

Landraces

Allies in the fight against animal epidemics



Current measures against Avian Influenza severely threaten domestic poultry diversity – the photo shows a Pomeranian Duck, a breed threatened by extinction. Photo: Feldmann/GEH

Avian Influenza is the latest animal disease that has frightened many people as we watched it spread across Asia and Europe. Apparently, not even the pre-emptive culling of chickens, geese, ducks and turkeys – whether infected or not – can halt its spread, even though that is the exact objective of culling. In the past decades the carousel of animal diseases has spun ever faster. According to the United Nations Food and Agriculture Organization (FAO), every year on average one new animal disease has emerged. Three quarters of these were zoonoses.

Globalisation accelerates the spread of disease

Several factors are thought to be responsible for the increase in pandemics. The increase in intensive livestock farming requires increased drug use. This in turn leads to increased drug resistance among disease-causing organisms and a reduced immunity status of livestock populations. Globalisation and the expansion of world trade have resulted in more frequent movements of livestock and livestock products around the globe, and have facilitated the spread of infections. Some regard the Sanitary and Phytosanitary (SPS) Agreement of the World Trade Organization (WTO) as a further cause. To facilitate trade, it restricts the use of sanitary and phytosanitary measures considered excessive. Some countries regard this as a way of forcing them to accept low-quality imports of animal products.

Key terms

Immunity is a human's or animal's insusceptibility to a certain disease. It can be congenital or acquired through vaccination.

Resistance is the ability of a host to resist infection or control the lifecycle of a parasite.

Tolerance means that an infected animal displays few measurable symptoms of a particular disease.

An infection or disease is endemic if it occurs in a particular location or population with predictable regularity.

A disease is called an epidemic if it infects many animals at the same time and spreads rapidly.

An epidemic becomes a pandemic if it spreads all over the world or over several continents.

Measures designed specifically to prevent the spread of an infectious agent are termed biosecurity measures.

Zoonoses are animal diseases which can also be transmitted to humans; they include rabies and anthrax.

In vitro conservation describes the preservation of genetic material, for example in a seed bank.

In vivo conservation, in the context of the conservation of animal genetic resources, describes the keeping and breeding of animals, for example on a farm.

Cryo-conservation is the deep-freezing of sperm or embryos.

At the international level, the World Organisation for Animal Health (OIE) is a standard-setting body. It has established a list of diseases that spread rapidly, have significant mortality and/or morbidity and have zoonotic properties. Member countries are obliged to notify the OIE in the event of an outbreak of these diseases. The OIE then limits the trade in animals and animal products from the affected country.

The OIE regulations are also the basis for the relevant EU Directives. Since 1991, the EU has prohibited vaccinations against Foot and Mouth Disease (FMD), Classical Swine Fever (CSF) and Avian Influenza, because it was not possible to distinguish between vaccinated and infected animals. Despite massive farmer protests the EU

continues to follow this policy. In China, however, poultry is now being vaccinated in response to Avian Influenza.

Damage runs into the billions

Livestock epidemics cause enormous damage. For example, the impact of the current outbreak of Avian Influenza in Asia has been estimated at US\$ 1015 billion in the affected countries. By April 2005, more than 140 million birds had died or had been pre-emptively destroyed.

During the Avian Influenza outbreak in the Netherlands in 2003, more than 20 million birds were culled in order to prevent the spread of the disease. Vaccination was prohibited. Exemptions were not even made for purebred show birds and hobby flocks. Thus more than 175,000 hobby animals and waterfowl were culled.

Disease control – the end of the road for rare and threatened breeds

The EU's disease control policy has significant impacts on rare breeds. During the FMD outbreak in the UK, breeding populations of sheep such as South Country Cheviot and Herdwick were reduced by a third, and specially adapted breeds including Lonk and Rough Fell were reduced by a quarter. The largest flock of high-performance British Milk Sheep, consisting of 400 ewes, was also culled.

