

Innovation in animal health &
sustainable livestock production in Europe:
Two sides of the same coin?



Event report

Opening Statement



Wijnand de Bruijn, AnimalhealthEurope President

While innovation is quite a straightforward concept, sustainability is slightly more complex, and the following statement sums it up: 'We cannot just add sustainable development to our current list of things, but we must learn to integrate the concepts into everything we do'. This is not an easy task, and we as the animal health industry work towards that end. For example, our industry invests 8% of its turnover in research and innovation, with R&D facilities in 13 countries, and our products support the livelihood of 9 million livestock farmers.

On 5 June the EU institutions reached an agreement on the veterinary medicines Regulation during the inter-institutional negotiations, and the EP Environment Committee will vote the text on 21 June. We hope the new Regulation will translate into a greater support for innovation and availability of animal health solutions. We now see light at the end of the tunnel, but the tunnel is still long.

Today's programme will give all participants an opportunity to share views on what innovations are necessary in animal health to support livestock farming in the future.

Keynote speech: Importance of European innovation in times of uncertainty



Eleanor Riley, Director of the Roslin Institute, University of Edinburgh

Sustainable livestock production encompasses ensuring healthy and productive animals, a positive or neutral environmental impact, high welfare standards and efficient trade routes. Healthy animals contribute to all three pillars of sustainable agriculture, and livestock has a key role for food security.

A sustainable research and innovation agenda is critical to deliver animal health solutions through cooperation with industry and other scientists. The Roslin Institute is leading research to control infectious diseases, zoonoses and food-borne pathogens, to improve animal production and welfare, as well as to develop blueprints for healthy animals. Activities include fundamental research on genetics and genomics of pathogens, genetic selection and genome editing for animal disease resistance in poultry and pigs (e.g. against PRRS¹) and using genomic selection to breed disease-resistant fish and molluscs for aquaculture. New horizons in research include genetic research of resistance markers, feed efficiency and methane production, as well as the development of new antibiotics and vaccines.

In relation to Brexit, the Roslin Institute adheres to the recommendations of the UK Science Partnership for Animal and Plant Health, and the UK R&D community's position. Continued participation in EU research and innovation programmes is essential, and so is working with industry both at national and international levels, for which long-term partnerships are particularly valuable.

Animal health innovation in the spotlight:

Precision farming for animal health management



Tomas Norton, Professor in Precision Livestock Farming, KU Leuven

Precision livestock farming (PLF) includes techniques and technologies aiming to support farmers in managing livestock production. PLF brings value to the animal, the farmer, the consumer, and society at large.

KU Leuven has developed technology to detect disease symptoms in real time by monitoring biomarkers of infection. For example, an online health monitoring of pigs through cough recognition for respiratory health. Other applications of PLF offer the possibility of integrating the monitoring of

¹ Porcine reproductive and respiratory syndrome

health, welfare and productivity through camera technology. This helps monitor drinker visits, aggression, and to estimate animal weight.

According to the PLF business model, the cost of PLF investment and operation is shared along the value creation chain for access to data pool. The focus is on both the farmer and the animal, and the role of the farmer is central as she/he is in control of the data. Multi-functional systems will enable different business models in the future, and PLF will allow the animals to drive the system.

Future diagnosis and vaccination strategies for pigs: which way to go?



Hans Nauwynck, Professor at Ghent University's Veterinary Faculty, and partner in the European SAPHIR project

The discovery and application of revolutionary diagnostic techniques provide an innovative approach to disease diagnosis and prevention. Unlike old technologies, new ones - such as 3rd generation sequencing - provide fast diagnosis of complex diseases. In addition, they will help in purity control of vaccine virus, the preservation of immunogenicity, and the provision of safe and powerful adjuvants, enabling a fast production of safe and efficacious inactivated viral autovaccines.

Modern technologies also lead to a quick production of safe and efficacious recombinant vector vaccines, for example by introducing genes of protective viral protein into general vectors by a fast recombination system, leading to a fast check of vaccine safety and efficacy, and lyophilisation. The result is a fully automated and individualised online monitoring of the diagnostics, treatment and vaccination by the authorities, the veterinarian and the farmer, leading to safe animal products.

