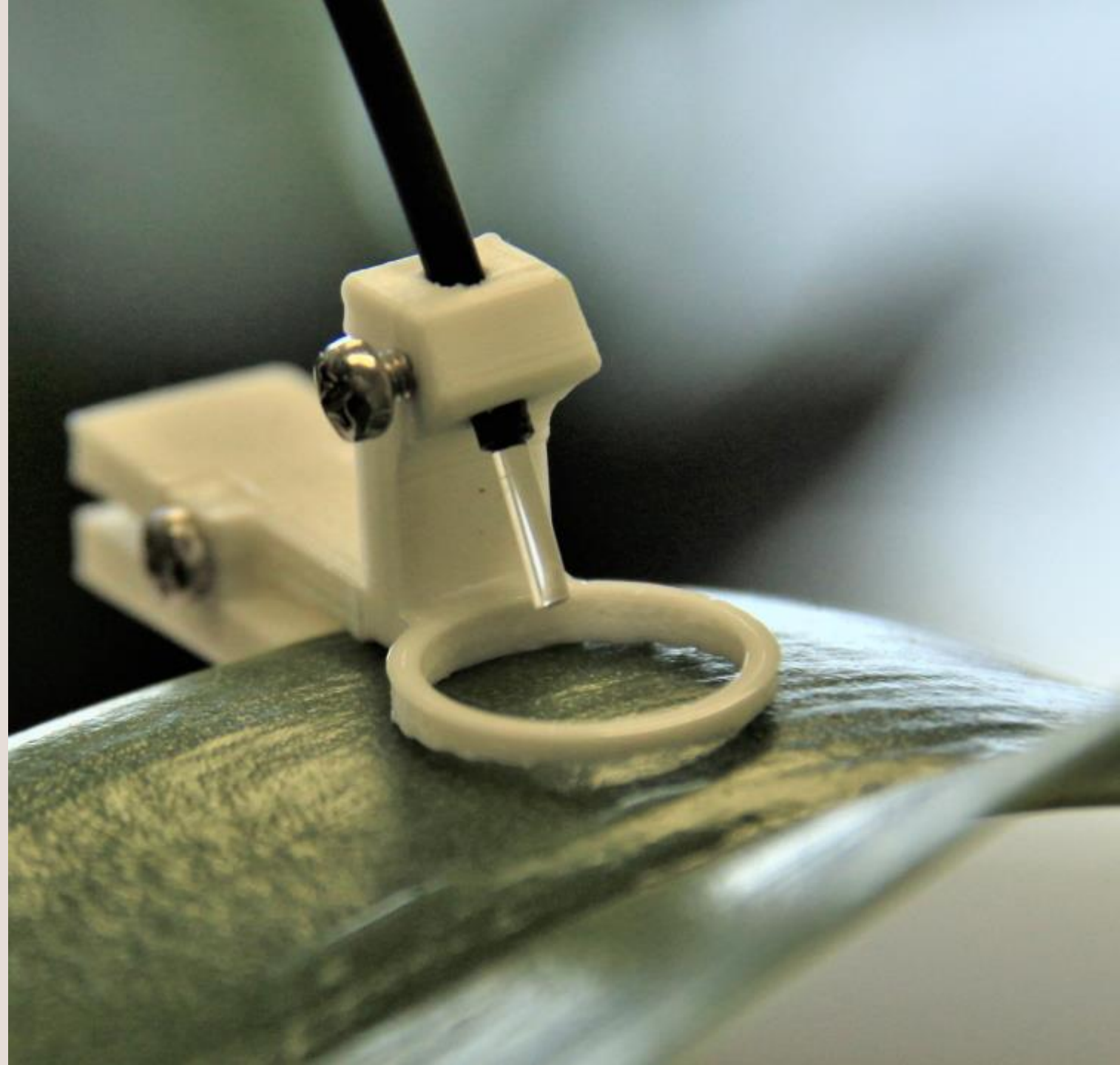
Value of real-time Oxygen and pH readings.

- Assess oxygen at the root zone to make informed decisions on pest and disease management.
- Better inform irrigation strategies to optimise growth and prevent P&D.
- Better inform nutrient uptake and fertilisation.
- Potentially a very early indicator for a change in soil life.
- Better understanding of biopesticide performance.



New Metrics, New Insight.

- Photosynthesis efficiency sensor.
- Follow the performance of the crop and optimise growth factors.
- CO² reduction.
- Light optimisation.
- VPD optimisation.
- Nutrient Uptake.
- Less Stress, less Issues.



IR4 Technologies and IPM



Innovation with a Purpose: The role of technology innovation in accelerating food systems transformation, World Economic forum, January 2018



Thank you for your time.

Ant Surrage
Technical Development
Specialist
Fargro

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ant.surrage@fargro.co.uk



07384 468042

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