Nuffield Poultry Group Study Tour 2024

The Netherlands

Kindly sponsored by

Organised by Steven Pritchard

Attended by Karen Simpson (Chairperson NPG), James Corbett, Matthew Davies, Nick Chippindale, Alistair McBain, Gordon Whiteford, Helen Houghton, Mike Tyers, Rachel Watkins, Simon Carlton, Sylwia Sobolewska

Special guests Wesley Thorne, MSD and Nick Bailey, Hendrix Genetics

Report written by Sophie Pentecost

Monday 2nd September

Vencomatic

We were welcomed to the building by Ruud van der Heijden and Lottie van der Ven after which Karen did a great introduction to our group and reminisced about how Glenrath Farms visited Eurotier in 2002 and ended up installing the first Vencomatic multi-tier system in the UK. This raised an interesting point for discussion; at that time, they were called Aviary systems, and it was debated whether we should we consider going back to using that term rather than multi-tier as it may have less negative connotations associated with it as a name.

Fig 1 – Nuffield Poultry Group visiting Vencomatic Headquarters

Lottie van den Ven

Lottie is one of the five brothers and sisters currently involved in the Vencomatic family business. They are the second generation involved in the business and they took over in 2018 having all previously worked elsewhere. Lottie gave an introduction and history of the Vencomatic group taking us through the first automated egg collector in 1983 to the current situation supplying multiple solutions for egg handling and poultry house equipment with over 500 employees across 80 countries.

Their business works on a 5-year plan, with the last review taking place in 2019. At this point the three goals for Vencomatic were to work towards zero emissions, further automation and precision poultry farming. For zero emissions they are continuing to develop their heat exchangers, which we received further information on from Lottie's colleague later in the day. Further automation was looking at egg flow management and egg counting and they are developing cameras to adjust the flow of eggs depending on the numbers. They were also making improvements to egg grading with an egg vision machine that enables it to pick up fractures, blood spots etc and take out those eggs reducing the labour input. Precision poultry farming developments pertained to their Meggsius system which was developed to try and enable farmers to get the most out of the birds genetic potential, and again we were given further information later on in the day.

Dennis Hoeks - Poultry Farming in the cloud

The driver for the Meggsius system was to try and help farmers who were not managing to reach the genetic potential of their birds. They believe reliable and accurate data is key and that more information helps identify what the problem is. They are developing a system to enable them to see production differences within individual houses but admit that it would be ideal to see this at bird level which is ideally what they will work towards.

Meggsius Connect is a platform which gathers all the data from the house in one place. It includes a heat map of the house which tells you where the eggs are coming from. This is worked out using data from the egg belt to extrapolate where in the house the eggs have come from. They are also able to collect data on egg quality using pictures taken by Meggsius. Detecting changes in egg weight can be an early indicator of disease challenge. The Meggsius Connect platform will be released at the end of the year and is currently being trialled on pilot farms.

The future development of this system will be the Meggsius Inspect which involves cameras in the house to inspect the top tiers. They are currently researching visual parameters to include such as bird appearance, feather cover, bird activity, bird distribution and egg distribution as well as sounds such as coughing, heavy breathing to aid detection of respiratory issues and smell to identify dead birds, manure and red mite.

Dick van der Ven

In-ovo sexing was a big topic for the week and it started here with Vencomatic showing us their Genus Focus system which uses MRI to sex the eggs before hatching. There have been changes in France and Germany recently to ban the culling of chicks so there are a number of companies developing systems to enable cull free eggs.

Initially MRI was not used as it was too slow and expensive but with developments over the years, they are now able to scan an egg per second. The Genus Focus was developed in conjunction with Orbem, pioneers in AI powered imaging. The scan analyses the anatomical differences in the reproductive organs and is a non-invasive technique. The system Vencomatic have developed is fully automated from trolley in to trolley out and one operator manages the whole system. The eggs are scanned at 11/12 days which isn't an issue as the eggs are exothermic at this point. They haven't seen any hatchability issues so far and they believe you could scan at 10 days giving a longer window in which to sex which would reduce the size of kit needed. A recent Germany study suggests that at day 13 the embryo can perceive pain. The system can be adapted up to 8 modules with a total output of 24,000 eggs per hour and can enable on farm hatching for layer farms. The sensitivity of the scans can be adjusted if too many female eggs are being lost or too many male eggs are getting through and the MRI scan also has the potential to detect early dead or defects and this is something they are looking into developing further. The system is very expensive and has a high electrical cost. Currently they have 9 hatcheries using the Genus Focus system.

Fig 2. Examples of Vencomatic equipment in their showroom

Anne van den Oever

On farm hatch layers.

Anne is an animal researcher and is part of the research and development team where they try to develop systems and products that try to follow the natural behaviour of chickens. Their development is linked to Lotte van de Ven's PHD research on the effects of early feed and water in broilers. This shows that early feed and water impacts the intestinal development, in particular the microvilli and crypt development is increased. Trial work in broilers shows higher hatchability, lower mortality and higher body weights as well as a reduction in antibiotics but this is difficult to quantify.