Discussion

- **Research funding:** There is great interest in this field. The EU institutions believe that companies should come up with solutions, but there is not enough money for fundamental research. Companies and researchers should strengthen cooperation to optimise the use of EU funding and deliver innovative solutions, not only for zoonoses, but also for animal health management.
- **Regulation:** It is important that the new animal health regulation is future-proof and caters for future innovative solutions.
- **Data sharing:** There is a potential for farmers to produce valuable data on feed, health and genetics in the future, and to share these with industry through contractual agreements. In this regard, farmers will have to go through a mind-changing process, and be open to sharing data on the application of diagnostics and vaccines for the benefit of all parties involved.
- **Brexit:** It is important that researchers and industry continue to talk to each other and work in partnerships to retain access to innovative technologies after Brexit. The UK Government is investing heavily in industry research to increase productivity.
- **Communication:** There is a need to improve communication on the benefits of innovative technologies to farmers, authorities and consumers in a transparent way.

Face-to-face interview



Tom Tynan, member of European Commissioner Phil Hogan's cabinet

The European Commission research programme 2014-2020 has allocated about €5.7 billion for knowledge transfer and innovation in rural development programmes. To speed up innovation on the ground, DG AGRI has established European Innovation Partnerships (EIP-AGRI) bringing together research, innovation and practice, and aiming to foster a competitive and sustainable agriculture.

Currently, there are 118 rural development programmes across the EU today, and there is cooperation within the European Innovation Partnership (EIP-AGRI) in around 100 of those programmes. By the time the programme finishes in 2020, there will be more than 3,000 innovation projects fully funded under that programme.

The next research framework programme should encourage win-win measures. For example, these could be on livestock genomics, improvement in animal welfare, health, diet, precision farming, and breeding. Between now and 2020, the programme will allocate €700 million for sustainable livestock programmes, covering breeding, animal health, and antimicrobial resistance.



Jannes Maes, President of the European Council of Young Farmers

Innovation in livestock relies on research, development and implementation, i.e. making sure that R&D makes a difference at farm level. Financing for all three pillars is essential so that farmers working in all production scales can benefit and apply them.

Researchers need to involve farmers in the R&D phase, by using their expertise and input before bringing new tools to the market. On the use of big data, there is a big opportunity for the farming community to help researchers bring innovative solutions. When it comes to sharing data coming from the farm, it is important for researchers to create a working relationship with farmers that is based on trust and care.

Citizens do not see the benefits of innovative solutions in livestock farming. Therefore, it is important that researchers step in the public domain and explain the benefits of using innovative solutions at the farm. Farmers should not be left alone to do this.

Discussion

- **New CAP proposal:** R&D is a priority and EIP-AGRI will bring key stakeholders together. The new proposal brings more subsidiarity, placing the farmer at the heart of the food chain, and bringing experts together, bearing in mind the COP 21 agreement. It aims to bring change and responsibility at national level.
- **Horizon Europe:** The proposal includes a significant increase in funding of R&D in agriculture (€10 million).
- **Farmers' financial constraints:** Farmers are well informed about the latest technical solutions for animal health management and there is willingness to apply innovative solutions, but financial constraints are a big obstacle to bring these technologies to the farm. This is a real challenge, especially for the younger generation of farmers.
- **Public perception:** Younger Europeans are not well informed about science and innovation in agriculture. Opening farms to the public can help in this regard. The European Commission is funding projects to promote public awareness of farming. It is important to involve experts in social sciences and communication in such projects.
- **Animal welfare:** Scientists should engage with farmers and make them aware of easy and accessible animal health solutions to improve animal welfare.

Panel debate: How can innovation in the chain help the future livestock production in Europe?



