The costs of IBV infections in broiler breeders

IBV is one of the poultry diseases that is often discussed from a veterinary and management point of view and often considered as a milder, manageable issue. Over the years, companies have experienced different IBV scenarios on breeder farms, from mild to moderate, a disaster, but also false layers. The financial consequences are sometimes rather blurry, but we can make an estimation of what an infection is costing. Using field data as a starting point we modelled a small economical calculation, making it more general and perhaps wider applicable.

This analysis uses a hypothetical flock of 25.000 breeders, with an expected number of 160 HE/h.h. until 60 weeks, the cost price of 0.22 EUR/HE, sales price of 0.25 EUR/HE and sales price of 0.38 EUR/doc. It distinguishes losses that happen due to infection in production and an infection in the rearing period.

Infection in production can happen at different moments and with different levels of severeness. From a management point of view any IBV infection entails a decrease in egg production, increase in rejected eggs and decrease of hatchability. Economics require precise figures and for the purpose of our calculation, we will run 3 different scenarios: a mild or subclinical case, a chronical or moderate infection and a severe infection.

As a **subclinical case** of IBV we estimate the flock to produce 2 eggs less per hen housed, which we calculate as 2 hatching eggs less, and on top of that it has 1% more rejected eggs which reduces the number of hatching eggs with 1% extra. We also estimate that the average hatchability is 1% lower:

	Lower production				1% rejected eggs				Hatchability				
Flock size	Less eggs per h.h. - number	Total eggs less	Price EURO	Loss due to less eggs EUR	No.of rejected eggs per h.h.	Total rejected eggs	Price	Loss due to rejected eggs KM	Expected number of HE	Less chicks	Chick price EURO	Loss due to less chicks EURO	Total losses EURO
A	B	AxB=C	D	CxD=E	F	AxF=G	D	GxD=H	I	Ix?%=J	K	JxK=L	E+H+L
	Subclinical									1%			
	2	50,000	0.25	12,500.00	1.6	40,000	0.25	10,000.00	4,000,000	40,000	0.38	15,200.00	37,700.00
25,000	2 eggs less:			12,500.00	1.6 rejected eggs:			10,000.00	1% lower hatchability:			15,200.00	37,700.00

The calculation is showing that 2 eggs less cost 12.500 euro, 1% of rejects takes away an additional 10.000 euro and 1% of hatchability results in a loss of 15.200 euro. In total, a mild infection that is often not really even noticed as a significant issue has costed 37.700 EURO. Almost a third of the expected profit of 120.000 EUR.

A **moderate infection** would refer to a loss of 5 eggs/h.h., we keep rejects at 1%, but we assume hatchability to go further down to a reduction of 2% :

	Lower production				1% rejected eggs				Hatchability				
Flock size	Less eggs per h.h. - number	Total eggs less	Price EURO	Loss due to less eggs EUR	No.of rejected eggs per h.h.	Total rejected eggs	Price	Loss due to rejected eggs KM	Expected number of HE	Less chicks	Chick price EURO	Loss due to less chicks EURO	Total losses EURO
A	B	AxB=C	D	CxD=E	F	AxF=G	D	GxD=H	I	Ix?%=J	K	JxK=L	E+H+L
	Moderate:									2%			
	5	125,000	0.25	31,250.00	1.6	40,000	0.25	10,000.00	4,000,000	80,000	0.38	30,400.00	71,650.00
25,000	5 eggs less:			31,250.00	1.6 rejected eggs:			10,000.00	2% lower hatchability:			30,400.00	71,650.00

A scenario like this one has took away 71.650,00 EUR from our pocket.

Severe infections are not happening that often, but they also happen, and they can cost, for example, 15 eggs/h.h, rejects remain around 1%, but hatchability goes further down as well and we estimate it at 3% less:

	Lower production				1% rejected eggs				Hatchability				
Flock size	Less eggs per h.h. - number	Total eggs less	Price EURO	Loss due to less eggs EUR	No.of rejected eggs per h.h.	Total rejected eggs	Price	Loss due to rejected eggs KM	Expected number of HE	Less chicks	Chick price EURO	Loss due to less chicks EURO	Total losses EURO
A	B	AxB=C	D	CxD=E	F	AxF=G	D	GxD=H	I	Ix?%=J	K	JxK=L	E+H+L
	What if not so moderate?									3%			
	15	375,000	0.25	93,750.00	1.6	40,000	0.25	10,000.00	4,000,000	120,000	0.38	45,600.00	149,350.00
25,000	20 eggs less:			93,750.00	1.6 rejected eggs:			10,000.00	3% lower hatchability:			45,600.00	149,350.00

A situation like this does not only costs us all of the expected profit of 120.000 EUR, but we have to find a way how to cover a further loss of almost 30.000 EUR. How to survive.

