Stalham Farmers 2025 February meeting

Is there something in the air?

A fascinating insight into the potential for scientists to spot air-borne disease threats was outlined by researcher Dr Darren Heavens.

A hand-held device can identify airborne diseases, which could prevent and manage human health issues and also benefit farmers.

In a quick-fire 35-minute presentation: “Is there Something in the Air? he gave more than 30 members of Stalham Farmers’ Club an insight into the rapid progress being achieved by researchers at the Earlham Institute, part of the Norwich Research Park.

Dr Heavens, who has 35 years’ experiences in the field of genomics, identified genes responsible for litter size and coat colour with PIC (The Pig Improvement Company) and has spent the last 18 years working in Norfolk on plants and pathogens.

Speaking at the meeting on February 11, 2025, he said that the cost of gene sequencing has fallen dramatically in the past quarter of a century, which has been a massive benefit to scientists and researchers. While it cost millions to sequence the human genome in the 1990s, now it can be done for under £100.

Dr Heavens and his small team developed the AirSeq project, which has achieved some dramatic results. For example, this technique identified traces of botrytis in greenhouse fruit a fortnight earlier than conventional agronomists. As a result, plants were treated with much smaller amounts of crop protection products – a saving for the grower and crucially for the environment.

The potential to detect signs of disease, building on these techniques, could transform medicine. Another use could include small testing kits, smaller than a paperback book to sample tiny amounts of blood, fluid or even tissue. In just a few minutes, the analysis could help doctors and consultants prescribe preventative medication.

Dr Heavens said that such applications could be of benefit to farmers and growers to identify crop disease threats, for example, yellow rust in wheat or leaf spot in barley. And potentially other crops, like sugar beet could be protected or treated earlier.

His team have established a handful of testing locations, including at Church Farm, Bawburgh, in woodland locations at Foxley and in Thetford Forest, and at coastal locations including Brancaster and at Kessingland to take samples. In just two hours, a vacuum suction pump mounted on a tripod sampling air at a rate of 200 litres per hour could gather or harvest enough genetic material to analyse DNA. This was roughly equivalent to the amount of air breathed into the lungs over three days!

The sheer complexity of the material gathered was a further challenge but as more DNA sequences were established, it was possible to build up an ever-more accurate picture

of the air-borne disease elements. It was actually so accurate that on a windy summer day the Church Farm suction pump was able to identify skin cells from a herd of nearby outdoor pigs seen scratching on their shelters!

For other wind-borne diseases like late potato blight, which cost the industry an estimate £50m in crop protection products, it may be possible to provide an even more accurate early warning system in the future.

Dr Heavens fielded questions from a number of members for more than half an hour, which clearly indicated the interest in the project being undertaken by the Earlham Institute's team.

He was thanked by Ian Deane and the meeting closed at 9.15pm. Dr Heavens was given a tie with the club's 1841 emblem of a Stalham hoe by the chairman.