Anne talked us through two trials for hatching layers in house on the Rondeel system. The first trial had a 50/50 split of hatched in house and hatchery, the second flock had a whole house of each. The trials were not hugely successful as they lost repetition in flock 1 as the birds got mixed at transfer and the second flock were culled at 44 weeks. However, they did see some positives including:

- More robust hens (lower mortality) after ILT infection
- Flock 1 – 7% higher egg production
- Flock 2 – 5% higher egg production
- Behavioural – better feather coverage, fewer cloacal damage, better hen distribution, fewer smothering incidents, males help break up fights and escort females in and out.

Interestingly we were told that Vencomatic were no longer pursing the building of any more Rondeel houses.

Site Tour

The Vencomatic office is a unique egg-shaped building with the showroom situated in the air space of the egg. They use an air/heat exchanger as well as solar on the roof which meant that in 2012 it was Europe's most sustainable building. They have an auditorium that they use within the business for quarterly staff briefings from the family, but they also let it out to schools and groups etc. We saw the warehouse, the RnD rooms, the mechanical workshop and the mechanical testing rooms. The warehouse is very large and enables Vencomatic to ensure that anything shipped to customers has never been stored outside.

Fig 3. Picture of the Vencomatic warehouse

Victor van Wagenberg – Eco Ventilation Systems

Victor is a project manager at Vencomatic working on Agrosupply which specialises in ventilation and heat exchangers. They are currently working on the ECO unit for emissions and climate optimisation, they have 5000 units in 30 countries since 2005. The unit is a box full of plastic channels and works as an air to air counterflow exchanger.

Developments on the unit include an automated wash system which recycles water and happens every 3 days automatically to reduce dust in the unit.

Victor talked us through some of their field trial results with improvements in indoor climate seen with reductions in ammonia concentrations, reduction in feed intakes and more eggs. Vencomatic claim they can get up to 10 extra eggs per bird per flock with their ECO unit.

They are developing the ECO Zero system which utilises the cooling ability of the unit and the ECO Air Care system to reduce ammonia emissions. The Air care system uses measuring equipment to take ammonia measurements and improves the indoor climate as well as providing guaranteed emission reduction.

Fig4. Eco unit in build in Vencomatic warehouse

Hato Lighting

The final presentation of our Vencomatic visit was from Nicky Verheijden-Boumans, the business development manager of Hato Lighting. Hato is a 50-year-old business with over 50,000 lighting systems installed in more than 50 countries, employing 150 employees in 4 locations. Nicky gave us some information on the history of Hato, how they started in mushroom cells, before moving to poultry and then pig, and cattle in the last 10-15 years. Their ethos is to research the animal first then make the lights.

Nicky went on to explain the difference between LED and fluorescent lighting, with LED lighting having a 46% higher efficacy and a longer lifetime (50,000 hours/8 years).

One of the most interesting parts of Nicky's talk that sparked some debate amongst the group was to do with the how birds see light. Birds have 4 cones in their eyes, one of which enables them to see UV light (humans don't). Of the UV light spectrum UVA is fine, UVB and UVC are sun damaging. UVA can influence bird development and group behaviour as it helps them see each other better and recognise feather detail.

The debate was regarding the latest proposals for layers to have 3% daylight from windows, but Nicky informed us that windows don't let in UVA light so does that mean that the light the bird sees through the window is daylight?!

All colours in the spectrum do something for the animal so Nicky suggests never to stay on one colour for too long. They still don't know exactly which colour does what, but she suggested that full spectrum light should always be used and instead blend in the colours needed such as red for reducing feather pecking. For example, green is important for egg quality so monochromatic red will damage shell quality.

Duis Scharrelfarm

The day concluded with a visit to a John Duis, a 2nd generation family farmer producing eggs under the 1* Better Leven system. This means the bird have access to an indoor veranda with daylight inside and scratching material in both the house and the veranda. The site initially had 2 old sheds producing eggs from caged birds until 1995, before switching to barn. The sheds were then demolished 3 years ago and replaced with the new building shown in the pictures below. The building houses 9 birds per square meter (excluding the veranda) with 40% of his eggs going for domestic consumption, 60% exported with 90% of that going to Germany. At the time of visiting the farm was on its 2nd flock with the birds at 30 weeks old.

Fig 5. Banner outside layer farm visited with Vencomatic

The farm also has a facility for manure drying where the air is pulled over the manure first before it is pulled into the heat exchanger. The manure is dried to 85% dry matter and then sold to a company who processes it and sells it in small bags. Currently the manure is sold at €17.50 per tonne but it can fluctuate between 12-22 euros.

We also discussed the government buy out scheme where it was explained that in the Southeast of the country where the farms tend to not have successors, they are taking the buyout option, but in the middle of the country they are more traditional family farms so more of them are opting to stay in.

