

MORTALITY PATTERS IN COMMERCIAL POULTRY
IN ZARIA, MIGERIA.

BY

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MASTER OF SCIENCE

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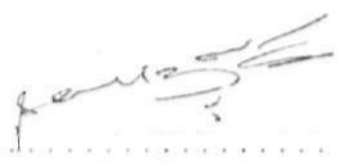
CERTIFICATION

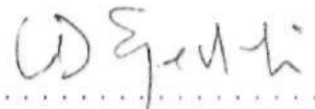
This thesis titled "Mortality Pattern in Commercial Poultry in Zaria" by HASAN SHEHU USMAN meets the regulations governing the award of the degree Master of Science of Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation.

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Nutritional and management conditions were significantly correlated with viral diseases and with fungal and parasitic conditions. There was also a significant seasonal variation in occurrences of diseases with the dry season being generally more important. Mycoplasmosis, egg peritonitis and asphyxiations occurred significantly more in the dry season. Most viral diseases, especially respiratory diseases, were seen more in the dry season. Coccidiosis was significantly important in the wet season. Fungal and parasitic diseases also occurred more in the wet season.

Vaccination failures for NCD and IBD were significant.

CHAPTER ONE

INTRODUCTION

Modern poultry production is the wisest way out of the current protein shortage in Nigeria, and other developing nations (Lockrill, 1971). This is because poultry is versatile and can be kept in most places. It has a greater turn over rate and at the backyard level can be maintained by most people. It is well known that poultry provides the cheapest source of animal protein in developed nations.

Other livestock sectors in Nigeria are poorly developed, more capital intensive, require more land and are restricted to particular geographical or ecological zones by natural or man made barriers. The large investments made already in the poultry industry justify further development of the industry.

Diseases is however one of the most important factors threatening the progress that may be made towards achieving this goal of self sufficiency in poultry production. Diseases such as Newcastle disease (ND), Infectious Bursal disease (IBD), chronic respiratory disease (CRD), fowl typhoid (FT), pullorum (PD) and others have been well documented in Nigeria (Onuskes, 1975; Osayemi, 1976; Ugochukwu, 1982; Etukudo, 1982). Recently avian influenza was reported for the first time (Sahmudhullah et al., 1987).

KASHIM IBRAHIM (1988)

condition (Kwatra and Chaudhry, 1976; Truscott and Aishekiy, 1977).

Mortality is sudden in birds 14 to 75 days old. A few birds showing mucoid diarrhea, cyanosis, lethargy and ruffled feathers may be seen.

The principal lesions are ballooning of the intestines, pseudomembrane formation and necrosis of the intestinal wall (Rahamathullah et al., 1987).

2.1.1.7. Pseudomonas infections

Pseudomonas aeruginosa and at times *P. pyocynae* are associated with catarrhal to haemorrhagic enteritis in fowls. They also cause a high mortality when they complicate CRD (Devries et al., 1975; Gross, 1984). The disease is transmitted by ingestion of or contact with contaminated materials. High fever, dyspnea, head and facial edema are the usual signs. Fibrinous airsacculitis, perihepatitis with visceral hemorrhages and necrosis are usual lesions.

2.1.1.8. Avian Spirochaetosis

This is an acute disease of poultry caused by *Escherichia anserina* and characterised by severe anemia. The disease is world wide in distribution but is found mainly in warm wet climates especially among range chicken.

The disease is transmitted by a tick vector (*Argas persicus*). Anemia, somnolence, occasional paralysis are the

tracheal mucosa with hyperplastic and vacuolated epithelial cells may be seen under the microscope (Siller,1981; Mallinson et al.,1984).

2.1.2.3. Newcastle Disease (ND)

This is a highly contagious disease of chickens, turkeys and some wild birds caused by a virus of the family paramyxoviridae (Beard and Hanson,1984).

Five forms of the disease are recognised ranging from asymptomatic disease to a highly fatal infection; these are:-

(a) Doyle's form which is an acute disease with mortality approaching 100%. Hemorrhagic enteritis is the principal lesion.

(b) Beache's form; an acute pneumoencephalitis characterized by respiratory and nervous disorders.

(c) Beudette's form; is a pneumoencephalitis that is inapparent in older birds but severe in young birds causing heavy mortality.

(d) Hitchner's form; a mild infection that is asymptomatic. The hitchner strains of the virus are used for vaccine production.

(e) There is an asymptomatic enteric infection that is only detected through viral isolation.

