What are the chances of HPAI on my farm?

The question 'what are the chances of HPAI entering my farm' is one that must have crossed every poultryman's mind, so in this article we will try to find the answer.

When we consider the situation it becomes apparent that we must have three prerequisites if HPAI (Highly Pathogenic Avian Influenza) is going to get on to the farm.

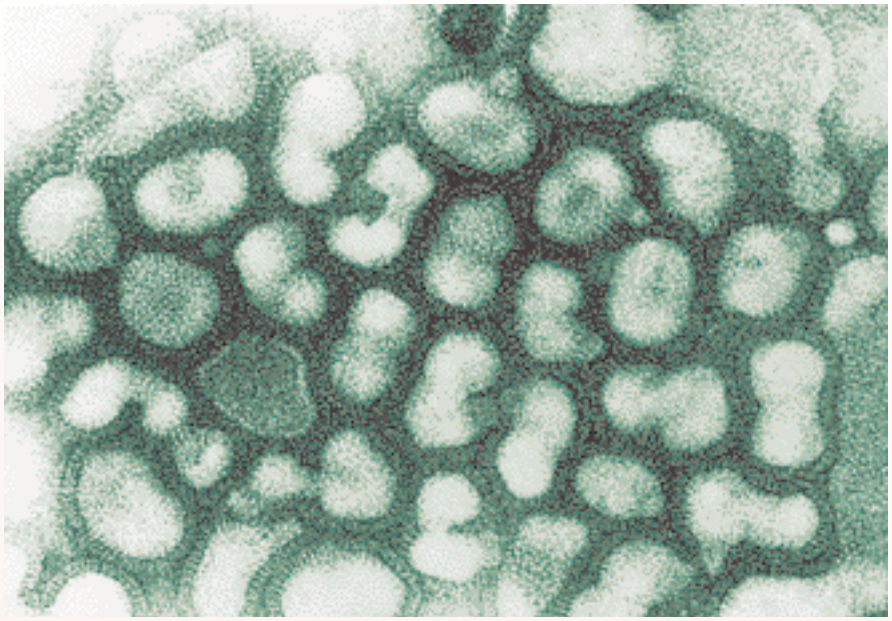
Firstly, there must be a source of the avian influenza virus, secondly it must be transferred to the farm and thirdly it must infect our birds. If these three prerequisites are not present, HPAI can not get into our flocks.

Also, when we evaluate the risk of HPAI getting into poultry we need to understand the pathogenesis of the disease and apply that understanding to the specific set of circumstances present.

HPAI infections, especially in chickens and turkeys, infect the whole bird and all its internal organs and is characterised by an extensive viraemia in which the virus infects the respiratory and digestive tracts, as well as the other internal organs.

This is an important piece of information because it identifies two ways by which the virus can leave an infected bird – via the respiratory tract discharges and via the faeces.

Let us now consider some specific examples:



Avian flu viruses.

Eggs

HPAI viruses have been found on the surface and in the contents of eggs. Research has shown that an egg laid three to four days after infection with HPAI H5N9 virus contained the virus in significant numbers.

When considering eggs as a source of infection we must also remember that the egg trays or setter flats used, as well as the egg trolleys, could be soiled with contaminated faecal material.

The situation is somewhat different with low path (LPAI) strains of the virus in that natural internal infection of eggs with this virus has not been reported.

For example during the 1996-98 Pennsylvanian outbreak of H7N2 LPAI the contents of almost 10,000 eggs were screened and no virus was detected, despite the fact that the virus was regularly isolated from tracheal and cloacal swabs.

LPAI virus can be excreted in large quantities in the faeces so surface contamination of eggs or the soiling of egg trays and trolleys is an issue here.

If we consider egg products, which are often made from downgraded eggs, viral contamination is a realistic probability when the eggs come from an infected flock.

Some industrial standards, such as 54.4°C for seven days for dried egg white would fail to acceptably inactivate the virus.

