Next-generation plant disease management

al-time

Fungal spore monitoring

BioScout



What are we doing?

We change the way **airborne fungal diseases** are controlled by monitoring pathogenic fungi in the air in real time to empower farmers to take action weeks before infections become visible on the crop.



What's wrong?

20% of food production lost to fungal disease

Current disease management practices heavily rely on intuition and lack empirical data.



Growth stage characteristics and weather data provide limited information on using fungicides and biological control agents effectively. Conventional spore-trapping methods are insufficient for timely and scalable data collection.

Farmers tend to spray too often and excessively and at the wrong time, wasting valuable resources and missing out on billions of revenue.

What if we could see what is in the air around us?



We've got the solution

BioScout Disease Intelligence System

- A comprehensive early surveillance system that integrates a next-generation automated fungal spore trap, a weather station and a crop disease management platform.
- Detects and identifies fungal pathogens, pollen and other particles in the air 24/7 to forecast disease outbreaks.
- Measures airborne inoculum concentration and microclimatic conditions to grasp the full spectrum of crop disease dynamics.





Starting as a PhD project at the University of Sydney by a team of engineers (biomedical & mechatronics) and medical scientists, it took 3 years to bring the idea to commercial production.

Where do we create value?



- Our technology empowers farmers to gain full control over crop diseases
- We send infection alerts two weeks before symptoms become visible to avoid yield loss



- Our data help farmers use plant protection products in a targeted and sustainable manner, applying the most suitable product at the right time and in the right location
- We prevent unnecessary sprays and overusing chemical fungicides, protecting the nature

More targeted application of fungicides results in healthier crops

- Our data insights help handle the effects of tightening laws and regulations on plant protection agents and fewer approved fungicide products
- By optimising spraying regimes we minimise the development of fungicide resistance



What particles can we monitor?

We've built one of the world's largest fungal disease datasets with millions of disease vectors captured by our IoT traps over the last 6 years



33

crop

categories



Trusted by pioneering agribusinesses and researchers



BioScout COMMERCIAL-IN-CONFIDENCE

How does it work?

Our entirely automated & self-sustained IoT device, requiring zero human intervention for years, takes air samples nonstop boosted by biosecurity sensing and microscopic imagery.

- A small but powerful fan, equipped with sensors regulating a constant air inflow of 10L per minute, draws in the air day and night
- ² A large wind vane and spout design ensure optimal spore collection, whereas its light weight allows the trap to constantly face even the gentlest of breezes
- 3 Air is sucked in through a narrow nozzle. Anything in the airstream, from fungal spores to pollen and even tiny insects, gets sucked in and adheres to a transparent sticky tape





How does it work?

- 4 Following a controlled sampling time, our proprietary automated robotic microscopy takes hundreds of high-resolution images with perfect focus leveraging advanced microscopic and hyperspectral imagery
- 5 The images are sent to our cloud-based server via cellular technology and thoroughly analysed by our AI algorithms supported by ML models
- 6 Environmental data and spore counts are reported daily on our plant disease management platform, incl. custom pathology reports, forecasts, etc., to help make informed decisions on control measures

Our solution can be used in outdoor or indoor farming, greenhouses & food storage facilities.







What does our dashboard look like?

Choose devices * Botrytis General rus Septoria tritici blotc... 1.0 44.8 4941.7 5.2 Spores / m³ Air Spores / m³ Air Spores / m^a Air Location and Weathe Gnarwarre - 1 -13/07/2023 01:38 PM 🥝 A Humidity A Temperatu **12.56**℃ 58.27% Max: 14°C Max: 82% Min: 5°C Min: 55% Rainfall Rind speed 30.65km/h 0.00mm Max: 39km/h Direction: ∠ NE

Reports by fungal spores

Spore concentration overview by device

Downy Mildew



Environmental conditions and custom pathology notes



Forecasting and disease alerts



Spray logs + Symptom observations + Growth stage



🗳 BioScout

But we ain't stopping here...



Misexecution undermines spraying

Disease control can fail during execution as unfavourable environmental conditions and equipment issues severely limit efficiency.

Spray coverage is the most important indicator of spraying efficiency, yet it's measured with obsolete and inaccurate methods.

- Water-sensitive papers react prematurely, bleed through, deform and have inconsistent quality
- This procedure of spray coverage testing is time-consuming and labour-intensive

What if we could execute sprayings more effectively?

BioScout



Spraying could be made more effective

LeafScout Spraying Operation Platform

- A world-first patented spray sensor that gives real-time fungicide application coverage results using our unique electrochemical detection methods and a bespoke spray operation platform for machinery calibration & automatic spray analysis.
 - Besides measuring spray coverage during spraying, it monitors the environmental conditions (leaf wetness, temperature, humidity, and dew point) suitable for spray applications.
- The sensor mimics a real leaf (e.g. grape, strawberry, apple), so the moisture condenses/evaporates as it would on an actual leaf of the crop.





How does it work?

- 1 The devices are placed in the canopy at different positions and mounted on a removable stake. The canopy shall grow around the sensor for the best measurement of canopy penetration.
- 2 Multiple sensors, both on the front and back of the leaf, measure whether spraying conditions are suitable.
- **3** Spray coverage is determined on the go as the sprayer machine passes through the calibration setup and reported on our interactive online dashboard instantly.
- 4 All the data is sent to a data server and visualised on our spraying operation platform alongside spraying analytics, reports, alerts and actionable insights to maximise the spraying efficiency.



How does it benefit farms?

The spray analytics dashboard enables farmers to make fully informed decisions on executing preventive sprays.

Farmers receive alerts and immediate visual feedback on the efficiency of their spraying operations based on real-time spray coverage measurements before starting broader spray activities. Our insights allow for equipment calibrations, checking and maintaining spray nozzles preventively, and detecting if your goes tr goes too fast or too slow.

We can now not only tell growers what diseases to manage but also how to do it, completing our vision to be the very first 360-degree disease management system to make farms free from fungal diseases.





Thank you for listening!

Get in touch with us!



Bence Bodo

- Business Development (Europe, Middle East, and Africa)
- +39 327 552 8815 (WhatsApp, Signal)
- bence@bioscout.com.au
-) www.bioscout.com.au
- 6 Sloane St, Marrickville, New South Wales, Australia