

DETECTING AIR-BORNE PATHOGENS

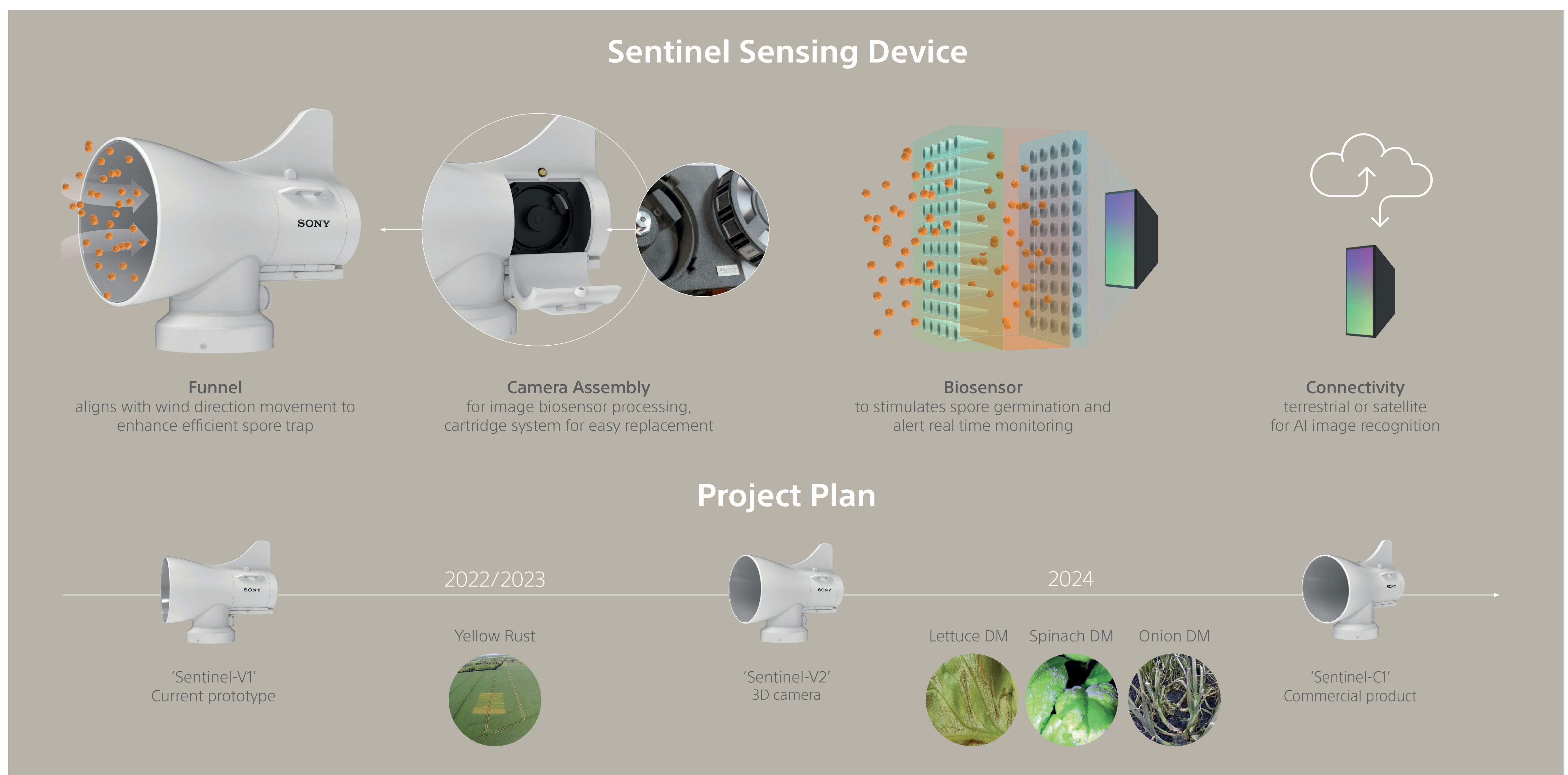
Sentinel Crop Disease Surveillance Network

Sentinel presents an in-field solution for early detection of airborne plant pathogens, providing an early warning which is turned into a management recommendation for the farmer/grower (Figure 1).

Supported by the Farming Innovation fund through Innovate UK and Defra, NIAB is collaborating with Sony Europe B.V., One Nine Design Ltd, BASF plc, Rothamsted Research, University of Manchester and G's Fresh Ltd to produce low-cost Sentinel devices which can be deployed on-farm in the UK. Three different pathogens are being targeted – yellow and brown rust of wheat, and downy mildews of vegetable crops.

Each battery-operated Sentinel unit is fully autonomous, with a biosensor that supports spore germination of the target pathogen, a smart camera to detect viable pathogen growth, a set of environmental sensors and a wireless communication module, all held in a robust weatherproof housing.

