

Poultry welfare problems related to avian influenza and other contagious diseases

C. BERG

Dep. of Animal Environment and Health, Swedish University of Agricultural Sciences, PO Box 234, SE-532 23 Skara, Sweden.

E-mail: Lotta.Berg@hnh.sl.se

Summary

In this paper various bird welfare aspects related to avian influenza and other contagious diseases are discussed. Disease outbreaks will, apart from the obvious direct effects on bird health, and thereby their wellbeing, also indirectly influence the welfare of the birds. For example, restrictions on outdoor access for free-range poultry may be imposed, and vaccination or testing schemes may lead to handling or sampling procedures that are stressful to the birds. At the same time, the immediate risk of a disease outbreak may lead to improved biosecurity measures on farms, which may in turn decrease the risk of other diseases entering the premises, thus resulting in improved bird health and welfare.

Keywords: biosecurity, broiler, laying hen, AI, killing

Introduction

Due to the structure of the modern poultry industry, contagious viral and bacterial diseases and also parasites can affect a large number of birds in a very short time. During recent years, outbreaks of highly pathogenic avian influenza (HPAI), which is a zoonosis, have been seen in different parts of the world. Outbreaks of AI, Newcastle disease or other severe diseases can of course have a considerable socio-economic impact, but this paper will focus on the bird welfare aspects of such outbreaks. HPAI will be used as the main example, but most of the reasoning can also be applied to other disease outbreaks.

Health is a part of poultry welfare – the importance of proper biosecurity routines

If highly pathogenic avian influenza virus is introduced to a poultry flock, birds will rapidly show symptoms of disease. The symptoms may vary, but often dullness, swelling of the head, loss of appetite, diarrhoea, cyanosis and rapid death is seen. Mortality rates can approach 100%. Freedom from disease is a well established criterion for good animal welfare. With the symptoms listed, it is evident that highly pathogenic avian influenza is certainly a painful disease, even though death usually follows rapidly. Hence, it can be concluded that biosecurity measures and other measures to prevent poultry from contracting AI are highly relevant to bird welfare. As a secondary effect, management routines which are laid down to improve biosecurity with respect to AI can also be expected to prevent other, maybe less serious but still problematic, diseases from entering the poultry shed. For example, strict biosecurity routines and health certificate systems will increase the awareness and may lead to lower risk of introducing, for example, *Salmonella* species, IBD-virus or red mites into a flock.

Advisory leaflets aimed at both commercial poultry producers and back yard flock keepers are currently available in many countries, and it can be argued that even if the risk of HPAI is often relatively low, the increased awareness caused by the AI scare has

had beneficial effects on poultry welfare by preventing other contagious diseases from spreading.

Negative effects of biosecurity on poultry welfare

The stricter hygiene and biosecurity requirements imposed as a result of the fear of AI can, however, also have a negative impact on some aspects of poultry welfare. The positive animal welfare aspects of outdoor access for laying hens have recently been reviewed by Knierim (2006). Nevertheless, free-range flocks represent a category at greater risk of infection, due to the potential for contact with wild birds (Serratosa *et al.*, 2007). Several governments have requested poultry to be kept indoors during certain seasons, in order to minimize contact with migratory birds. In many cases this has been of limited relevance as the vast majority of commercial layer and broiler flocks in Europe are kept indoors in any case. However, for ecological flocks and other types of free-ranging poultry the situation is different. These birds are used to being able to go outside, and preventing outdoor access can have several negative effects. Firstly, it may lead to stress in flocks that are suddenly faced with a considerably higher stocking density and limited to a much more barren environment than they are used to. Secondly the ventilation, manure removal system and other technical aspects of the henhouse may not be designed for indoor housing only, especially not as temperature rises during the spring. Thus, there is a risk of impaired welfare in these flocks, as the stress-inducing factors mentioned above may lead to behavioural problems, such as feather pecking and cannibalism, but also to health problems if air and litter quality deteriorates.

Vaccination strategies and poultry welfare

The general EU Commission policy on AI vaccination has been that commercial flocks should normally not be vaccinated, as the main strategy is to apply biosecurity to prevent infection and, in case of an outbreak, to exercise stamping out. One of the reasons for this policy is that while the currently available vaccine protects the birds from symptoms – which is beneficial from a poultry welfare point of view - it will not prevent the virus from proliferating, being excreted and spreading to other flocks. However, some member states have been allowed to try different types of vaccination routines, on back-yard and free-range layer flocks and other types of poultry which may be difficult to house indoors, such as ducks and geese. There have also been local vaccination campaigns using vaccination for LPAI (low pathogenic AI). Furthermore, vaccination against AI has been applied in valuable or rare zoo birds (Redrobe, 2007). It appears that emergency vaccination for AI is becoming more acceptable (Capua & Marangon, 2007). From a poultry welfare point of view, successful vaccination can obviously be beneficial; however the injection of a vaccine will involve additional capture, restraint and handling.