Infections in rearing are generally considered less dangerous, and perhaps even less likely to happen as we vaccinate quite often. However, an early infection that happens during first 2 weeks of the bird's life can have a big influence. Such an early infection can result in so called false layers, birds that look perfectly normal, but IBV has damaged their reproductive tract very early and the damage becomes visible only when they start making eggs and die due to the build up of liquid in their belly. They die just when you made the full investment, finished rearing, and expect to finally start seeing some money in return.

The economic calculation of a case of false layers is somewhat different then the calculation of an infection in production. The losses are generated due to mortality of birds that happens in the period from 26 to 32 weeks of age, so just after we made a full investment in their rearing. Furthermore, we did not only lose those birds, but we lost their egg production as well.

We know from experience that the problem of false layers is not limited to mortality. We see that flocks with an incidence of false layers also have problems with production per hen present and with hatchability, as the egg formation of birds that are slightly infected seems to be impaired as well. However, as we do not have reliable data on this, we did not include it in our financial calculations. .

For the purpose of the calculation, we estimate the value of a pullet at 14,00 EUR, which includes all the costs invested into a bird until the start of the production.

To estimate the loss of potential production, we use a standard of 160 HE/h.h. by week 60, each with a sales price of 0,25 EUR. Nevertheless, until week 60, those birds would also insure a cost of maintenance (mainly feed) which we estimate at approximately 16 euro/bird. This cost of maintenance needs to be deducted from the income the sale of eggs would generate.

Using these inputs, we make a similar calculation as with the production infection and we look into subclinical losses of 1% of birds, moderate loss of 5% birds and high loss of 15% of birds:

	LOSS OF INVESTMENT INTO LOST BIRDS				LOSS OF POTENTIAL PRODUCTION FROM DEAD BIRDS					
	Flock size	No.of dead birds	Value of birds in 28th week (avg). EURO	Direct loss of dead birds EURO	Expected number of eggs from dead birds	Lost eggs - total	Value of lost eggs – price 0,25 EURO	Cost of lost birds maintanence from 28th till 60th week - 16.00 EUR/bird	Value lost through not produced eggs	TOTAL LOSSES EURO
Moderate lossess :	A	A x % =B	C	BxC=D	E	BxE =F	F x 0.25= G	B x 25,00 = H	G-H=I	D+I= J
Subclinical loses:										
1% mortality	25,000	250	14.00	3,500.00	160	40,000	10,000.00	4,000.00	6,000.00	9,500.00
LOSSES				**3,500.00**					**6,000.00**	**9,500.00**
Moderate loses:										
5% mortality	25,000	1,250	14.00	17,500.00	160	200,000	50,000.00	20,000.00	30,000.00	47,500.00
LOSSES				**17,500.00**					**30,000.00**	**47,500.00**
But what if not so moderate?										
15% mortality	**25000**	**3,750**	14.00	52,500.00	**160**	600,000	150,000.00	**60,000.00**	90,000.00	142,500.00
LOSSES				**52,500.00**					**90,000.00**	**142,500.00**

1% of false layers is not a very high figure and if the necropsy is not done very regularly it is often overlooked, but it costs 9.500 Euro. 5% false layers takes away almost 50.000 euro, but 15% or more leads us to a potential bankruptcy.

Hopefully, these figures give a wider understanding of the financial impact of IBV, but we wanted also to consider it in relation to the cost of IBV protection of the flock. For those purposes, we have

calculated the cost of IBV vaccination of a flock of 25.000 breeders, using a standard vaccination program for rearing and production. We have estimated that when you start with a primer, and then vaccinate IB (different strains) at 24, 28, 56, 84 98 and 126 days, and then from 154 days onwards every 6 weeks in production, your vaccine costs for IB (excluding labor) will be approximately 3000 - 5000 euro for a flock of 25.000 breeders, depending on the strains you use, the manufacturer etc.

An adequate protection against false layers is in fact even a lot cheaper, as the birds need to be protected against IB in the first weeks of life, so only the vaccine costs at the start of the flock should be calculated for that. Of course on top of that there is the cost of biosecurity for the starting flock, which is of utmost importance to get the young birds not infected before they build up an adequate immunity.

In the light of the potential financial loses our calculations have revealed, an investment of 3000-5000 euro into protection doesn't seem as a figure any farm should hesitate with, as some operations have learned the hard way.

From a health and management point of view, IBV is indeed not one of the deadly poultry diseases (unless there are false layers involved). But even though the birds usually do not die from it, these calculations reveal that IBV has a potential to kill a business and in our experience it is a very expensive disease in poultry.

Ron Meijerhof

Biljana Tomic