The farm also has a vending machine at the front which we saw half a dozen visitors to during the hour we were on site. On average 10,000 eggs per week are sold via the vending machine. In the future they may look to expand the vending machine with offerings from other local farmers.

The design of the building was quite unique which was motivated by a desire to make the farm look beautiful to gain people's trust. They are sited on a bit of a hill and the shed is quite visible from the area around, so the architect encouraged them to make the shed look as nice as possible. Initially they were not convinced by the design, but they came around to the idea and are now very pleased with it. The shed also had a lovely meeting room, with shower facilities etc and Vencomatic use the farm as an example of best practice.

Fig 6. Egg dispensing machine and graphic of layer farm layout

Broiler breeder farm

Our final visit of the day was to Mr Beerens' broiler breeder site with 55,000 birds to see the Vencomatic heat exchanger. Mr Beerens explained that he needed to reduce the ammonia levels and benefit the chicken house as well. He believes that the system enables him to get a better climate in the house and this his litter is drier and more friable. The ammonia is taken out, stored (takes 10months to fill his 90m3 storage tank) and goes to a local dairy farm at around 4% nitrogen content. He thinks that the machine is perhaps a little noisier than he would like and was expensive. However, he believes the 'chickens are happier' and that even in winter he no longer has any issue with smell. He has two sheds, one with the EcoCare system and one without but says it is difficult to quantify if the shed with the EcoCare performs better or not.

Fig 7. Broiler breeder farm with Vencomatic Eco system

Tuesday 3rd September

Broiler farm visit

A morning visit was made to Mr van de Kruys to his slow growing broiler farm; he also has a pullet rearing farm. Mr van de Kruys had just participated in Boernen van Weert, an open farm initiative. He believes that farms should be transparent and that in the current climate less children are raised on farms and therefore children's exposure to farming is decreased.

The broiler farm is currently rearing 9000 birds per house, across 2 houses reaching a weight of 2.5kg over 8 weeks. They have an average mortality rate of 1.25% at 8 weeks and do not use any antibiotics, although he also didn't use any antibiotics for the last 4 years producing fast growing birds. Mr van de Kruys was quite unique in that he has both a broiler farm and pullet rearing farm, and in the past has also reared turkeys, fast growing broilers and layers.

Throughout the week we had many discussions about the current situation in the Netherlands with regards to the government's current offer to buy out intensive farms which is expected to result in a 10-20% drop in hen numbers. Livestock farmers are being offered a voluntary buy-out scheme to reduce nitrogen emissions from intensive farming. The government will buy the businesses of farmers who are considered "regular" or "peak" polluters for 100–120% of their business value. Farmers can keep the land, but they must permanently reduce nitrogen emissions by up to 85%. They also can't continue farming in the Netherlands or the European Union. Mr van de Kruys has already sold one of his sites which had an issue with ammonia to the government and is in the process of deciding what to do with his second site. He has a son who is 25 years old who is considering coming back to the farm although he prefers broilers to pullets, he has until January to decide!

Fig 8. Some of the group in discussion with Mr van de Kruys in his viewing gallery

The other farm is currently rearing 62,000 pullets where Mr van de Kruys spends a lot of time training the pullets early on. Initially, they put the birds up on the system and then they leave the lights in the 2 tier aviary system on all the time for the first two weeks. The Dutch model is slightly different to the UK in that the hatcheries sell the pullets directly to the layer farmer, so the hatcheries success depends on how well the pullet is reared but there is no pullet rearer in the middle. Currently a white pullet is €5.50, a brown is €6 and in-ovo sexing is €3.60 extra. We had a short discussion about White v Brown with Dutch retailers moving toward white eggs. All birds are intact beaks, but they can do mixed flocks of brown and white birds in the same house separated by corridors. There needs to be a minimum of 30% white birds in a mixed flock or they fight. Currently there is no natural daylight in rearing farms as it is not global legislation yet, but it is being pushed for.

Hendrix Genetics Family Farm

We were very kindly hosted at the Hendrix genetics family farm and given presentations by both Teun van de Braak and Thijs Hendrix.

Teun gave us an insightful overview of the Dutch poultry industry and the Hendrix Genetics business, the vision for which is to set the standard for sustainable breeding. Western Europe is very welfare focused, and the Netherlands has just had its first 600 egg flock. Teun believes there will be 1000 egg flocks but likely the next generation, not ours. Shell quality is the main reason flocks get depleted, so this is one of the focuses for breeding. They are not working on FCR anymore as they believe feed quality will deteriorate so they want birds to have a good appetite.

Hendrix has 40 different pure lines which is the largest in the world, but they are always looking to see what they can add into their lines. Currently egg numbers per hen housed is the main aim and they are selecting for liveability, persistency, optimal curves, eggshell quality, behaviour and carbon footprint. Hendrix believes there needs to be a change in mindset in that the rearing of the birds should be seen as an investment. They have shown that 5-week bodyweight can be a good indicator of performance and the first 5 week are crucial. During this period birds should be feed the highest quality feed and that the investment in expensive food costs less in the long run.

