

Poultry coccidiosis : Evaluation of management systems on the incidence of coccidia infection in Nigeria

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RÉSUMÉ

Coccidiose aviaire : Evaluation du mode d'élevage sur l'incidence de cette infection au Nigéria

Les conditions d'élevage les plus répandues dans les poulaillers à litière épaisse fournissent un milieu favorable à la prolifération des coccidies puisque l'incidence des coccidies est plus importante chez les volailles entretenues sur litière épaisse que chez celles élevées en batterie. Le système d'élevage en batterie nécessite un investissement plus grand que celui sur litière épaisse, mais il empêche l'ingestion constante des oocystes et les infections répétées chez les volailles.

Mots clés : Coccidiose — Mode d'élevage — Volailles — Nigéria.

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Summary. — The prevailing condition in deep litter pens provides suitable environment for the proliferation of coccidia parasites hence the higher incidence of coccidia parasites in birds kept in deep litter than in similar birds kept on battery cages. Battery cage system though more capital intensive than deep litter system of management prevents constant ingestion of oocysts and repeated infection in birds while deep litter system exposes birds to higher parasitic infestation.

Key words : Coccidiosis — Poultry management — Poultry — Nigeria.

INTRODUCTION

The type of poultry managements practised by most poultry farmers in this country as well as the indiscriminate use of various marketed coccidiostats have not only enhanced the rate of mortality among young susceptible chicks but also influenced the incidence of various species of *Eimeria* (2). In most of our urban cities today abound thousands of poultry houses and farms. Most of the elite poultry farmers in the cities who could not afford large

acre of land to erect poultry farms have turned part of their dwelling places such as boy's quarters, motor garages as well as part of kitchen into poultry houses. They keep most of their birds on the deep litter since they find this system cheap to operate. It is the only few rich backyard poultry farmers as well as the large scale commercial poultry enterprises that operate battery cage system. A battery cage house that will accommodate about two thousand chickens would cost ten thousand naira (₦10,000) with the present inflation in the

country now. Deep litter of the same capacity will cost about three thousand Naira. Though deep litter is very economical to maintain there are certain aspects of it that are not desirable if profitability is envisaged. This investigation was conducted to evaluate among other things the influence of management systems on the preponderance of coccidia parasites and the relationship to coccidia infection.

MATERIALS AND METHODS

The litter from ten brooder houses, containing Colonia single tier unit battery cages accommodating 1,200 H & N breed of day-old chicks and other deep litter houses accommodating 2,300 chicks were examined. The brooder houses varied in sizes between 10 ft × 25 ft and 15 ft × 30 ft. Fourty six, 4-litre plastic drinkers and feeders were arranged inside the deep litter houses in the ratio of one drinker to 50 chicks. The litter used consists of wood shavings and allowed to accumulate for a period not less than 8 weeks which is typical of what obtains on the field. The battery houses contain twenty-four Colonia single tier units each accommodating 50 chicks. Water pans are kept underneath each cage to collect the faecal droppings of the birds.

A total number of 200 faecal and litter samples were collected at random from the deep litter houses and battery cages, weekly from day-old till 14 weeks of age. Oocysts were examined and counted employing modified McMaster technique (3). The average oocyst counts under each system were recorded. Eggs and oocysts of parasites encountered were also identified based on the oocyst morphology and sizes.

RESULTS

A total of 200 samples of faecal droppings were examined from pullets of ages varying from one day old to 14 weeks kept on deep litter and battery cages respectively. 184 (92 p. 100) out of 200 litter samples from deep litter were positive for infection while 3.57 p. 100 were positive from battery cage.

Mixed infection with two or more types of *Eimeria* oocysts are predominant. The species and percentage of *Eimeria* recognised from lit-

ter samples of the two systems are recorded in table I. The mean number of oocysts per gram litter from both deep litter and battery cage houses at day-old to 14 weeks are given in table II. The highest number of oocysts occurred in brooder houses that contain more deep litter than battery cages. Although, there are variations in the oocyst numbers that occurred at different ages. Table II shows that oocyst increases up to 4 weeks and remain so up till 6th week after which there is an appreciable decrease to a low level at 8 weeks upwards. In battery cage, there was apparently little or no oocysts production recorded.

TABLE I—Species and percentage occurrence of *Eimeria* in pullet chicks

Species	Percentage Incidence Deep litter	Percentage Incidence Battery cage
1. <i>Eimeria acervulina</i>	43.10	2.50
2. <i>E. tenella</i>	27.00	1.00
3. <i>E. maxima</i>	13.50	—
4. <i>E. necatrix</i>	9.00	—
5. <i>E. brunetti</i>	4.10	—
6. <i>E. mitis</i>	2.30	—
7. <i>E. mivati</i>	1.00	—

Oocyst of *Eimeria acervulina* and *E. tenella* are predominant in most of the positive samples. But few numbers of *E. maxima* and *E. necatrix* were recognised. The helminth ova recognised included those of *Heterakis gallinae* and *Ascaridia galli*.