In developing countries it has not been possible to monitor the effect of the stamping-out policies on animal genetic resources, but the impact is likely to have been devastating.

The need to integrate wildlife into disease surveillance

Many pandemics can be carried and transmitted by wild animals as well. Even when all infected domestic animal stocks – both commercial and hobby flocks or herds – have been stamped out, free-ranging and captive wildlife can provide important reservoirs for reinfection of livestock. With respect to Avian Influenza, it is known that wild birds play a role in spreading the disease; however, the exact mechanism is not yet known. In the UK it is suspected that deer populations may carry FMD. Hence it is necessary that the disease status of wildlife populations is also monitored. However, this is difficult and there is great need for further research.



Market in Bogor, Indonesia. Photo: Emmanuelle Guerne Bleich, FAO

In Germany, regulations to combat CSF require that pig stables must be built inside a gated enclosure to guarantee that no contact can take place with possible disease carriers. Outdoor keeping of pigs has been placed under so many restrictions that many keepers of rare pig breeds have given up.

In the wake of these experiences, rare breeds associations and smallholder/farmer associations have strongly lobbied their governments and the EU to change the stamping-out policy and to make special provisions to save threatened breeds and hobby animals.

Both the OIE and the EU Commission have recognised that there are ethical, ecological and economic problems with fighting outbreaks of epidemics by means of mass culling. They have acknowledged that vaccinations are a more appropriate approach. In guidelines for decision-making for the control of FMD, the FAO has also emphasised the importance of genetic conservation as an insurance against change, and recommended a combination of *in vivo* and *in vitro* conservation programmes.

Accordingly, the new EC Council Directive (2003/85/EC of 29 September 2003) on FMD gives priority to emergency vaccinations over killing. This legislation also contains special provisions for zoos, wild animal parks and other institutions that conserve threatened breeds and species. If a breeding herd has been identified as essential for the survival of an officially registered threatened breed in advance, then the appropriate body in the country can order special measures such as prophylactic vaccination instead of killing. Nevertheless, these special measures, together with basic strategies for combating the epidemic, need to be embedded in a speci-

fic contingency plan. While countries are in the process of discussing these contingency plans with stakeholders, they are under no obligation to make them public.

The Directive also places a responsibility on Member States to establish lists of holdings where animals are kept for purposes related to the conservation of animals that are indispensable for the survival of that breed. A good example of the implementation of the Directive is furnished by the British contingency plan.

Thanks to outspoken non-governmental organisations (NGOs), special provisions are now being made in Europe to save valuable animal genetic resources in case of disease outbreaks. But in developing countries there have been no such moves. The global strategy for the progressive control of highly pathogenic Avian Influenza, which entails a seemingly comprehensive plan of action, does not make any reference to animal genetic resources, even though indigenous poultry breeds and their small-holder owners are the ones that will be most affected. There is thus a need for organisational strengthening of livestock keepers in developing countries, so that they can press for special regulations for their indigenous breeds, following the example of Europe.

Breeding instead of vaccinating

Breeding for disease resistance is an emerging trend in disease control. It is motivated by the increasing resistance of pathogens. In addition, consumers increasingly favour naturally grown food that contains no additives.

Diseases that can successfully be managed by breeding include tick infestations, helminth infections, and Marek's Disease – a viral disease causing paralysis in poultry. Experts emphasise that genetic options for disease management need to be integrated into whole-system solutions, and that the communities which depend on livestock need to be actively involved. Currently there are many open questions with respect to breeding for disease resistance. One is the issue of whether this may compromise productivity. Resistance to infections is always relative rather than absolute, and it is also not possible to achieve resistance to all pathogens. However, an increased level of natural resistance can certainly reduce morbidity and economic losses caused by infectious diseases. The solution may lie in combining vaccination programmes with breeding for natural resistance.

Cryoconservation is, however, not sufficient for the conservation of animal genetic resources, as freezing prevents the adaptation of the genetic material to changing disease scenarios and new diseases.