Again, the move to cull free eggs was discussed including other techniques such as the Israeli start-up developing a technique to change male eggs to female. When Germany introduced the ban, they wanted it to happen by day 4 of the embryo development but realised that was not ethical, so moved to day 7, although they are currently working at day 13.

Teun gave us a great insight into the Dutch market with their egg consumption being 200 eggs per capita, 70% table eggs. Of those 65% are aviary/barn *, 25% Free range **, 10% organic ***. The star system is defined as:

1*Animal welfare is given sufficient attention, animals get more space and play materials.

2** Plenty of attention given to animal welfare, animals get even more space and can go outdoors

3*** Animal welfare is good, animals get as much freedom as possible to live their lives the way they would wish.

Hendrix are working to reduce the carbon footprint of animal breeding and within the span of 40 years, pigs and poultry are now able to produce the same amount of protein using half the inputs. In 2020, at 90 weeks birds could produce 435 eggs and 8000 eggs per tonne of feed, with a prediction that by 2030 at 100 weeks birds would produce 515 eggs and 9000 eggs per tonne of feed. This equates to an increase of 8 eggs per bird per year. The company targets a 2% annual improvement at Hendrix Genetics x 30 years = 60% increase.

Fig 9 The Hendrix family farm entrance

After Teun we were given an overview of the Hendrix business by Thijs Hendrix. The site we visited was built by Thijs' grandparents in 1923 in an area where peat shovelling was the main source of income. Thijs' parents took over in 1954 to specialise in poultry, setting up a hatchery for broilers, layers and rearing layers. Thijs' generation is the third to be involved in the business with all 5 children being involved in the business. Thijs went through the history of the business covering the purchases of DEKalb and their 36 genetic lines and Nutreco to enable a focus on nutrition. As well as poultry breeding, they also have an arable farm of 400 hectares, a small pig farm and they are investing in AI and VR. They also have social enterprises including two former churches for cultural activities. Their latest addition was a business unit in China, as well as aquaculture and a 2500-hectare Canadian farm. Hendrix is more than just poultry genetics!

Thijs talked about how the Netherlands has 18m people, which equates to 520 people/km2, compared to 279/km2 in the UK. The number of farms in the country is going down but the number of birds is stable due to the fixed quota system, but the quota is being bought out so the numbers will go down and they can only buy quota from their own region. There is a government incentive to reduce nitrogen emissions with the target being a reduction by a third. Thijs believes the new government will have to invest in equipment and systems to reduce emissions rather than just trying to buy-put intensive farms.

Thijs also discussed the pressures on producers in his country from NGO's such as Wakker Dier who are responsible for supermarkets only selling slow grown poultry meat. They also currently have a campaign against dairy farms involving a cow drowning in milk. Wakker Dier are funded by donations and money from the national lottery. Interestingly though there has been no pushback on the increased carbon footprint of the slower growing birds.

Fig 10. The group at the Hendrix offices

Global Food Group – Egg processing

Joep Lemmers, a 3rd generation involved in the family egg processing business welcomed us to their plant and gave us a short history of the company. Originally the family had a chicken and cattle farm selling dairy and eggs door to door and then moved into rearing birds before starting a small-scale egg processing factory in 1999.

85% of their products are exported to the UK, Germany, Belgium and Scandinavia with egg powder products also being exported to Asia. In 2010 they merged with their rivals Egg Products Ospel and bought a feed mill to set up a vertically integrated model.

The Global Feed Mill is a separate entity which sells feed to both integrated farms and independent farms. They only produce layer feed, and they are using processed animal protein (3-4%) as well as still using soya, rapeseed and sunflower and do not use legumes or beans. They produce feed for Kipster and use a former food waste blend from Nijsen to replace soya in layer feed.

Global Food Group offers liquid egg with a range of different blends, egg powders which can be tailor made in different pack size, egg specialities such as cooked egg white or yolks for salads.

They produce customer specific products to their individual countries' requirements. They do not sell any eggs for retail.

Again, we touched on the government buyout plan where we were given the statistic that so far 219 farms had been bought out, 135 of which were layer sites (out of the initial 600 in the country). This has meant that the group are having to look outside the Netherlands for egg supply, bringing some in from Spain and Eastern Europe and this is still a cost-effective option. Of the eggs they buy in 70% are barn, 15% cage and 15% free range.

The group have contract producers who supply GFP with all their eggs, but if the egg price is good then GFP can sell eggs to a packer to go for table eggs. GFP pay by the kilo for their eggs, and they aim for the producers to take birds to 105 weeks.

After the presentation we had a tour of the factory, which was built in 3 phases, starting in 1999, 2005 and then 2021. They are an allergen free factory, and they can use up to 20 tonnes sugar per day and 8 tonnes salt per day, which when added to egg products increases the shelf life. Products are also pasteurised to increase shelf life. They start the production day with organic products, then free range etc to reduce washing between production cycles. The egg breaker runs for 16 hours per day, and they use approximately 7million eggs per day. 80% of the eggs are contracted eggs, 20% they buy on the free market, sometimes through the UK.