DISCUSSION

There is no doubt that systems of poultry management have tremendous influence on the preponderance of oocyst population as well as the incidence of coccidia infection. As revealed in this survey, the incidence of coccidiosis in battery cage is extremely low (3.5 p. 100) when compared to that of deep litter (92 p. 100). The deep litter, in no doubt, provides the suitable environment for the proliferation of the oocysts (1). Since the birds are always kept in contact with the deep litter in which the sporulated oocysts abound, there is constant ingestion of the oocysts and repeated infec-

TABLE II—Incidence of *Coccidia* oocysts in deep litter and battery cage houses

	Mean Number of Oocysts/gm litter							
	1-2	Age of Pullets (weeks)					11-12	
		3-4	5-6	7-8	9-10			
Deep litter House	200	1200	1950	670	350	500	410	<i>Eimeria acervulina</i> <i>E. tenella</i> <i>E. maxima</i> <i>Ascariidia galli</i> <i>Heterakis gallinae</i> <i>Capillaria columbiae</i>
Battery cage House	-	250	100	20	25	20	85	<i>Eimeria acervulina</i> <i>E. tenella</i> <i>E. necatrix</i> <i>Ascariidia galli</i>

tion. This repeated ingestion of viable oocysts above the threshold level may probably be responsible for coccidia infection outbreaks that characterised birds kept on deep litter. The low incidence of coccidiosis amongst the chicks kept on battery cage may be attributed to less contact with the litter or faecal droppings or less build up of oocysts for any re-infection as in deep litter. Moreover, the birds are not over-crowded hence the chances of transmission of viable oocysts is greatly minimised or prevented, as commonly encountered in deep litter since the system provides a suitable environment for the build up and survival of oocysts. Deep litter as a matter of fact negates the principle of hygiene because large number of birds are overcrowded and maintained in close contact with accumulated droppings. In this survey, out of the three hundred chicks maintained on deep litter, one hundred and ninety birds were lost at six weeks of age as a result of coccidiosis. This gives us about 64 p. 100 mortality within 6 days of infection. No single mortality was recorded in those chicks kept on battery cage. Since the chicks maintained on deep litter are widely exposed to constant ingestion of oocysts, there is bound to be an outbreak leading to high mortality. In most deep litter houses, the standard of hygiene and sanitation is always poor. The litters are allowed to accumulate without being turned or removed, some of the water drinkers may be leaking making the whole house wet and humid. This situation will enhance sporulation and proliferation of coccidia oocysts. The battery cages are so

constructed in such a way that birds are kept far away from the faecal droppings that may accumulate, hence the chances of ingesting oocysts is rare to nil. The results in table II revealed that oocyst numbers especially in deep litter house rise with time from very low number at 1-2 weeks to a peak at 4 weeks after which the numbers start to fall. In battery cage, there is no appreciable increase in oocysts number since the system does not permit proliferation of oocysts as in deep litter.

Few of the reasons why most poultry farmers opt for deep litter include the high economy in the management and because floor litter provides dietary factors essential for growth of chickens and the hatchability of eggs (4, 5). Although, the cost of maintaining battery cage system is expensive but the advantages in terms of profitability and health of the birds really outscore the cost. Erecting a battery cage is a fixed asset which in due course will pay off itself. The standard of hygiene and sanitation is by far higher than what obtains in deep litter. There is also greater economic returns in birds maintained on battery cage than deep litter birds where there is greater percentage of egg cracks. Battery cage system affords the farmer the opportunity to monitor the egg production as well as health progress of individual birds. There is no doubt that incidence of coccidia infection in birds maintained on battery cages is low compared to deep litter system. Much gains are derived from battery cage system more than deep litter system which is the ultimate desire of every poultry enterprises.

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Resumen. — Las condiciones de cría más utilizadas en los gallineros con cama de paja espesa facilitan la proliferación de las coccidias ya que es más importante la incidencia de las coccidias en las aves de corral mantenidas sobre cama de paja espesa que en las criadas en batería. El sistema de cría en batería necesita fondos más importantes que el sobre cama de paja espesa pero impide la ingestión constante de los oocistos y las infecciones repetidas en las aves de corral.

Palabras claves : Coccidiosis — Tipo de cría — Aves de corral — Nigeria.

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