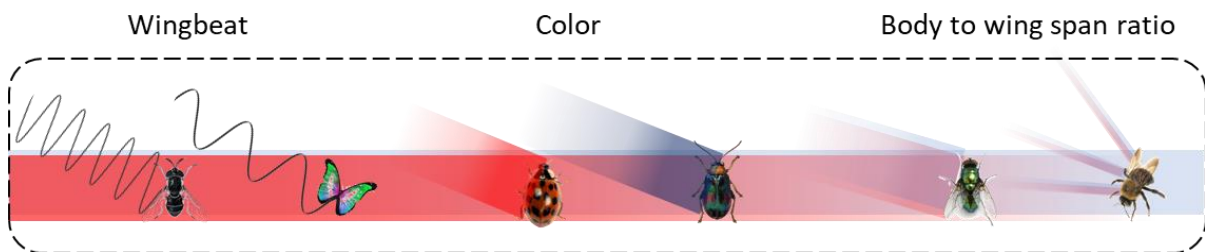


## Introduction to the Scout sensor

The following note provides insight into the Scout sensor product. The product is a digital insect sensor solution currently under development at FaunaPhotonics. The sensor is planned for commercial release in Q2 2020.

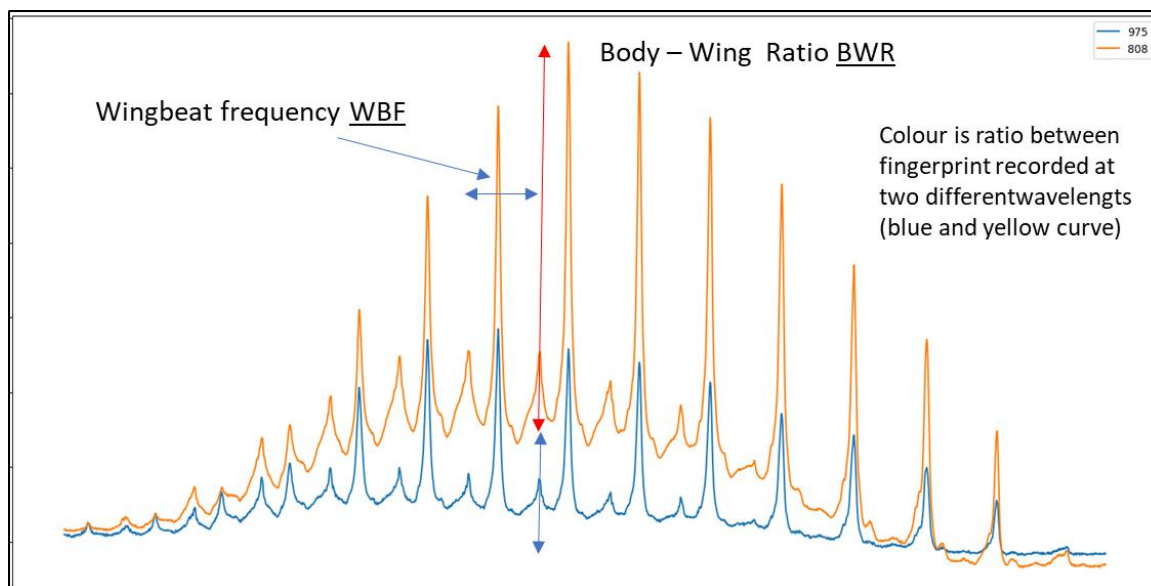
### How it works

Our sensor product transmits infrared, invisible light on insect activity and automatically detects the back reflected light of each individual insect.



This back reflected light provides a unique fingerprint of the insect as shown below. The fingerprint contains information on the insect's wingbeat frequency, color and wing to body ratio. After detection, each fingerprint is transmitted via 3G or 4G to the FaunaPhotonics cloud for further processing.

In the cloud FaunaPhotonics applies artificial intelligence (AI) to analyse the insect fingerprints and extract the information on wingbeat, colour and wingspan to body size ratio of the insect.



The fingerprints, and extracted information, are unique for different insect species. This information therefore allows the FaunaPhotonics machine learning to recognize and count the abundance of individual species. Prior to identification, the AI needs to be trained using the target species. Currently the system is trained to recognize a number of species typically found in abundance in oilseed rape. FaunaPhotonics, in collaboration with partners, is continuously working on adding to the collection of species the sensor can recognize.

