

A perspective on respiratory diseases in intensively managed poultry in Nigeria.

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JOSHUA (R. A.). Les maladies respiratoires chez les volailles en élevage intensif au Nigeria. *Rev. Elev. Méd. vét. Pays trop.*, 1987, 40 (1) : 33-37.

Une étude de l'épizootologie des maladies respiratoires chez les volailles d'élevages intensifs a été menée dans quatre zones écologiques du Nigeria. La maladie respiratoire chronique sévissait dans toutes les zones écologiques étudiées. L'étiologie des maladies respiratoires est complexe par son interaction avec l'hôte qui provoque la maladie clinique ou la mort. Le taux de mortalité moyen était de $14,9 \pm 6,7$ dans les bandes infectées. L'infection était généralement plus sévère chez les jeunes que chez les adultes. On a observé une application inadéquate de la chimiothérapie. Différentes erreurs de gestion ont eu tendance à entraver l'action rapide du traitement et les mesures de prophylaxie. *Mots clés* : Volaille - Maladie respiratoire chronique - Elevage intensif - Nigeria.

INTRODUCTION

Intensive systems of husbandry, in which large number of domestic fowls are kept in close contact, sometimes create a favourable environment for the spread of respiratory diseases. The most widespread of these diseases is variously termed air-sac disease or chronic respiratory disease (6, 8).

Air-sac disease is a very common and rather serious infection of poultry in Nigeria. The disease is not a specific infection but a disease associated with many pathogenic organisms (1). So common is air-sacculitis that it is frequently considered normal by some poultry service-men (2). Unsuitable aeration, over-crowding and nutritional deficiencies, especially vitamin A deficiency, have all been incriminated in the pathogenesis of air-sac disease (9, 10). The disease can occur in birds of any age, but occurs commonly in broilers between the fourth and eighth week, and in pullets between the fifth and seventh month of life. The principal pathological changes appear in the respiratory tract.

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Improved management standards and adequately balanced ration could play an important role in the control of air-sac disease. The poultry industry in Nigeria is still confronted with a serious disease condition that is of considerable economic importance to the nation (8). Severe and complicated infections of the respiratory system, including air-sacculitis are widespread in the poultry industry. In none of these instances has a basic and fundamental approach been made towards elucidating the epizootiology of the respiratory condition involving the air-sacs of poultry. The aim of the present investigation was to examine the extent of involvement of air-sac disease in intensively raised poultry in Nigeria. A good understanding of the epizootiology of the disease could lead to comprehensive control measures.

MATERIALS AND METHODS

These investigations were made during a two-year customer-service programme supplied by a big hatchery to poultry and feed customers. Visits were made to poultry farms and the birds were observed clinically in the pens. In some cases, the history supplied by the farmers were relied upon in assessing the extent of mortalities. Ages of birds were estimated by the purchase receipts supplied to the farmers by the hatchery. Most observations were made on farms that purchased birds from the big hatchery, as well as some big poultry farmers that were likely to be potential customers to the big hatchery that used the author as a retainer.

Post mortem examination

Post mortem examination were carried out on freshly dead birds that died within twenty-four hours. In some cases, some moribund birds were killed by cervical dislocation for post mortem examination. No attempts at cultural isolation of causative agents were made on all the birds, due to lack of laboratory facilities on the field. Diagnosis of respiratory infection was therefore based on past experience, clinical signs and gross pathological changes.

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Poultry farms

The poultry farms were located in four different ecological zones in Nigeria (Table II). The flock size in the farms ranged from 200 to 5,000 birds.

Most farms kept broilers and cockerels in the same farm, but few reared broilers and pullets in the same pen. Visits were made to poultry farms within twenty-four hours of receipt of reports of ailments to the birds. After a diagnosis of infection had been made, based on clinical signs and post mortem lesions, therapy was usually instituted. Follow-up visits were generally made to such farms within two weeks of treatment. All poultry mortalities observed within this period were termed death due to the infection.

Assessment of virulence

Two approaches were adopted in estimating the severity of the infection in poultry flocks. The group percentage mortality shows the percentage death in each infected age group. The total percentage mortality shows the age proportional mortality of all deaths recorded.

RESULTS

Types of respiratory diseases

The disease was found in broilers, pullets and cockerels. Nearly all breeds of poultry available on the field e.g. Babcock, Harco Hyline, Cathline, Cobb, Hubbard, Rosella and local fowls were susceptible to the disease. It was also observed in all locations where birds are reared intensively (Table I).

There was no age barrier to the clinical manifestation of the disease. Mortalities were however highest in birds aged from 4 to 6 weeks (Table III). Generally, clinical signs of respiratory depression were observed in birds suffering from at least ten diseases (Table I).

Clinical presentation of air-sac disease

Young birds suffering from air-sac disease generally had rough plumage and the clinical signs were more prominent at night than at day time. Sneezing and rattling were most prominent. A gentle squizz of the nostrils resulted in the expulsion of catarhal fluid from the nostril. In broiler flocks, mortalities were generally higher in starters, while the growth rate in subclinical infection was poor.