Allan Buckwell, Emeritus Professor in Agricultural Economics at Imperial College in London, and RISE Foundation

Livestock has several direct and indirect impacts and concerns relate to AMR, zoonoses and animal welfare. Europeans on average are hugely over-consuming livestock products, and don't use all the animal proteins they ingest. This is not an intelligent use of global resources. The question is whether we can use these considerations to determine ceilings for upper boundaries for a safe operating space for livestock. There is compelling evidence that we are exceeding the upper boundaries on at least greenhouse gases and nutrient flows, a large part of which come from the livestock sector.

We can act on production, and innovation is a key part of that. We can also consider how we can deconcentrate/relocate livestock production. There are plenty of challenges and options where science can help us change the system. Our assessment to date is that the likely rate of productivity improvement is insufficient to enable us to meet the COP 21 objectives through a safe operating space within that period. Therefore, we should act on both consumption and production. These are highly complex and difficult issues.

We need much better science in defining and calculating boundaries, as well as awareness raising among decision-makers and the public as how to respond to them. We should investigate the negative impacts of livestock, scientifically scale them, and decide rationally how to respond to them.



Jan Venneman, Director of the European Forum of Farm Animal Breeders, and FABRE Technology Platform

Critics claim that the animal production sector is not resource efficient, has a high environmental impact, decreases biodiversity, and is responsible for AMR, animal diseases - including zoonoses - and animal welfare. According to NGOs, the solution lies in reducing consumption of animal products in Europe, with less animal production, fewer farm animals, and less intensive animal production systems.

However, critics are often one-sided. The livestock sector faces many challenges, and there is a need to better communicate with society about livestock production. Sustainable intensification is key to feed the world, both in the EU and outside of it, with special attention for less favourable areas and less intensive systems. Innovation in the agricultural supply industry is essential to reach a safe operating space for livestock production. EU policy makers should consider the importance of public-private partnerships to deliver innovation, especially where industry has no incentives yet, for example, in reducing greenhouse emissions. Genome editing is a key issue in animal breeding and reproduction, and should be mentioned in the next European research framework programme.



Mateusz Rawski, Poznan University of Life Sciences and HiProMine S.A.

Two main protein sources in animal nutrition - fish and soybean meals - are currently considered as unwanted and need to be replaced due to their negative impact on the natural environment. Fishmeal production should be restricted due to scarcity of marine resources and ocean overfishing. In the case of GMO soybean meal, there is a possibility that a ban on GMO sources takes place either locally or throughout the EU. Poland, for example, plans to introduce a local ban on the use of GMO materials in feed production. All the above-mentioned reasons show the need to develop alternative protein sources that are both economically sustainable and environmentally friendly.

In HiProMine S.A. we work with insects as an innovative source for nutrients for animals, and we are introducing them in animal research, as well as in commercial feed production. We should underline that insects are the natural source of feed for both animals and people since centuries. They are present in the diet of both wild and farm animals, i.e. poultry in organic production systems, or salmonid and cyprinid fishes.

To understand the high level of environmental balance of insect production, it is important to note that most of their production is based on bio waste or food waste use as feed. Insect farming does not contribute to greenhouse emissions or increase the farmed land. Insects should not be considered as a protein source only, but also as a source for high quality oil and functional additives for animal nutrition, cosmetics and medicine. Future challenges for the sector are implementation, increasing the scale of production, and building knowledge on insect nutrition and health. We could expect that this branch of animal production will rapidly rise in the future and create the need for research on diagnostics and veterinary medicines for insects, which could provide valuable solutions. It must be underlined that we should consider insects as a new group of farm animals, and expect large scale of their use in both animal and human nutrition.



Jean-Louis Peyraud, President of the Animal Task Force

The livestock sector is subject to much criticism and the focus of many scientific publications. These criticisms relate to low efficiency, emissions (nitrate, ammonia and greenhouse gases), antibiotic use and risk of antibiotic resistance, and animal welfare. It should be noted that livestock production provides ecosystem services for society, such as keeping landscapes and maintaining rural vitality. Both sides of the debate should be considered.