Species-specific insect density data combined with time, geolocation and environmental data is an input to digital farming solutions. Our aim is to offer data integration between in-field sensors and farming software platforms.

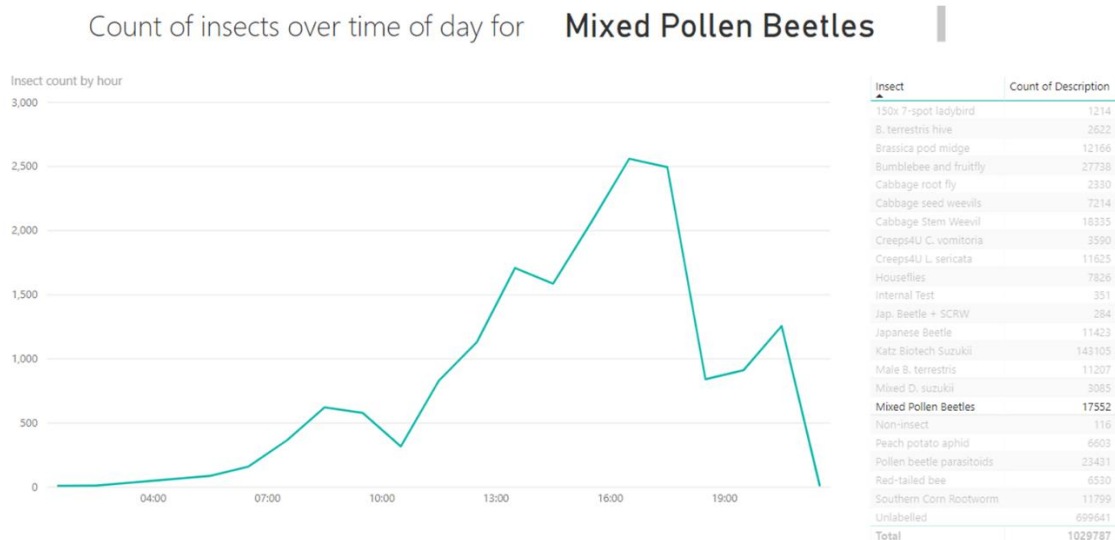
Our systems are developed in collaboration with partners in the agricultural sector. By involving growers, agricultural consultants, corporate R&D and scientists in our technical development we assure solutions are developed to address the needs of customers. An affordable sensor-based digital solution which allows precise, accurate and efficient insect monitoring will be greatly advantageous for growers worldwide.

### What it does

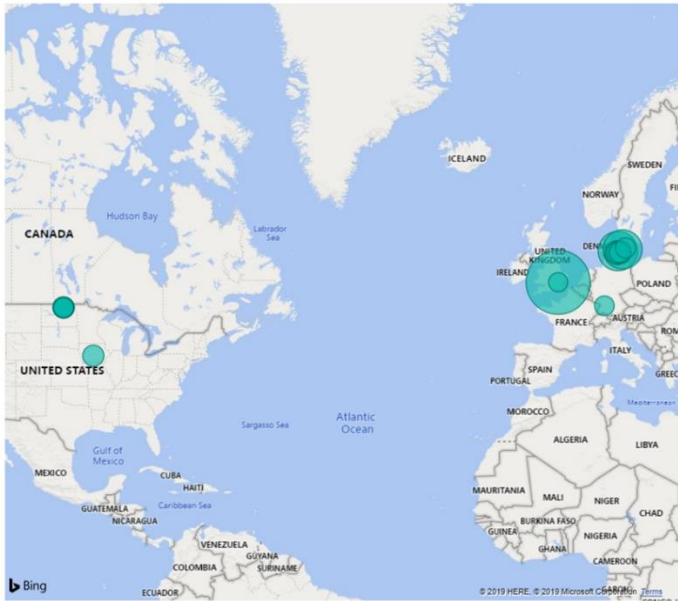
The Scout sensor is a digitalized insect sensor. With the system you can, in real time, monitor insect activity in the field with a day-to-day, hour-to-hour and even minute-to-minute resolution. Besides providing data on total insect activity, the instrument can be trained to identify and quantify activity of specific pests and beneficial insects, just as it provides a measure of insect biodiversity within the field.