Signs and lesions of ND depend on viral strain, route of infection, dose of the virus and immune status of the birds. Transmission is by aerosol and the incubation period

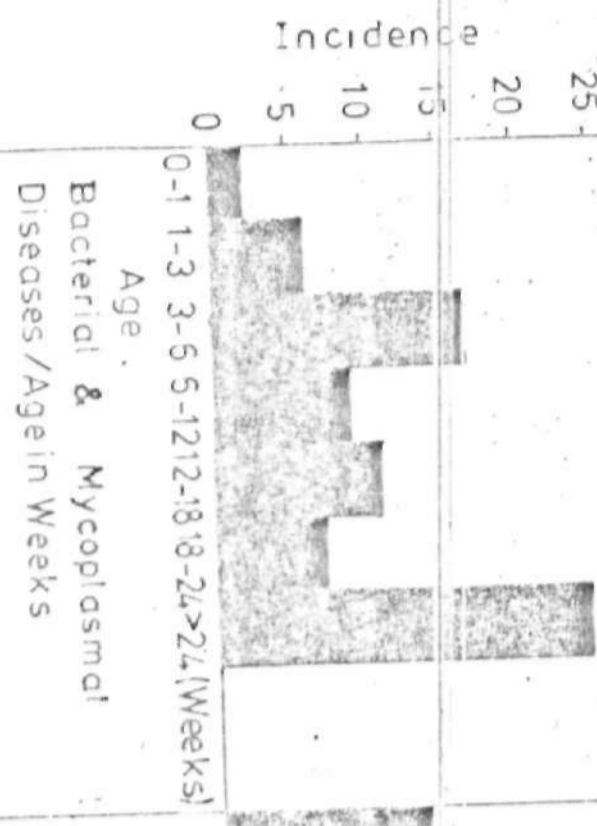
and Rohlf,1981). This analysis tested the effects of seasons, farms (management) and disease on mortality.

(c) A Z - test was done (Sokal and Rohlf,1981) using a microcomputer program to evaluate the effects of wet and dry seasons on the incidence of diseases.