Wednesday 4th September

Feed Design Lab

Ageuth ven der Lee, the project coordinator for the feed design lab gave us a short presentation before a tour of the facility. The Feed Design Lab is a research and education centre for innovation and sustainability in the feed industry. It is more of a foundation than a business as the aim is not turning profit. They have a network of partners who pay €3250 per year which gives them access to the training plant, plant tours etc. The partners are asked what they want the lab to look at it in terms of research, trials etc. There are also chain partners who pay more but then have a board member. The design lab was started by Vitelia and Dinissen who wanted an independent pilot plant to trial things and enable changes to be made and to test new ingredients. They are less research oriented than IFF (Germany) and are more application oriented, applying promising technologies in commercial conditions. They run approximately 50 experiments/trials per year and can trial unlicenced products (as all the equipment can be wet cleaned).

Fig 11. Pictures from inside the feed design lab showing infographics and equipment

It is the contributions from the chain partners that makes Feed Design Lab possible, so they can initiate promising projects and develop the research and education centre. The partners pay €3250 per year and get priority and discount for renting the facilities/training. To rent the pilot plant can be between €2900 -€5000 per day (Partners 25% discount). The partners determine the focus and work together on innovation. The knowledge gained from trials and projects is only available to partners, the feed design lab advises. We received a tour of the plant which has three lines. As they are an experimental lab they don't hold any stock of raw materials so there are no silos. They also have a testing lab. After the tour we received a short presentation on particle size.

Kipster Unit Visit

We were given a presentation by Rob van Haare, a project manager for Kipster. Kipster was set up by 4 entrepreneurs who believe there is a role for animals in a sustainable food system but wanted to develop a system that avoided direct competition with feed for land and feed for animals. The Kipster unit was built in 2017, and they also have a second farm 45km away, as well as one farm in the US. The house is designed with lots of glass to demonstrate transparency. To fit with the sustainable food system idea, they currently use food waste

They secured a contract with Lidl for eggs and meat from the hens and the roosters which they did before they built the shed which is partly what made it all possible. They get a fixed price for the eggs which is based on feed prices. The eggs are packed on site and distributed to Lidl and all eggs go to Lidl, with mixed sizes all in on box and the boxes come with a letter that explains when the birds are young, they only lay small eggs. The seconds are sold separately to a processor where they go into a normal stream.

They still find it hard to get planning permission even for this type of shed, with ammonia emissions being the issue. They have tried to convert an existing farm in Barneveld that was a Better Leven 3* laying unit, but they have found that it is cheaper and easier to build from scratch although it takes them a very long time to get the permits required for new sites. This combined with high set-up costs and some people's reluctance to be tied into a 5-year contract is why development of new sites is slow. Now they have secured a permit for a site in France which is in the last stages of talks with a partner and Lidl with the plan to start building one exhibition house in 2025. They are currently awaiting the results of an application for a permit for a site in Shropshire in the UK as well.

Fig 12 The viewing gallery inside the Kipster unit and the outside veranda areas of the unit.

Union of Poultry Producers presentation

We were given a short presentation by Aalt den Herder on the Union of Poultry Producers. Aalt is the found of the UPP with the aim being co-operation for a strong poultry industry with a sustainable revenue model.

They are driven to support the poultry farmer as they believe they are in a poor position in that they have very little influence on pricing and therefore hold little power. In general business terms in order to increase profit you need opportunities to increase market share, to further reduce costs, to realise a higher price, develop new products and distribute more efficiently. However, for poultry farmers most of these are not an option with the only really opportunity coming from strengthening their position in the food chain which can be improved by the formation of integrations, hence the development of the UPP. Co-operation as a Union of Poultry Producers, bundling the supply of eggs and broilers. Being a professional partner who ensures a more equal position with more balance in the poultry chain.

The Union of Poultry Producers wants to strengthen the market position of Dutch poultry farmers in the food chain, so that more room is created in the chain for a future-proof poultry farm that is able to invest in further sustainability based on what society and/or the market demands. This can be achieved by ensuring a profitable price with fair margins in the chain, where good cooperation with chain partners is essential. Initially the idea was to set up a pool of eggs from several producers to enable negotiation, but this didn't work out as planned so at the moment they negotiate an individual contract for an individual client. Since setting up 2 years ago they now have 160 members looking after more than 25% off the egg production and nearly 10% off the broiler production in the Netherlands with an organisation of 19 people.

AVINED

We were also given a short presentation by Jetter Visser, a Poultry officer for AVINED. This is a foundation started in 2013 as the Dutch poultry egg board was abolished in 2014. They used to make the laws for the sector, the responsibility for which moved to the government. AVINED was set up to act as a voice for the sector towards government and enable reaction to policy changes. Initially they had 3 divisions, one layer, one broiler and one overall, but in 2022 they moved to become one. They are made up of a board of 5 different organisations that represents the sectors, hatchery, slaughterhouse, egg packer and two producers. There are no retailers or consumers involved, and the board decides what they focus on and where the money goes.