Figure 1. Sony's Sentinel sensing device

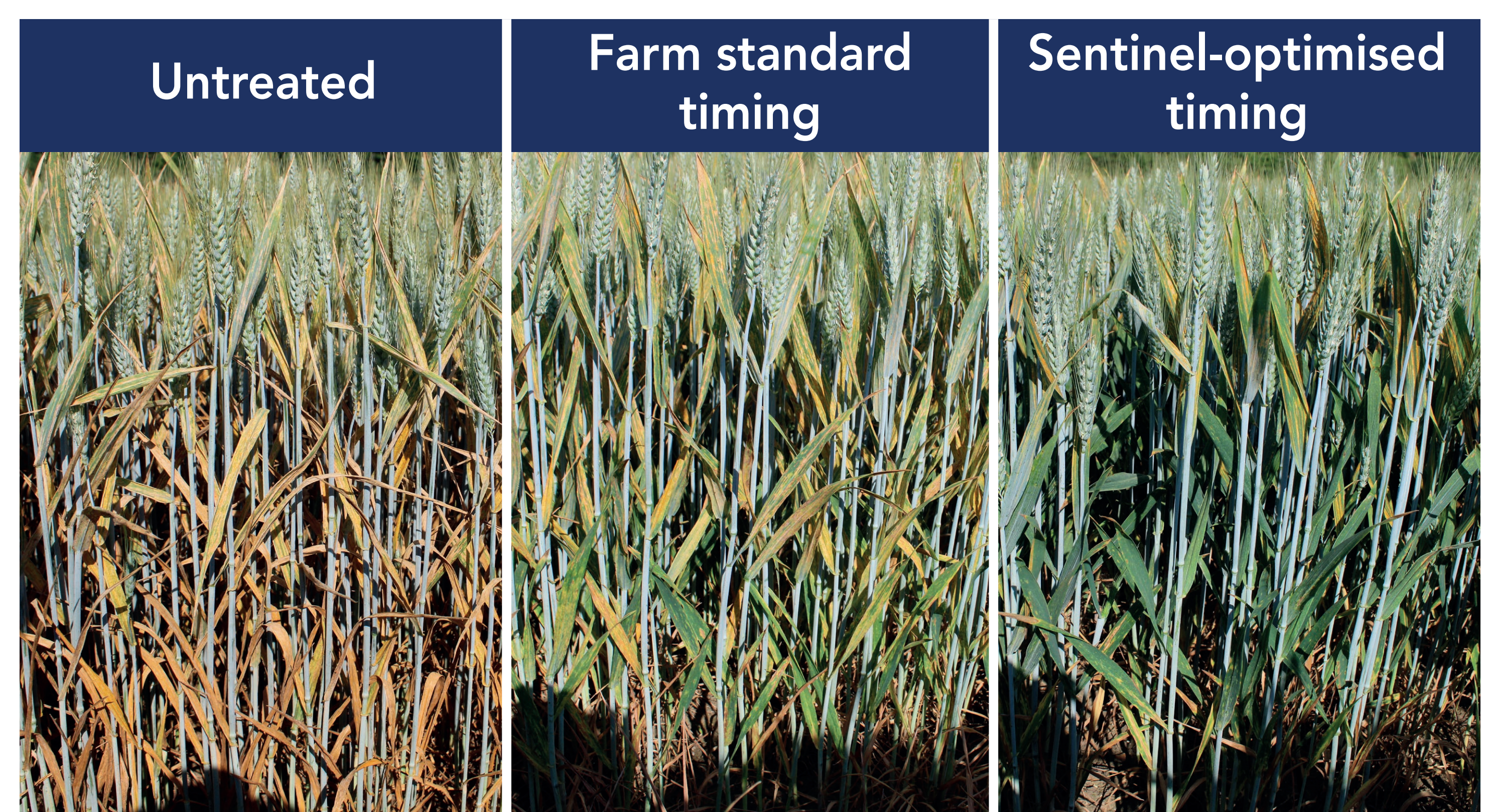


Focus on NIAB research

These biosensors were deployed in field trials in 2023 (in collaboration with BASF) to monitor the arrival of viable yellow rust spores. This real-time monitoring was used to inform application of T0 and T1 fungicide sprays (Figure 2).

NIAB also discovered the volatile compounds produced by wheat that stimulate germination of yellow rust spores. These volatile compounds have been used to induce yellow rust spore germination on artificial surfaces, enabling the development of the biosensor.

Figure 2. Biosensor field trial in 2023



Location: NIAB trials site, south Cambridgeshire. Images taken on 15 June 2023
 * Plots were sprayed when spore germination was manually observed on Sentinel Glass

Photos: Jon Helliwell, BASF plc