Table 1. The risk of AI viruses being present in avian commodities from infected birds.

Product	HPAI	LPAI
Eggs	Very high	Negligible
Egg products	Depends on processing	Negligible
Semen	Remote	Remote
Fresh poultry meat	Very high	Remote
Meal containing poultry products	Depends on effectiveness of processing	Negligible
Poultry viscera	Very high	Negligible
Meal containing poultry	Depends on effectiveness of processing	Remote
Feathers and down	Depends on effectiveness of processing	Depends on effectiveness of processing
Commercial manure	Very high	High

Semen

Another product produced by the bird is semen. To date there have been no reports of LPAI or HPAI viruses in the semen of birds.

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Virus	Conditions	Temperature (°C)	Result
		HPAI	
H5N2	Field	Ambient	Infectivity still present after 105 days
H5N2	Field		Infectivity detected after 44 days
H5N2	Expt.	4	Infectivity detectable after 35 days
H5N2	Expt.	25	Infectivity detectable for up to 2 days
		LPAI	
H7N2	Expt.	4	Infectivity detectable for at least 23 days
H7N2	Expt	Ambient	Infectivity detectable at 19 days
H7N2	Expt	37	Infectivity detectable at 14 days

Table 2. Reports on the survival of AI in avian faeces.

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However, as in most infections with HPAI there is a viraemia so it could conceivably be possible for HPAI virus to get into semen.

One must also give due consideration to the fact that the semen could be contaminated, for example, during collection from turkey stags for use in artificial insemination.

Under experimental conditions turkey hens have been infected when artificially contaminated semen was used.

Meat

HPAI virus can be detected in the muscle tissue (meat) of birds during the post infection viraemia stage. This meat is capable of infecting chickens.

Duck meat presents a particular risk since ducks can experience an asymptomatic viraemia when infected by HPAI viruses and such birds may not be detected at meat inspection.

For example, in the current H5N1 outbreak in Asia the H5N1 virus has been detected in duck meat that was exported from Korea.

When it comes to meat, feather and bone meals the risk of these containing HPAI virus is low providing the production plant has been operating at the correct temperatures and that pre- and post process products are kept apart.

Other feather products, not intended for human consumption, present a real risk unless they have been correctly processed using an approved method.

Litter

There is another product from poultry that represents a real risk of containing and, therefore, spreading HPAI virus and that is poultry faeces or manure/litter.

Litter from an infected farm should either be buried under at least 40cm of soil or accumulated in heaps covered by an appropriate plastic sheet.

Such heaps generate heat and providing temperatures of 42-55°C are achieved HPAI virus inactivation should occur. It should be remembered that such temperatures are often not reached in the litter close to the surface of the heap.

Water.

Water is very easily contaminated by wild waterfowl so what about the survivability of AI viruses in water?

Table three shows data that relates to survivability and water temperature – with the viruses surviving longer at lower temperatures.

So, what are the implications for this to the breeder farm?

The good news is the very limited role for semen in the transmission of the flu virus and this is especially relevant for turkey breeders that use a stud farm to service several hen farms.

The real risk that we need to be aware of is the danger of faeces and manure and we need to be sure that these do not enter our flocks by any route. ■

References

- Scientific Report. Animal health and welfare aspects of avian influenza. Annex to EFSA Journal 266 1-21.

Table 3. Survival of avian influenza viruses in water.

Virus (All LPAI)	Water type	Temp (°C)	Dt in days*
H3N6	Lake	0	8.4
H3N8	Distilled	17	32
H4N6	Distilled	17	34.5
H6N2	Distilled	17	29
H10N7	Distilled	17	24
H12N5	Distilled	17	21
H3N8	Distilled	28	11
H4N6	Distilled	28	12.3
H6N2	Distilled	28	16.3
H10N7	Distilled	28	5
H12N5	Distilled	28	17

*Dt is time taken to reduce virus infectivity titre by 90% at the specified temperature.