They run a research program and what they do must benefit the sector as they fund it. Currently they are working on a Dutch court ruling that impacts poultry being caught by the legs; the EU legislation missed a sentence about poultry being exempt. They are also looking at light management (addition of UV vs artificial daylight) with animal protection services campaigning for natural daylight.

Fig 13 Gordon Whiteford presenting thank you gifts to Jetter Visser of Avined and Aalt den Herder of the UPP.

Kuijpers Kip – patio broiler farm visit

Of the groups visit this was probably one of the most thought provoking we attended. We arrived at a site that upon first arrival wasn't really clear that it was in fact a broiler farm but which we later learnt was a 5-year-old shed raising broilers using the Vencomatic Patio system. This is a tiered system for raising broilers with the chicks being hatched in the house. We were welcomed into a room upstairs in the building where we were introduced to Marcel Kuijpers who proceeded to talk to us for the next two hours about his journey over the last 5 years growing broilers with his mission of 'Great food for everybody'.

Fig 14 – Marcel Kuijpers broiler farm from the outside

Initially when he started rearing birds this way, he used to get the meat back from the slaughterhouse and then sell to his customers, including supermarket Albert Heijn. However, the animal welfare groups that campaigned for the higher welfare birds put a stop to this. As a result of this the meat from this farm is now exported.

Marcel's argument for his system is the sustainability of the system, the lower carbon footprint, the decreased stress on the birds (demonstrated by measuring corticosteroid levels of birds in the patio system).

In terms of performance, he is producing Ross 308 birds to 42/43 days at 2.95-3.25kgs with a 1.50 FCR (to 32 days) and an average mortality of 2.3% for the last 6 months. The site is multi age, with 4 units holding 65,000 birds each. Marcel has legislation to house up to 1million birds at which point he would then be able to get a licence to be a slaughterhouse and he could then stun the birds straight off the patio system.

Marcels wider message is that food production is a social activity and his mission is for everyone to have access to lovely food and he believes that all ideas that are developed should be both materially and socially sustainable. He believes that currently his country leans toward social sustainability. Marcel's view is that the current situation in the Netherlands giving supermarket customers no choice in chicken meat (slow growing only) is socially irresponsible and taking away the option of chicken meat for the poorer customer. He believes that more and more people are moving to buying chicken meat online of the faster growing variety as it is cheaper. He explained to us that in Belgium politicians realised that not everyone could afford to buy the slower growing chicken meat and made it so that customers had the option.

Fig 15 Marcel in discussion with group

Thursday 5th September

MSD

We visited the MSD headquarters in Boxmeer where we were hosted by Wesley Thorne from the UK and Kristof Mullem from the Netherlands along with his colleague Franny Pecher. The day started with Kristof giving the group a presentation detailing the history of MSD. MSD works in both the human and animal health sectors and only 8-9% of their turnover comes from the animal health sector. The company started in 1949 and outside of Europe is know as Merck. The biggest driver for MSD is human cancer research. We were educated on how pharmaceutical companies are measured against each other with a company's sales growth being measured against the market growth. An index of 100 means the company is growing at the same rate as the market. The data is submitted optionally and allows companies who submit their data to compare against others.

This was then followed by a tour of the MSD site by John and Ave. The site is fully end to end starting with Research and Development all the way through to Production. MSD has 13 RnD centres worldwide. We saw the wide variety of work environments around the site from quality control labs to virus culture and as a site it is where a large amount of the poultry research and development for MSD happens.

Fig 16 The Nuffield Poultry Group at the MDS headquarters.

The group then returned for a presentation from Franny on Slow Growing Broilers in the Netherlands. The presentation gave the group a bit of background as to how the Netherlands ended up where it is now with only slow grown chicken meat available in all Dutch supermarkets, a change which resulted in a reduction of 400million broilers produced per year down to 250million broilers.

Throughout the week the influence of Wakker Dier had been discussed but Franny's presentation explained the full history of the change in production of broilers. Between 2000-2006 the Better Leven concept was introduced. Better Leven 1* is based on an EU regulation to include growing for > 56 days of age, lower density of 25kg/m2, and an enriched environment. Part of the concept looked at antibiotic use with no antibiotics allowed. If they are used the client would see a price reduction at the end of the crop. In 2013 came the introduction of the 'Kip van Morgen' the chicken of tomorrow, along with the Wakker Dier campaign of the 'Plofkip' the exploding chicken which brought increasing pressure on the retailers. Initially every supermarket had its own concept of the 'Chicken of tomorrow'.

By 2025 80% of chicken on the floor in the Netherlands will be Better Leven 1*. The group asked about the relevance of the increased carbon footprint of slower grown birds and we were told that 'We just don't talk about it'. Animal welfare trumps carbon footprint! Franny insisted that the consumers are happy to pay the increased price of chicken meat in the supermarket and that poultry meat consumption is still going up despite the price increase.

