Innovation to compete in the global livestock industry

The challenges and opportunities facing the agri-food sector were examined recently at the BSAS annual conference, jointly organised with TEAGASC and University College Dublin.

The British Society of Animal Science (BSAS) held its annual conference at Croke Park, Dublin, on April 9-11, 2018. This is the first time the conference was held outside of the UK and 500 scientists, vets, policymakers and farmers from across the world gathered to hear about the challenges and opportunities facing the agri-food sector. The theme of the conference this year was 'Innovation to compete in the global livestock industry'. During over 40 sessions, delegates heard from an international line-up of speakers about ground-breaking technologies and innovations across a wide range of topics from aquaculture to precision agriculture, intensive pig and poultry to grass-based beef and dairy production systems, as well as equine husbandry, welfare and health. A brief summary of some of the main sessions is outlined here.

Global food consumption

Sir Charles Godfray, Hope Professor of Zoology from Oxford University, spoke about 'Food security, global health and environmental sustainability: challenges from increasing meat consumption'. He stated that increasing consumption of meat and other animal-sourced foods is one of the most important contemporary trends in the global food system. However, he warned that: "The earth could not support a global population of around 10 billion consuming meat at anywhere near the quantities prevailing today in Europe and North America without radical changes in production methods". Notwithstanding putative health risks associated with the long-term consumption of red and processed meat in particular, the professor argued that in many parts of the world, where diets are still deficient in calories, increased consumption of animal-sourced foods may be desirable. He outlined the results of novel bioeconomic modelling analyses, where the health and environmental consequences of different types of diet were examined, and posed the question whether the livestock industry should view the increasing attention being given to the health and environmental consequences of eating meat as a challenge to be resisted, or an opportunity to be embraced.

Impact of Brexit

In an engaging session on the potential impact of Brexit on the UK and Irish agri-food industries, delegates heard comprehensive viewpoints from Ireland, Northern Ireland and Scotland. Kevin Hanrahan from Teagasc outlined the possible impact of Brexit on Irish agri-food exports to the UK and on Irish farm incomes. His analysis employed data from Ireland-UK trade statistics, and the EU tariff framework, as well as microeconomic data from the Teagasc National Farm Survey. While Irish agriculture has progressively reduced its dependence on the UK export market since joining the EU, Kevin warned that Brexit could dramatically accelerate this process and impose significant economic losses on the sector. The impact would, of course, vary across commodities, depending on their reliance on the UK market. Myles Patton from the Agri-Food and Biosciences Institute in Northern Ireland analysed three possible post-Brexit trade arrangement scenarios available to the UK. The results again indicated variable impacts across sectors, and reflected the extent to which the UK is a net importer or exporter and the degree of international competition within specific sectors.
Steven Thomson from Scotland's Rural College (SRUC) gave a comprehensive and thought-provoking presentation on the various options that the UK Government might pursue in terms of agricultural support and trade following Brexit. He challenged the current cost competitiveness of meat production in the UK, as well as the reliance on EU subsidies, and advised animal scientists that continued effort is required to improve the economic and environmental efficiency of livestock production systems.

Microbiome and gut health

Two complementary sessions on the subject of 'Microbiome and gut health' were organised and chaired by Sinéad Waters from Teagasc, the first focusing on pigs and poultry and the second on ruminant livestock. The role of the gut microbiome is central to the health and well-being of all animal species and this research area has become hugely topical in recent years. Paul Wigley, Professor of Avian

Infection and Immunity at the University of Liverpool, delivered a comprehensive presentation on 'The gut microbiome of the broiler chicken', explaining how the microbiome is central to gut health, increased productivity, and carriage of food-borne bacterial pathogens such as *Campylobacter jejuni* in poultry. He explored how the avian microbiome can be manipulated through the inclusion of supplements in feed, including prebiotics and probiotics, as well as competitive exclusion products that are frequently used to improve feed conversion efficiency and reduce the likelihood of pathogen carriage. However, the development and application of such products has, up to now, been largely empirical in nature because of limited understanding of the composition of the microbiome, its variation in the developing bird, and limited description of any mechanism of action of such products. The main aim of Paul's work is to seek ways to 'improve' the microbiome of developing chicks to both enhance development and reduce proliferation of *C. jejuni*.
Torres Sweeney, Professor of Animal Genomics at the School of Veterinary Medicine, University College Dublin, presented a paper on 'Supporting the symbiotic relationship between mucosal morphology, immunity and the gut microbiome in the pig'. She spoke about the establishment of the gut intestinal microbiome in the pig and its relationship with the host mucosa, and how that relationship is critical to the lifetime productivity of the animal. Torres detailed how strategic dietary supplementation can ensure an appropriate level of immune reactivity in the gut to accommodate the presence of beneficial and dietary microorganisms, while allowing effective immune/inflammatory responses to clear pathogens. For example, a variety of natural sustainable bioactives that target different components of the gastrointestinal tract environment have been identified. In the ruminant-focused session, Sharon Huws from Queen's University Belfast delivered a comprehensive presentation on 'Understanding the role of the rumen microbiome in animal phenotype'. She explained how the rumen microbiome is diverse, containing bacteria, protozoa, fungi, methanogens and bacteriophages, and is critical to the digestion and utilisation of feed. It also controls nitrogen use efficiency, methane emissions, and the fatty acid content of meat and milk. In summary, all speakers concluded that the gut, and in particular the rumen microbiome, is very complex in nature, making manipulation challenging and, as such, future progress will require a much greater understanding of the gut ecosystems through enhanced genome sequencing, and functional and bioinformatic technologies. A thorough understanding of the enteric microbiome will facilitate the development of long-term innovative technologies to improve the efficiency of monogastric and ruminant production systems, including reducing the environmental impact, as well as ensuring that meat and milk continue to be safe and nutritious for the consumer.

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