DISEASE INCIDENCES BY AGE
IN WEEKS AND BY MONTHS

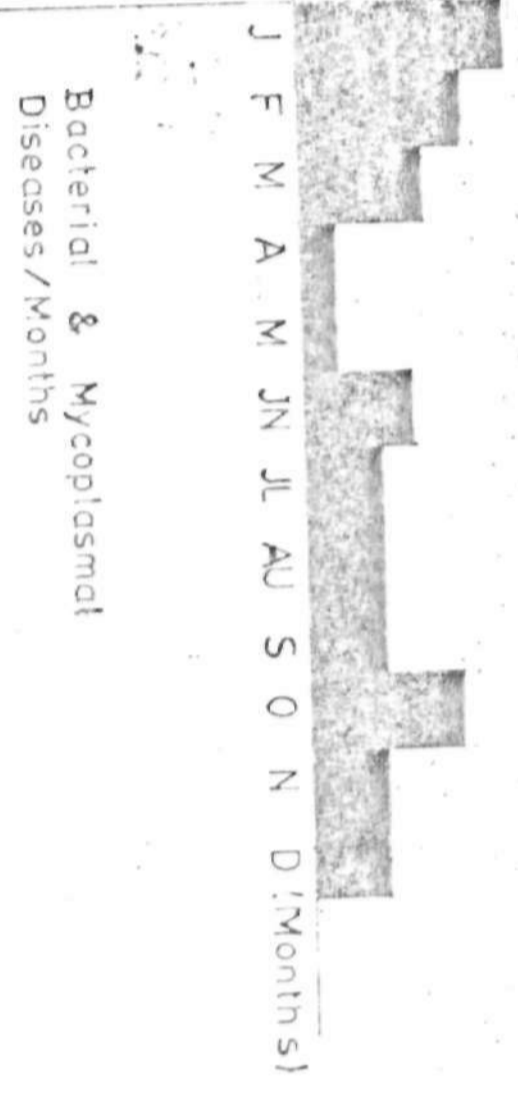
Virid Diseases / Age in Weeks

Fig. 2A



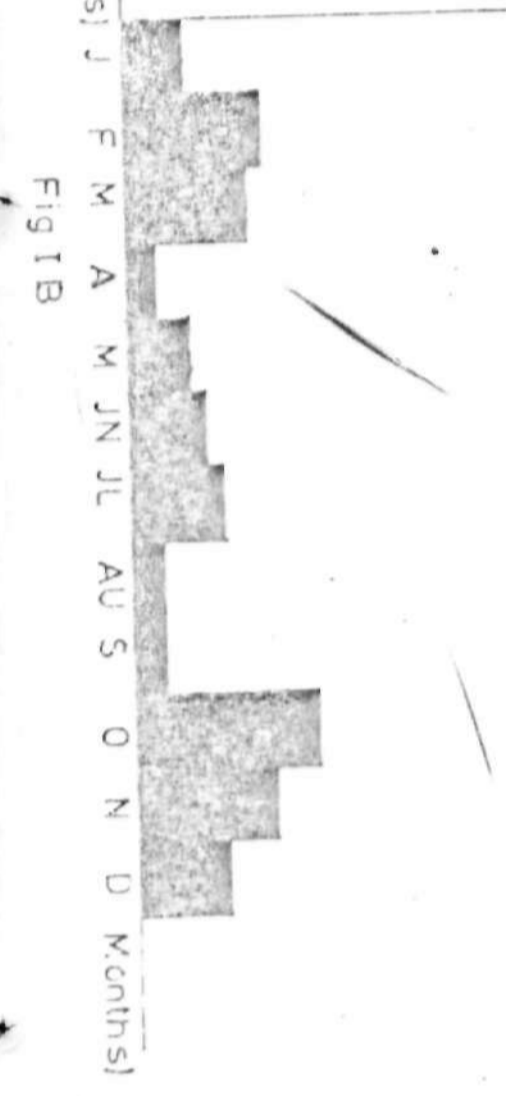
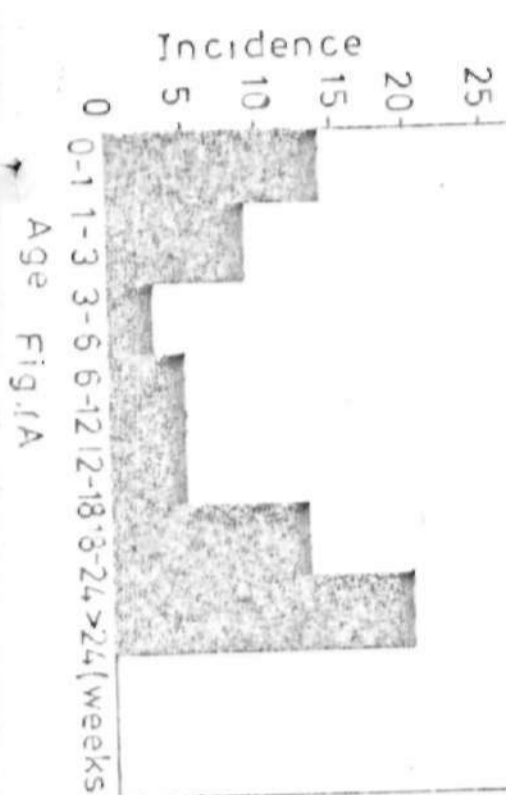
Virid Diseases / Months

Fig. 2B



Bacterial & Mycoplasma
Diseases / Age in Weeks

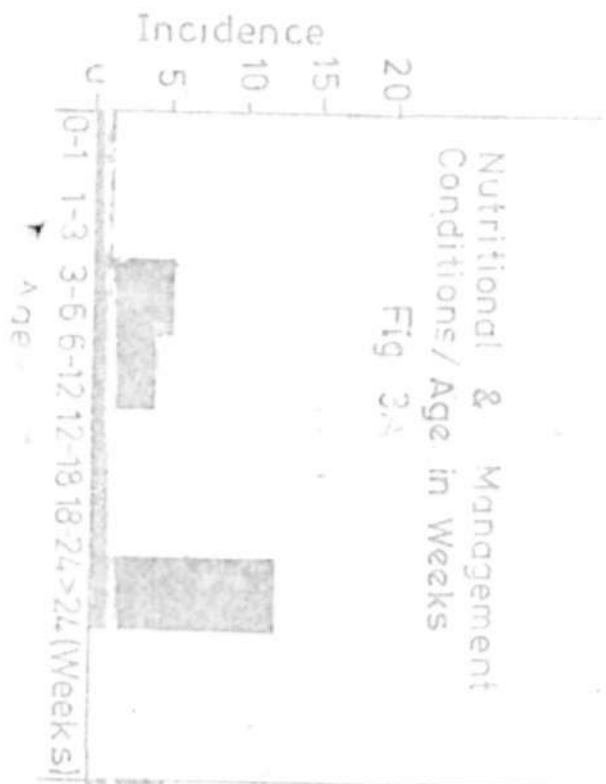
Bacterial & Mycoplasma
Diseases / Months