ITB Climate Control

This visit aimed to give us an alternative view on heat exchangers, and we received a short presentation on the history of the company before being given a factory tour. ITB was Founded in 1982 as an installation company of heating and sanitary in farm and in 1983 started production of ventilation chimneys and AIR2 tube heat recovery units. In 1987 they began to specialise in the development and production of climate systems with a focus on pig and poultry farms. 51% shares sold to Fendycompany in China in 2016 before being purchased back in 2023.

Talked through their different product ranges including geothermal systems, air handling units and air scrubbers with heat exchangers. Their aims for the future are to increase their focus on heat recovery unit and develop it for export by making it a smaller unit. They also want to focus on new markets such as insects, mushrooms, and aqua (RAS).

ITB have developed the Air2 heat exchanger which aims to be compact and suit all flock sizes, to be robust and durable and easy to install. The unit is designed to be easy to manage and safe and easy to clean as well as being an efficient unit.

Insect Engineer Presentation

Bob Holtermans of Insect Engineers spoke to the group at the Hendrix Genetics site in Boxmeer and gave a slightly less traditional view on the role of insect protein.

Bob founded the 'Insect School' to offer something which would trigger movement in the industry and believes sharing knowledge is a fundamental act of friendship and enables him to give something without losing something. The Insect school is a knowledge platform that is free to access, and they also have a testing facility for research projects. Insect Engineers focuses on 1 insect, the Black Soldier Fly and they offer an alternative to tray systems, the ZOEM racks and they are also able to supply large turnkey projects.

The black soldier fly has a 45-day life cycle from egg to pupal stage and the function of an adult fly is mating and laying eggs over a 5-8 day lifespan. The Black Soldier Fly do not eat, they consume enough food in the larvae stage to last their lifetime as a fly.

Fig 17 Simon Carlton and Helen Houghton inspecting the black soldier flies.

Bob believes the focus should be on a stream for waste rather than growing insects for feed sources which would make it more attractive to companies that have a waste stream they need to dispose of. Currently the only waste streams allowed to be used are pre-consumer food waste. Also, the feed price for flies is part of the reason it is too expensive to use insects as a feed source for chickens, 60% of the cost to produce flies is in the feed substrate.

With regards to animal welfare there is already starting to be some pressure on the welfare issues surrounding insect farming and Bob is currently working on ways to ensure that it doesn't become an issue and is trying to develop their systems to be like that of the Better Leven. Currently Bob has systems in Kenya, Chile and Turkey as well as a pilot study site in the UK and is also currently working on a project with Tesco in the UK to use supermarket waste.

Friday 6th September

HatchTech

The final day began with a visit to the very impressive new headquarters of HatchTech, a privately owned company whose mission is to provide intelligent solutions for tomorrows food challenges. They are made up of a group of small companies, HatchTech providing incubation technology, HatchTraveller providing chick transport, Cultipro working in the vertical farming sector and the Respeggt group.

They told us about their office and manufacturing facility in Ukraine sited 600m from the border where they have colleagues who are fighting on the frontline but they stay because they want to keep putting money back into the country to help rebuild it, although they could switch production to other countries if they needed to.

First, we received a presentation from Maikel on the company's incubation technology currently supplied in 40 countries. The key difference with their hatching equipment is the way they organise the airflow which provides more uniform environmental conditions. We discussed the HatchCare system – a hatching unit that provides light and fresh feed and water to chicks as they hatch which they have shown to provide performance improvements in the field although the data shown was from 10 years ago. They currently have 175 units sold and are developing in other sectors with the first commericial unit up and running in the US for turkeys and also doing a field trial with ducks.

Fig 18 – the HatchTech HatchCare system showing the trays and their access to feed and water

They are currently developing SetCare which is based on optimal incubation taking 24 days rather than the industry standard of 21 days. Extending the incubation period to 24 days results in an increase in hatchability of first-grade chicks of at least 3% and improved chick quality. The embryo liveability is increased when you slow down how quickly you bring the temperature up (over 3 days as opposed to 5 hours). SetCare also reduces first-week mortality and improves post-hatch performance at the processing stage.

We then were given information on the Respeggt group, a subsidiary of Hatchtech looking at in-ovo sexing following the ban on chick culling in Germany and France, with Italy joining in 2027. The group was found in 2019 with Hatchtech becoming the sole shareholder in 2022, and by 2023 they had 6 hatcheries in Europe using the Respeggt technology. Currently their technology is being used in Norway. Germany, Italy, France, Spain, Belgium and the Netherlands. The Respeggt system sexes chicks in-ovo by carrying PCR analysis of a small sample of allantoic fluid extracted from the egg between days 8-11. A tiny hole of 0.3mm is made in the shell of the egg with a laser before a small sample of fluid is extracted using a suction method, making it non-invasive, and the hole is sealed with beeswax. The current system is able to sample 3500 eggs per hour

We then had a tour of the showroom which many of us likened to being a car show room with lots of their different equipment on display. We were shown the different development stages of the Respeggt machine which was interesting to see the evolution of.