Epidemics undermine consumer confidence

Epidemics affect consumer behaviour worldwide, at least temporarily. Following the Avian Influenza outbreak, fast-food chains in Southeast Asia reported a switch from chicken products to fish burgers. In Viet Nam, lack of supplies led to the disappearance of chicken from up-market restaurants, and from the homes of those on higher incomes. In Europe, the BSE outbreak caused consumers to avoid purchasing conventionally raised beef. The series of disease outbreaks precipitated policies supporting sustainable and organic livestock production and contributed to raising consumer interest in organic products.



Indigenous chicken breed in KwaZulu Natal. Photo: Wolfgang Bayer

Combining disease eradication with the conservation of genetic resources

In order to ensure that disease control does not eliminate valuable animal genetic resources and does not reduce genetic resistance in the global livestock population, targeted policies for the protection of rare and indigenous breeds need to be designed and integrated into disease control strategies.

International level

- The FAO and OIE must give consideration to animal genetic resources and the socio-economic status of livestock keepers in their global pandemic action and contingency plans.
- Discriminatory use of mass culling policies.
- Reconsideration of agricultural policies and practices in order to take account of biological, environmental and

financial factors. NGOs such as Rare Breeds International suggest that “attention has been focused too narrowly on maximising production and profit, and that insufficient attention has been paid to food security, animal health and genetic conservation”. They recommend a critical evaluation of the impact of intensive farming methods, and an assessment of the benefits of extensive systems and local production for local needs.

- More effective regulation of long-distance movement of livestock and the feeding of animal products such as meat-and-bone meal.

National level

- Inclusion of indigenous animal genetic resources in national contingency plans, as well as the national pandemic preparedness plans and global pandemic exercises that have been suggested by the FAO, OIE and WHO.
- Establishment of inventories of rare and threatened breeds in developing countries and registering of the relevant communities or breeders’ associations.
- Keepers of rare and indigenous breeds in developing countries need to be supported organisationally so that in the event of a pandemic, their holdings can be given special consideration and be exempted from culling.

Regional level

- Increased research to develop vaccines that allow a distinction between vaccinated and infected animals.

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- stimulate an interest in the conservation and sustainable use of biological diversity,
- present quickly and clearly concrete actions and experiences,
- explain new concepts and issues relating to the topic of biological diversity,
- encourage and stimulate the mainstreaming of this topic within development cooperation projects and programmes.

We look forward to your suggestions and experiences so as to enable us to improve this series.



Bunaji cattle in Nigeria.

Photo: Wolfgang Bayer

- Awareness-raising and capacity-building of NGOs in developing countries, so that they can play a similar role to that of European NGOs.
- Firmer focus on local production of livestock products with full traceability. Locally adapted breeds, marketed and processed through local networks of abattoirs and markets, reduce the possibilities for major epidemics and provide the basis for a vigorous local economy.

References:

Bishop, S., M. de Jong and D. Gray (2002): Opportunities for incorporating genetic elements into the management of farm animal diseases: Policy issues. Commission on Genetic Resources for Food and Agriculture, Background study paper No 18.

<http://www.dad.fao.org/en/refer/library/reports/bsp18e.pdf>

Gibson, J. (2002): Appendix 13, Role of genetically determined resistance of livestock to diseases in the developing world: Potential impact and researchable issues. In: Perry, P. D., T. F. Randolph, J. J. McDermott, K.R. Sones and P. K. Thornton: Investing in animal health research to alleviate poverty. International Livestock Research Institute, Nairobi, Kenya, 14 pp.

Reodecha, C. and K. Choprakarn (2006): Avian influenza and its impacts on poultry diversity in Thailand. Paper presented at Montpellier, International Workshop on Options and Strategies for the Conservation of Farm Animal Genetic Resources, November 2005. Will be published shortly.

Further in-depth information is also available on the FAO (www.fao.org) and OIE (www.oie.int/eng) websites.

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