TABLE I Infections with clinical signs of respiratory depression in intensively managed birds.

| | Diseases | Number of cases | Percentage of total cases |
|----|--|-----------------|---------------------------|
| 1 | Cloudy air-sac (Air-sac disease) | 42 | 32.06 |
| 2 | Chronic respiratory disease (CRD) | 27 | 20.61 |
| 3 | Collisepiticaemia | 19 | 14.50 |
| 4 | Infectious coryza | 12 | 9.16 |
| 5 | Aspergillosis | 7 | 5.34 |
| 6 | Lung tumours | 7 | 5.34 |
| 7 | Newcastle disease | 7 | 5.34 |
| 8 | Fowl cholera | 5 | 3.82 |
| 9 | Metabolic disease (Feeding rancid oil) | 3 | 2.30 |
| 10 | Syngamiasis | 2 | 1.52 |

TABLE II Prevalence of respiratory diseases in different ecological zones in Nigeria.

| Ecological zones | Number of cases | Age of birds (weeks) | Morbidity per zone | Mortality per zone | Mean percentage mortality |
|------------------|-----------------|----------------------|--------------------|--------------------|---------------------------|
| Savanna | 3 | 3-5 | 4,500 | 658 | 14.62 ± 3.6 |
| Riverine | 21 | 3-19 | 37,996 | 3,550 | 9.04 ± 4.5 |
| Forest | 20 | 3-14 | 20,968 | 1,676 | 13.79 ± 6.4 |
| Derived Savanna | 87 | 2-18 | 63,480 | 9,399 | 17.79 ± 7.6 |

TABLE III Effect of age of birds on prevalence and severity of infection.

| Age of birds (weeks) | Number affected | Total percentage morbidity | Total deaths | Group percentage Mortality | Total percentage Mortality |
|----------------------|-----------------|----------------------------|--------------|----------------------------|----------------------------|
| 0-2 | 1 292 | 0.23 | 418 | 32.4 | 2.74 |
| 3 | 7 210 | 5.68 | 1 172 | 16.3 | 7.67 |
| 4 | 17 068 | 13.44 | 2 483 | 14.5 | 16.24 |
| 5 | 22 473 | 17.70 | 3 435 | 15.3 | 22.47 |
| 6 | 30 320 | 24.67 | 3 848 | 12.7 | 25.18 |
| 7 | 15 039 | 11.85 | 2 001 | 13.3 | 13.09 |
| 8 | 12 516 | 9.86 | 1 010 | 8.1 | 6.61 |
| 9 | 6 214 | 4.89 | 526 | 8.5 | 3.44 |
| 10 | 4 126 | 3.25 | 103 | 2.5 | 0.67 |
| 11 | 3 780 | 2.98 | 66 | 1.75 | 0.43 |
| 12 | 3 835 | 3.02 | 109 | 2.8 | 0.71 |
| 13* | 3 071 | 2.42 | 102 | 3.3 | 0.67 |

The major symptoms of respiratory disease are respiratory distress, sneezing, rattling and sniffing which spreads slowly through the flock. The appetite was depressed, while egg production was reduced by 19 to 30 p.100 in layers. Hatchability was depressed in egg produced by affected breeders.

The poor management system adopted by many farmers predisposed to complications, resulting in chronic respiratory disease complex, air-sac disease. The cases seen in government farm in savanna zone were mild when compared with similar cases in some privately owned farms in the forest and riverine zones.

In broilers, the starters were less active and droopy while in finishers, the kneel bone was very prominent, and the pectoral muscles were flabby. There was loss of appetite and lack of commensurate weight gain. Also there was difficult breathing characterised by tracheal rales, coughing and nasal discharge.

The disease was very severe in over-crowded birds. Some poultry farmers associated the clinical symptoms of this disease with feeding of palm kernel cake. No valid scientific basis for this incrimination could be established. The criteria for the efficacy of therapy were clinical recovery, reduction of severity of symptoms, weight gain or increased egg production.

Gross pathological observations

In many cases the air-sacs became very fibrotic, while cheesy deposits were found in the air-sacs. The clavicular and the thoracic air-sacs were mostly affected. Occasionally, the abdominal air-sacs were involved. In poultry that has been subjected to series of antibiotic treatment, fibrosis of the air-sac was a common feature. A higher incidence was recorded during the dry warm months than the wet cool months.

There was generally increased abdominal fluid which was putric but fibrinous in some chronic cases. In adult birds, the residual air-sac lesions were seen as focal whitish semi-opaque nodules which were characterized by scars containing lymphoid nodules. Salpingitis was common in some layers. The post mortem picture in chicks was quite different. The air-sacs were cloudy, there were also some kerato-conjunctivitis.

Curative and prophylactic measures

Many poultry farmers adopted the practice of feeding antibiotics or chemotherapeutic drugs to poultry at subtherapeutic dose rates over a long period. This practice posed the problem of drug resistance. Break-through infections in such flocks were generally difficult to arrest.