Killing for disease control purposes

If HPAI is diagnosed in a poultry flock, the flock will be destroyed immediately. This stamping out policy has been applied not only in the EU member states, but also in other parts of the world. From a European perspective it can be claimed that the policy has been quite successful – outbreaks have most often been isolated and controlled relatively rapidly. Nevertheless, stamping out policies are generally considered controversial by the public (Hueston, 2007). This is because they involve killing large numbers of birds, and sometimes not only birds who have acquired the infection, but also pre-emptive

culling of healthy flocks located within a restricted zone or which have otherwise been in contact with the affected flock.

The methods used for killing poultry for disease control have been discussed and developed during recent years. The OIE has published its terrestrial animal health code (OIE, 2005), where acceptable methods are listed, and also the European Food Safety Authority has dealt with this issue (EFSA, 2005). However, the current EU legislation on slaughter and killing of animals (EC, 1993) does not include any detailed provisions related to which methods can be used for killing for disease control purposes. The Nordic countries have developed a common policy (Berg, 2007), and most countries will have contingency plans covering various alternatives. A recent review of available methods has been published in the *Journal of Animal Welfare Science* (Raj, 2008).

It is generally acknowledged that from a worldwide perspective, animal welfare has often been severely compromised during efforts to control such disease outbreaks, although there are methods available which could have been considered both efficient from a disease control perspective and acceptable from an animal welfare perspective. When deciding on a method for killing birds, several aspects must be taken into account besides animal welfare. These include biosecurity and worker safety, as well as numerous practical considerations (Berg *et al.*, 2007). There is no such thing as the one and only optimal method for depopulation of poultry; it depends on the species, the number of birds, their age, the housing system etc. (Berg, 2007).

Many on-farm killings of broilers or commercial flocks of laying hens (including end-of-lay hens not destined for slaughter) are carried out using whole-house CO₂ gas killing. This method was, for example, used during the Dutch outbreak of AI in 2003 (Gerritzen *et al.*, 2006) and is routinely used for the killing of spent hens in remote areas of Sweden, where transport to slaughter is not an option (Berg & Yngvesson, 2007). The main advantage, both from a biosecurity and a bird welfare point of view, is that the birds do not have to be caught alive, thus minimizing human-bird contact (Gerritzen *et al.*, 2007). Furthermore, the gas is easily available at a relatively low cost (Raj, 2008). However, CO₂ is an aversive gas and concerns have been raised in relation to bird welfare (Raj *et al.*, 2006). Although CO₂ is often considered an acceptable - although not perfect - method, there is an interest in finding less aversive gasses or combinations of gasses. For example, trials are being carried out using nitrogen for killing of various species of poultry.

When whole-house gassing is not applicable or desirable, containerized gassing units are another option. There are several different designs (Gerritzen *et al.*, 2006, Raj *et al.*, 2008). For example, containers can be filled with gas mixtures (usually Argon/CO₂ or CO₂ in air) and birds can be placed there prior to the gas or lowered into a container already filled with gas. Alternatively birds can be brought into different CO₂ concentrations by a conveyor belt. With containerized gassing though, birds will first have to be caught manually inside the house, which is more time and labour consuming than whole-house gassing. It may also be more stressful to the birds, although the killing process itself will normally be more rapid in the container because higher concentrations of gas are achieved more rapidly.

Another method which is under development is the use of different types of foam (Benson *et al.*, 2007).

For ducks and geese, the situation is even more complicated. A variety of methods have been reported, although very little scientific evidence based on on-farm trials is available. Field reports mention methods such as electrocution (Scheibl, 2008), CO₂ in

containers and mechanical stunning followed by neck dislocation, but the animal welfare implications are partly unclear.

Sampling for disease surveillance purposes

Within the EU surveillance programme for avian influenza, approx 127,000 poultry holdings were sampled during 2007. These were generally blood samples and, although some were taken at slaughter, others were taken from live birds. Although blood sampling in commercial poultry on farm is often done by trained and skilled staff, the process of catching the birds and puncturing a vessel in order to withdraw blood will inevitably be related to a certain amount of stress in the birds. As a part of the EU AI surveillance programme, a large number of wild birds are also sampled every year. In the EU member states a total of almost 80,000 wild birds were trapped and submitted to cloacal and/or laryngeal swabbing during 2007. It can be assumed that the welfare these birds was temporarily compromised during the sampling, although there are no indications of any lasting harm.

