

Short Communication

Sudden exposure to sand bath as a cause of death in Pullets

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Abstract

This case report describes sudden exposure of pullets as a cause of death. Initially, 441 rearing chicken were kept in PTC+ Barneveld poultry farm of the Netherlands for training purpose. The cumulative mortality rate up to the 8th week was 2.49%. However, due to sudden exposure of the pullets to sand bath in the 9th week the mortality rate rises to 12.24%. A postmortem examination conducted on 15 dead pullets has revealed blood coagulation in the heart and hepatization of lungs. This finding is associated with the sudden exposure of the pullets to sand bath which scared the birds and resulted in gathering to one corner of the house. This in turn resulted in shortage of oxygen and high concentration of CO₂ leading to the sudden death. This case report justifies the consequence of a minor problem in management resulting in higher mortality rate. Therefore, serious attention should be given to climatic factors, behavior and reaction of birds to new management practices.

Key words: Blood coagulation; Climate; Hepatization; Management; Mortality; Pullets; Sudden death

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Introduction

Globally, poultry are kept under a wide variety of production systems that range from those with very rudimentary night shelters to those with fully automated, environmentally controlled systems (<http://www.fao.org/ag/againfo/themes/en/poultry/production.html>). Fully automated and environmentally controlled systems are most commonly practiced in the developed world. These systems are also emerging in the developing world as well. Chicken plays the most important role to world poultry production with an increasing proportion in recent years. Over the past 12 years or so, chicken meat has increased its share of world poultry meat production from less than 86 percent to the current estimate of almost 88 percent.

Global chicken meat output increased by 27.5 million tons between 2000 and 2010, equivalent to an average annual growth rate of almost 4% (<http://www.themeatsite.com/articles/1699/global-poultry-trends-2012-poultry-increases-its-share-of-global-meat-production>).

The growth of chicken production is mainly characterized by the shift from extensive to intensive production system. An intensive poultry production is taking the advantage of enhanced yield and increased density of birds per square meter at the expense of improved management, skill and technological use to satisfy the birds' requirements. Climatic factors and level of management in controlled poultry houses could have tripled effects on the yield, safety of the products and welfare of the animals (<http://www.fao.org/docrep/013/a1734e/a1734e00.pdf>; Elijah and Adedapo, 2006). Since birds in intensive housing system are confined at higher densities, the climatic factors in the house such as temperature, humidity, air composition, and wind speed should be controlled. With this regard, house design, litter management and ventilation play crucial roles. Shape of floors are very important especially in rearing stocks as they may be concentrated to a corner and be suffocated due to lowered temperature or scaring from anything which they are not adapted to. This paper is aimed to report a case of sudden death in pullets as a result of suffocation.

Case report

We report a sudden death in pullets (rearing chicken) due to sudden exposure to sand bath. Initially, 441 rearing chicken were kept in PTC+ Barneveld poultry farm of the Netherlands for training purpose. These pullets were taken care by international trainees. Until their 8th week of age, the mortality rate was 2.49%. In the 7th week, perches made of locally available materials were introduced to adapt the pullets with jumping (Fig 1), which later on facilitates jumping to laying nests and help for their welfare. In the 9th week, black boxes of sand bathes were introduced to create natural environment for the birds (Fig 2). The sand baths were introduced into the pullets' house at around 10 AM. When we went to look the birds at 6 PM, 43 pullets were found dead. All the dead birds were found at one corner of the house and piled one over the other. This has brought the mortality rate of the rearing pullets from 2.49% in the whole age of 8 weeks to a total of 12.24% in the 9th week due to a single moment management error (Table 1).