A wide variety of pharmaceutical products is available in the Nigerian market for the treatment and prevention of air-sac disease. However, control by drugs alone did not prove completely effective. Continual infection in premises, where the disease had occurred before, was a general phenomenon.

In breeder-birds medication of infected birds in water mitigated the clinical manifestation of the disease but it neither eliminated egg transmission nor sterilised the birds. Offsprings of such birds that were treated at two weeks of age did not manifest clinical signs, but those not treated showed signs as from about three weeks of age.

Medication was most effective by inoculation, less effective by addition to water and least effective in the feed. In the case of chronic respiratory disease complex, a thorough amendment of the husbandry defects coupled with adequate drug administration produced a palliative cure. Overcrowding, poor ventilation keeping birds of varying ages in the same pen and poor feeding were generally observed in severely affected flocks.

DISCUSSION

The present investigation has shown that both air-sac disease and chronic respiratory disease are common in intensively kept poultry in Nigeria. Previous studies on chronic respiratory disease complex of poultry flocks, under field conditions, showed that the disease might be precipitated or aggravated by a number of aetiological agents, as well as poor husbandry practices (9, 11).

Since air-sac disease presented non-specific clinical symptoms, it is essential to have well-equipped diagnostic laboratories within the reach of field Veterinary officers. The brooding of a great number of chickens on the same premises with adult birds seemed to pose a lot of problems. Control of air-sac disease is important for the poultry industry. Table I shows that nine other diseases that produced lesions in other organs also presented the thickening of the air-sacs. This finding confirms earlier observations (1, 9).

The present investigation showed that birds aged from 2 to 7 weeks were at the greatest risk of air-sac disease. The highest mortality was among birds aged 6 weeks. Studies by WHITE (12) showed that the strongest level of immunity in birds is developed after six weeks. Between 0 and 6 weeks of age, the physiological adaptation of birds to life outside shell is great. The stress of adaptation to its new environment might have added to the severity of disease in the young bird (5). In addition, since the birds were not

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monitored from day old till adult life, it was not possible to say if the adult birds had some preimmunity to the infection which have accounted for the low mortality recorded in the adult birds. The chronic nature of air-sac disease, the inconsistent nature of the clinical response and the variable nature of the post mortem lesions made it difficult to evaluate the resistance of naturally infected birds to a second infection. Since the mean mortality recorded in the present investigation varies from one place to the other, it is possible that husbandry practice adopted is a determinant of the virulence of the pathogens (5, 7).

The types of respiratory diseases observed during the period of the present investigation are shown in Table I. These figures should not be taken as absolute but should serve only as a guide, since the diagnoses were based on clinical signs and gross pathological signs. Air-sac disease was found to present problems of accurate diagnosis, as well as difficulty of isolation of all agents involved in the disease at a specific time. Also, the high incidence, as well as the severity of the infection in birds aged six to seven weeks, might have

been caused by vaccination since birds are routinely vaccinated against Newcastle disease at that age. This investigation has also shown that the problem of air-sac disease in poultry is poorly understood and deserves further investigation. Investigations of the outbreak of air-sac disease did not disclose the origin of the infection. Finally, the provision of modestly equipped diagnostic laboratories might help in identifying the causative agents and help in the control of air-sac disease and chronic respiratory disease of birds in Nigeria.

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JOSHUA (R. A.). A perspective on respiratory diseases in intensively managed poultry in Nigeria. *Rev. Elev. Méd. vét. Pays trop.*, 1987, **40** (1) : 33-37.

A study of the epizootiology of respiratory diseases in intensively reared poultry was carried out in four ecological zones in Nigeria. Air-sac disease was observed to be rampant in all ecological zones investigated. The factors causing respiratory diseases are complex in terms of their interactions with the host to cause clinical disease or death. Mean mortality rate was as high as 14.9 ± 6.7 in infected flocks. The infection was generally more severe in young birds than adults. An indiscriminate application of chemotherapeutic agents was observed. A variety of husbandry defects tended to complicate prompt treatment and control measures. *Key words* : Poultry - Air-sac disease - Intensive rearing - Nigeria.

JOSHUA (R. A.). Las enfermedades respiratorias en aves de corral criadas de modo intensivo en Nigeria. *Rev. Elev. Méd. vét. Pays trop.*, 1987, **40** (1) : 33-37.

Se efectuó un estudio sobre la epizootología de las enfermedades respiratorias en las aves de corral criadas de modo intensivo en cuatro zonas ecológicas del Nigeria. Se encontraba la enfermedad crónica respiratoria en todas las zonas ecológicas estudiadas. La etiología de las enfermedades respiratorias es compleja en relación con las interacciones con el huésped que causa la enfermedad clínica o la muerte. Era de $14,9 \pm 6,7$ el término medio de mortalidad en las crías infectadas. Generalmente la infección era más importante en los jóvenes que en los adultos. Se observó una aplicación inadecuada de la quimioterapia. Diferentes errores de gestión impidieron la acción rápida del tratamiento y de las medidas de profilaxis. *Palabras claves* : Aves de corral - Enfermedad crónica respiratoria - Cria intensiva - Nigeria.

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