Parameters measured:

- Total insect activity as well as species-specific activity in the field. The sensor returns daily insect activity plots with an hour-by-hour resolution.
- Biodiversity indices for monitoring diversity of insects.



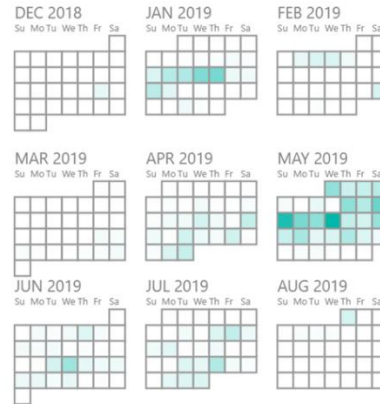
The data collected from individual fields are aggregated into regional maps, monitoring emergence of pests locally, regionally and on a national level.



Insects Collected

1.03M

Count of Description by date



### **Benefit for the farmer**

Insect pests directly damage crops causing significant losses and regular monitoring of fields is a labour-intensive, time-consuming and costly activity. At the same time, efficient pest control that is non-threatening to beneficial insects and pollinators is a major challenge. The ability to systematically, efficiently and accurately monitor insect populations is key to improved pest control.

In-field sensors will enable farmers to only treat fields when and where it is really needed. Insecticide spray programs will become more targeted – greater precision in treatment strategy and optimum timing tailored to the conditions of each individual field. Knowing what goes on in the field makes life easier, secures harvests, boosts yields and protects pollinators.

### **Status**

The Scout sensor is currently under development. During spring 2020, the sensor will be tested in fields with a focus on improving integrated pest management in winter oilseed rape production. In parallel, FaunaPhotonics is continuing work in close collaboration with public, industrial and academic partners to expand applications.

The sensor is expected to be ready for commercial release in Q2 2020.

### **FAQ:**

Q: How far can it detect?

A: The sensor detects all flying insects up to 2m distance.

Q: Can the sensor detect all insects?

A: The sensor can detect all flying or jumping insects from tiny fruit flies to larger bumblebees, and dragonflies.

Q: Can it differentiate insects to species level?

A: In order to do species recognition, the sensor needs to be trained. Currently the sensor is mainly trained to recognise pests associated with oilseed rape production, but applications will be expanded in the coming years.

Q: How long can it stay in the field without maintenance?

A: The main limitation on unattended use of the sensor is battery lifetime. The sensor comes with a 12v input that needs to be connected to a battery and/or solar panel. For prolonged monitoring the sensor can be programmed to run in energy saving modes where insect activity is sampled for shorter periods of time during a day rather than continuous operation.

Q: How much does it cost?

A: We have a subscription model. Setup fee of USD 769. Monthly fee of USD 117.

Q: What am I buying as a user?

A: Setup fee covers one sensor. Access to insect data through web and app.

Q: How much time/service do I need to put into it?

A: (example) You want to understand when the cabbage stem flea beetle reaches a certain economic threshold level. You mount the sensor where you normally have your trap during April-May and August-November; when the threshold level on your sensor is obtained (red indication on your field data) you spray. After spraying you follow up on the effect of the spraying (hopefully resulting in a green mark on your field). Total time in the field is 6-8 weeks in spring and 16 weeks in the autumn.

Q: How many would I need?

A: One unit will be able to cover about 25 hectares.

Q: Can I put it on my tractor/sprayer?

A: No, not yet.

Q: What will happen if I spray the sensor, do I need to move it before spraying?

A: The front of the sensor should be reasonably clean, after spraying you may need to clean it

Q: What happens if the sensor hits the ground from 2 meters?

A: It will break, and you will need a swap sensor.

Q: Can the sensor withstand rain, wind and snow?

A: The sensor is weather resistant and is built to be outdoors. It is not recommended to leave it out in extreme conditions.

Q: How often do I need to height adjust sensor during the growing season?

A: The system does not measure insects flying in and amongst the crop, it is only effective above the top of the crop. Therefore, it must be adjusted as the plant grows.