



Is hi-tech, intensive livestock production more sustainable, more biosecure?

The Earl of Caithness

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Science for Sustainable Agriculture

Faced with a ‘potential explosion’ of livestock disease in Britain, the Earl of Caithness highlights the enormous potential to prevent the spread of infectious diseases in farmed animals through genetic advances in which UK research is world-leading. He urges UK Ministers to speed up plans to allow the commercial use of precision breeding techniques in livestock so that these advances can be deployed as soon as possible to prevent animal suffering and to improve biosecurity. Noting that infectious diseases do not differentiate between animals reared intensively or extensively, he also refutes claims from environmental NGOs and animal welfare campaigners that more intensive forms of livestock production increase the risk of zoonotic diseases. In fact, the scientific evidence points in the opposite direction – intensive livestock farming may actually be more sustainable, and more biosecure.

In a recent debate in Parliament introduced by the distinguished veterinarian, Lord Trees, members of the House of Lords considered the question of biosecurity, and the threats posed to plant, animal and human health by the combined effects of globalisation and climate change.

The debate could scarcely have been more timely, coinciding with an unseasonal surge in bluetongue cases in south east England, and amid [concerns](#) that UK border checks on illegal meat imports faced budget cutbacks.

After the UK experienced a record outbreak of avian influenza which over-summered here for the first time in 2022, and with reports that African swine fever has already been confirmed in 17 European countries, the importance of robust surveillance and control measures to protect our biosecurity has never been greater.

Recent news from the UK’s [Animal and Plant Health Agency](#) that an unprecedented and highly contagious bird flu outbreak in the sub-Antarctic has spread to mammals there offers a further sobering reminder of the ability of these emerging infectious diseases to cross species barriers.

The human devastation wreaked by Covid19 has demonstrated the huge potential impact of zoonotic diseases, and the need to use every scientific tool at our disposal to prevent and guard against future outbreaks.

Effective and properly resourced phytosanitary controls are of course a first line of defence. Warning of a potential explosion of livestock diseases with cases of bluetongue and Schmallenberg virus expected to spike in the warmer weather, the NFU recently [asked](#) whether the Government's Animal and Plant Health Agency (APHA) is sufficiently equipped to deal with the worst-case scenario of multiple disease outbreaks at once, including avian influenza and a possible outbreak of African swine fever.

Alongside such controls, there is also enormous potential to prevent the spread of infectious diseases in our farmed livestock through advances in genetics, by unlocking the potential of our world-leading research institutes where scientists are applying the latest breeding techniques to develop animals with resistance to many of these potentially zoonotic diseases.

For example, researchers at the Roslin Institute in Edinburgh are at the forefront of global efforts to develop genetic resistance to avian influenza in poultry and African swine fever in pigs.

The Genetic Technology (Precision Breeding) Act, which received Royal Assent last year, is a positive development which opens up the potential to harness and exploit many of these advances.

I applaud Ministers for sticking to their guns by including precision bred farmed animals in the legislation. This was despite the best efforts of some welfare campaign groups who sought to remove animals altogether from the scope of the legislation on ethical grounds, suggesting that it would be a backwards step for animal welfare and that gene editing would be used to further intensify livestock production.

Indeed, many of the arguments raised against the use of gene editing in farmed animals seemed to articulate a more general prejudice against modern livestock farming, rather than the technologies themselves.

As far as I am aware, the vast majority of current gene editing applications in farmed livestock are focused on alleviating animal suffering, and improving animal health and welfare.

For example, gene edited pigs have already been bred with resistance to porcine reproductive and respiratory syndrome (PRRS), a viral infectious disease of global importance for which there is no effective vaccine or treatment, and which causes extremely high morbidity and mortality in both indoor and outdoor pig production systems.

Once again, the gene edited trait conferring complete resistance to PRRS was pioneered by British scientists at the Roslin Institute. The first PRRS resistant pigs

are expected to be approved for commercialisation in the United States later this year.

I think it is a fair question to ask those campaigning against the use of precision breeding on ethical and animal welfare grounds – how can it be ethical not to embrace such advances?

But the Precision Breeding Act will not take effect in relation to animals until secondary legislation is agreed to establish a new advisory body and to put in place additional animal welfare checks for precision bred animals which do not currently apply to conventionally bred animals.

This is despite the underpinning rationale of the legislation that precision bred animals could equally have been produced using conventional breeding methods.

In seeking to duplicate or add to existing welfare provisions solely in relation to the use of precision breeding technologies, there is a serious risk that genetic research and innovation with potentially game-changing implications for disease control and improved animal welfare, and in which the UK is recognised as a world-leader, could be discouraged or driven elsewhere.

The UK must not be left once again in the position of being a good inventor but a poor implementer. I would therefore urge the Government to apply as light a touch approach as possible to the welfare assessment process, and to speed up plans to allow the commercial use of precision breeding techniques in farmed animals so that these advances can be deployed as soon as possible to prevent animal suffering and to improve our biosecurity in the face of increasing infectious disease threats.

Of course, the prevailing narrative among environmental NGOs and animal welfare campaigners is that more intensive forms of livestock production increase the risk of zoonotic diseases and a future pandemic. This argument is used to make the case for an emphasis on more extensive, lower-yielding farming practices.

But the scientific evidence on this issue points in the opposite direction – intensive livestock farming may actually reduce the risk of future pandemics.

This is partly because infectious diseases do not differentiate between animals reared intensively or extensively, and the biosecurity associated with modern housed livestock systems is more effective at keeping disease out, or keeping disease in. Bird flu, for example, is spread by migrating wild birds so the response to an outbreak is not to increase the extent of free-range systems, but to keep all farmed poultry indoors.

According to [research](#) published in 2022 by team of ecologists and veterinary scientists at the Universities of Cambridge and Leeds, the scientific evidence also indicates that because lower-yield farming requires much more land to meet demand for meat, eggs and dairy, a switch to more extensive production systems, such as free-range, would drive habitat loss and disturb more wildlife, potentially including species that could host the next pandemic virus, and increasing the risks by bringing people, farmed livestock and wild animals closer together.

This is in addition to the scientific evidence that more intensive livestock production systems are also more sustainable in their use of natural resources. The British Poultry Council recently advised that, with investments in science, innovation and technology, today's broiler bird generates a 50% smaller carbon footprint than a bird from 1970, and a bird from 2030 is projected to generate a 15% smaller carbon footprint from today's bird.

To conclude, when Covid-19 struck, we turned to the best available, most advanced genetic technologies for solutions, and we celebrated the scientific developments in both public and private sectors that made this possible.

We must apply the same, science-based principles to the use of new genetic technologies in agriculture to improve prospects for the control of infectious diseases in livestock, for the health and welfare of farmed animals, and to reduce the risk of future pandemics in the human population.

Malcolm Ian Sinclair, 20th Earl of Caithness, has been a Conservative member of the House of Lords since December 1969. He served as a government minister in several different departments – Transport, Environment, Treasury, Foreign Office, Home Office - under successive Conservative governments between 1984 and 1994. He was made a privy counsellor in 1990. He takes a keen interest in farming and rural issues in Parliament.