Concluding remarks

It is obvious that the threat from avian influenza and other contagious diseases has influenced poultry welfare in several ways. Structured contingency planning has become an important task for all governments, thereby reducing the risk of completely non-humane methods being used to kill birds in case of a disease outbreak. Disease in itself is always detrimental, but the awareness of such risks has generally led to improved biosecurity and hence improved bird welfare. Outdoor access is considered beneficial for the welfare of many types of poultry, but future systems for free-ranging flocks must be designed to minimize the contact between poultry and wild birds, rodents and visiting humans, to prevent transmission of contagious diseases.

References

- BENSON, E., MALONE, G.W., ALPHIN, R.L., DAWSON, M.D., POPE, C.R. & VAN WICKLEN, G.L. (2007). Foam-based mass emergency depopulation of floor-reared meat type poultry operations. *Poultry Science* 86:219-224.
- BERG, C. (2007). Emergency killing of poultry during disease outbreaks in the Nordic countries. *Proceedings XIII International Congress in Animal Hygiene, Tartu, Estonia, ISBN 978-9949-426-32-4, pp 1053-1059.*
- BERG, C., YNGVESSON, J. (2007). Avlivning av värphöns i stallet med koldioxid. *Fjäderfå nr 7/07, 18-20.*
- BERG, C., ALGERS, B., ATKINSON, S., DZIECIOLOWSKI, T., BJÖRNEROT, L., (2007). Emergency killing of poultry flocks for disease control purposes. *Svensk Veterinärtidning/Swedish Veterinary Journal, vol 59, 7:11-19.*
- CAPUA, I. & MARANGON, S., (2007). The challenge of controlling notifiable avian influenza by means of vaccination. *Avian Diseases* 51:317-322.
- EC, 1993. COUNCIL DIRECTIVE 93/119/EC of 22 December 1993 on the protection of animals at the time of slaughter or killing.
- EFSA, (2005). Scientific Opinion on Animal Health and Welfare aspects of Avian Influenza (EFSA-Q-2004-075).
- GERRITZEN, M.A., LAMBOOIJ, E., STEGEMAN, J.A. & SPRUIJT, B.M., (2006). Slaughter of poultry during the epidemic of avian influenza in the Netherlands in 2003. *Veterinary Record, 159: 39-42.*

- GERRITZEN, M., LAMBOOIJ, E., REIMERT, H., STEGEMAN, A. & SPRUIJT, B.M., (2007). A note on behaviour of poultry exposed to increasing carbon dioxide concentrations. *Applied Animal Behaviour Science*, 108:179-185.
- HESTERBERG, U., HARRIS, K., MOIR, R., STROUD, D., FABRE, C., KNIGHT-JONES, T., LONDT, B., COOK, A. & BROWN, I., (2008). Annual Report on surveillance for avian influenza in wild birds in the EU during 2007. SANCO/2181/2008 Rev.1
- http://ec.europa.eu/food/animal/diseases/controlmeasures/avian/res_ai_surv_wildbirds_2007_en.pdf
- HESTERBERG, U., YOUNG, N., COOK, A. & BROWN, I., (2008). Annual report on surveillance for avian influenza in poultry in the EU during 2007. SANCO/2179/2008 Rev.1. http://ec.europa.eu/food/animal/diseases/controlmeasures/avian/res_surv_wb_annual_07_en.pdf
- HUESTON, W., (2007). The risk communication challenges of mass animal destruction. *Veterinaria Italiana*, 43(2), 3003-315.
- KNIERIM, U., (2007). Animal welfare aspects of outdoor runs for laying hens. *NJAS* 54:2, 133-145.
- OIE, (2005). *Terrestrial Animal Health Code*, Chapter 7.6
- RAJ, M., (2008). Humane killing of nonhuman animals for disease control purposes. *Journal of Applied Animal Welfare Science*, 11:112-124.
- RAJ, A.M.M., SANDILANDS, V. & SPARKS, N.H., (2006). Review of gaseous methods of killing poultry for disease control purposes. *Veterinary Record*, 159: 229-235.
- RAJ, M., O'CALLAGHAN, M., THOMPSON, K., BECKETT, D., MORRISH, I., LOVE, A., HICKMAN, G. & HOWSON, S., (2008). Large scale killing of poultry species on farm during outbreaks of disease: evaluation and development of a humane containerized gas killing system. *World's Poultry Science Journal*, 64: 227-243.
- REDROBE, S.P., (2007). Avian Influenza H5N1: a review of the current situation and relevance to zoos. *International Zoo Yearbook* 41:96-109.
- SCHEIBEL, P., (2008). Field report from large-scale killing of ducks. *Deutsche tierärztliche Wochenschrift*, 115:4, 158-161.
- SERRATOSA, J., RIBÓ, S., CORREIA, S. & PITTMAN, M., (2007). EFSA scientific risk assessment on animal health and animal welfare aspects of avian influenza (EFSA-Q-2004-075). *Avian Diseases* 51:501-503.