Figure 1: Perches in pullet houses



Figure 1: Boxes containing sand bath

Table 1: Management record of pullets

Breed name: Lowman Brown Classic
Hatchery name and date of hatching: Verbeek Hatchery Holland, 3/09/2012
Housing system: Full litter
Initial number of birds: 441

Age (Wks)	No. of birds present	Weekly Mortality (%)	Body wt (gr)	Vaccination
1	438	3(0.68)	67	(Mareks, IB) ¹ , NCD
2	437	1 (0.23)	124	IB 4-91
3	436	1 (0.23)	178	
4	432	4 (0.92)	236	
5	432	0	318	
6	432	0	408	NCD clone 30
7	432	0	530	
8	430	2 (0.46)	653	
9	387	43 (10)	764	

¹ Vaccination for Mareks and IB-primer were given at the hatchery

Case Identification

From the history and clinical finding the cause of death was suspected that the birds were scared of the new environment created due to the black boxes that contained sand. This was proved as all the dead pullets were found at one corner piled one over another. When all the pullets gathered at one corner, the once at the bottom were died from oxygen shortage and increased CO₂ concentration. When there is oxygen shortage in the environment, the concentration of CO₂ goes high which leads to suffocation and death resulting in a buildup of carbon dioxide in the bloodstream which had to be exhaled under normal circumstances.

Postmortem findings

Postmortem examination was conducted in 15 of the dead pullets. The main findings were blood coagulation in the heart and hepatization of the lung. These have confirmed the cause of death is suffocation as a result of high CO₂ and low O₂ concentration (Fig 3 and 4). Birds inhale O₂, and exhale CO₂ and H₂O. True 'lack of oxygen' does not occur in poultry houses because animals can inhale sufficient

oxygen even if the oxygen levels in the air are substantially lower than normal. However, 'lack of oxygen' in practice is, a combination of high CO₂ concentration, high temperatures and high humidity (http://www.worldpoultry.net/PageFiles/31420/001_boerderij-download-WP5977D01.pdf). Since CO₂ is a heavy gas, as

compared to nitrogen and O₂ which accounts for about 79% and 20% respectively, its concentration at bird level can be much higher than at 2 meters height.

The high CO₂ and low O₂ concentration in the environment result in shortage of oxygen supply to the heart muscles which in turn results in the death of the heart muscles and heart attack. Due to the sudden heart attack, the heart stops pumping blood and there will be blood coagulation in the heart (Fig 3). Red, solidified and firm appearance of the lungs was observed during postmortem examination (Fig 4). This could be associated with the excessive production of red blood cells to compensate the shortage of oxygen. These excessively produced red blood cells accumulate in the lung resulting in hepatization.

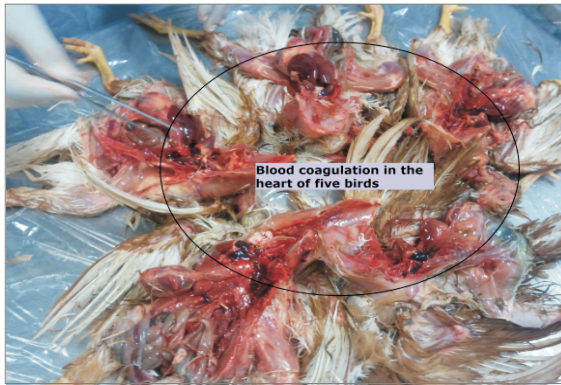


Figure 1: Blood coagulation in the heart



Figure 1: Hepatization of lung

Discussion

These deaths were caused by inappropriate management practices. In one hand, the new boxes of sand bathes were suddenly introduced and the attendants left the birds without observing their behavior. A wise farm technician should decide based on the behavior of the birds and their reactions towards each step of management than solely relying on literatures and standards. On the other hand, the corners were not having card boards which could have protected the birds from being gathered at the corner over each other. The more circular the corners, the lesser is the risk of suffocation as the birds will have higher chances of escaping from being trapped at the corners. Therefore, such minor management mistakes in poultry production can cause significant mortality which ultimately leads to higher economic losses. Hence, serious attention should be given to climatic factors, behavior and reaction of birds to new management practices.

References

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