Fig 19 Development stages equipment of the Respeggt machine

De Heus

We were hosted at De Heus by Selina Chen who is head of poultry at De Heus. De Heus is a Dutch family owned business with 300 years milling history. They produce premixes and compound feeds with their customers ranging from small and large farmers to integrators and dealers. They take an 'on the farm' approach to supporting their customers which they believe gives them valuable knowledge and insight. They have research facilities in the Netherlands, Poland and Asia, but not in the UK or the US. They are not in the UK as they believe it is quite a settled market and we have a lot of strong local players.

The company is built on four pillars:

- Feed for food
- Sustainable supply chain
- Fostering communities
- Thriving employees

With regards to Processed animal protein there are no limitations for them, they have good streams of legislated supply and they currently put poultry meat into swine and vice versa. It is easiest to do in mills with dedicated lines but they come across issues with mills that are multispecies. They don't think there has been any consumer reaction to a return to using PAP and there was open communication about it happening. They are also using legumes and animal fats commercially but not insect protein as the volumes are not scalable enough.

Edwin gave us a short presentation on trends in the broiler market and how consumers don't have a choice in the supermarkets. It is agriculture being influences by politics. Edwin also talked to us about calculating Carbon.

Our last presentation of the trip was given by Henk Rodenboog, a zootechnician on Heat Stress, how to deal with it and what the thermometer doesn't tell us. Chickens cant sweat so they lose most of their body heat from the comb, the beak and the feet and birds in hot areas and have bigger combs to enable heat loss. Climate control is always based on temperature but the presentation gave an insight into the importance of air speed in controlling heat and cold stress in the bird and how it is more important to understand what the bird is feeling not the temperature of the shed. Henk had a very good excel worksheet that enable farmers to calculate the optimum settings, and his take home messages were that real temperature is dependent on relative humidity and wind speed, the windspeed effect is a bit higher on a lower temperature but much higher on younger birds.

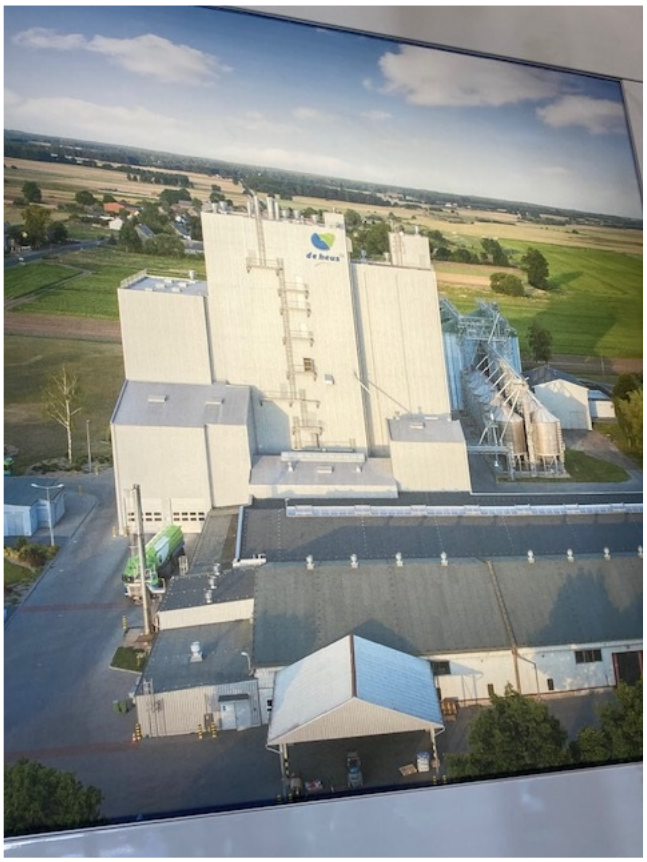

Fig 20 The De Heus plant

Supermarket visit

As is tradition the trip ended with a supermarket trip to compare packaging and prices of poultry products in the Netherland with the UK. Meat prices were more expensive compared to the UK, although not quite to the extremes that had been alluded to throughout the week. The range of egg offering was quite extensive with lots of different packaging but relatively clear labelling for different production systems.

Fig 21 Examples of egg packaging in a Dutch supermarket.

Conclusion

Overall, the group had a fantastic week on a trip that was packed full (even by Nuffield standards!) of interesting visits that sparked a number of debates and discussions both during the visits and afterwards. Thanks must go to Steve Pritchard for his excellent organisation of a brilliant week that of course would not be possible without our very generous sponsors. The Nuffield Poultry Group is extremely grateful to both Hendrix Genetics and MSD for enabling this trip and thank you to Wesley Thorne and Nick Bailey for joining us. Thanks must also go to Teun van de Braak and the team at Vencomatic who were instrumental in facilitating all the wonderful visits.