On the one hand, livestock reduces biodiversity because of deforestation and, on the other, livestock helps maintain grasslands and biodiversity in mountain areas. It is important to note that 50% of Europe's endemic plant species are grasslands species, and that 80-90% of natural resources used for animal feed is not suitable for human consumption. The question is: How can we reduce the environmental drawbacks of livestock while optimising the societal and ecosystem services they provide, and their role in maintaining competitiveness? We need innovation to address these issues and

should take an inter-disciplinary approach as all challenges are interlinked. We need to think locally as livestock is present throughout Europe with a wide variety of production systems. Additionally, we should approach innovation through both a top-down and a bottom-up approach, by involving all actors – including farmers – in the process.

Furthermore, if we are to meet these challenges, we need to consider circularity, e.g. by implementing modern technologies to improve manure management and avoid excesses in some areas, and to maximise the use of plant by-products by animals. We also need a better and more intense use of natural processes to maintain biodiversity and increase production while reducing inputs, e.g. through breeding techniques, vaccines, use of legumes etc. Equally, we need to implement disruptive technologies, such as PLF and digital data. Other important aspects are the governance of the system and the role of policy makers in new collaborative approaches – by industry and farmers – to develop new value chains.

Summing up, we need to make progress both by reducing livestock's drawbacks, and by improving the ecosystem and societal services livestock provides, while securing the competitiveness of the livestock sector in Europe.

Discussion

Communication:

- It is important to raise awareness about livestock production to the public at a very early stage, e.g. at school and through the curriculum.
- The sustainability concept should be better explained when communicating with the public.
- More attention should be paid to communicating through social media. It is an important source of information for the public, especially for the young generations.

Sustainability:

- Sustainable livestock production is complex, and all the three pillars are interlinked. Different livestock production systems can be sustainable.
- On the recommendations of the International Governmental Panel on Climate Change, it is important to update and correct the facts and assumptions regarding the environmental impact of livestock - emissions data - and the predictions on reductions. It is the role of scientists to correct these data.
- RISE Foundation's 'safe operating space' concept refers to sustainability. An activity is unsustainable if it compromises the needs of future generations. Therefore, it is important to know what the regional, national and global boundaries are.
- Resilience is a key issue for sustainability, and the diversity of the production models is a part of the system's resilience. The question is how to improve all systems, and the solution will be different depending on the system.

Animals and crops:

- The environmental impact of livestock is very much in the spotlight. It can equally be argued that crops are not in a safe operating space either. We need to think of circularity, integrating crops, livestock and soil. Both crops and livestock are a part of the solution in Europe and globally.
- EU plant protein strategy: It is possible to reduce soya imports, and there is a push for halting soya imports for feed. If the demand for soya goes up - e.g. due to increases in China - prices may go up. The question is whether Europe will be able to be self-sufficient.
- We need to internalise externalities, which will result in higher prices for livestock products.

Innovation:

- The question is whether we are going to see an improvement in productivity in livestock and a reduction of the health, welfare and environmental impacts at a rate of more than 1% per annum. If there is not going to be such a change, that will not suffice to meet the boundaries estimated by science.
- We need a mechanism by which we monitor data on livestock, and PLF can be a valuable tool.

Close



Roxane Feller, Secretary General of AnimalhealthEurope

Today's event featured a wealth of interesting presentations and discussions, as well as a new style and format, with a greater social media engagement - through Twitter and an online poll.

The online poll revealed the following:

- 100% of respondents believe that EU livestock production needs innovation to remain sustainable.
- For a large majority, innovation in animal health plays a large role in future livestock production.
- On the most important input - 'innovation to ensure sustainable livestock in the future'- 86% of respondents believe that improved nutrition, animal health solutions and animal breeding technologies altogether are equally important. This is an important take-home message, and all sectors can work together.
- As per innovative solutions in the animal health sector playing a key role in future livestock farming, a clear majority (72%) believes that sensory technologies for early detection of diseases will have a significant role.

The event concluded with words of thanks to the speakers and the participants for their invaluable contributions.



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