Age Fig. 1A

Fig. 1B

DISEASE INCIDENCES BY AGE IN WEEKS AND BY MONTHS



DISEASE INCIDENCE BY AGE
IN WEEKS AND BY MONTHS

Other Conditions/
Age in Weeks

Other Disease Conditions/Months



Fig. 5 A. Age

Fig. 5 B. Months

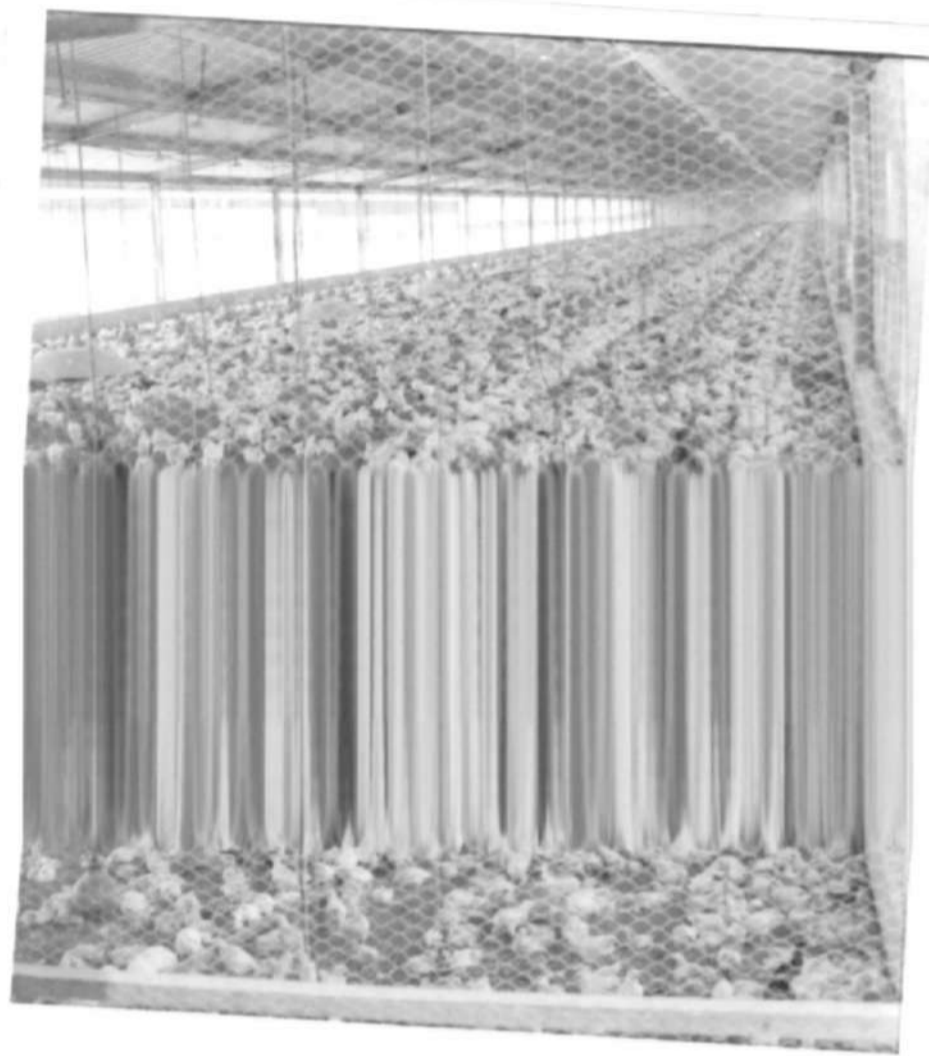


Plate 1: A modern poultry unit.



Plate 2: Sinusitis caused by *Pasteurella multocida* in a pullet.



Plate 3: A severe case of perosis in broilers 8 weeks old.



Plate 4: Urate deposit on the heart in a case of VUD.



Plate 5: Urolithiasis. Note swollen and distended ureters
(white arrows) filled with urates.



Plate 6: Subcutaneous lymphoid leukosis in a 22 week old
Shaver breeder pullet.



Plate 7: Ovarian involvement in lymphoid leukemia.

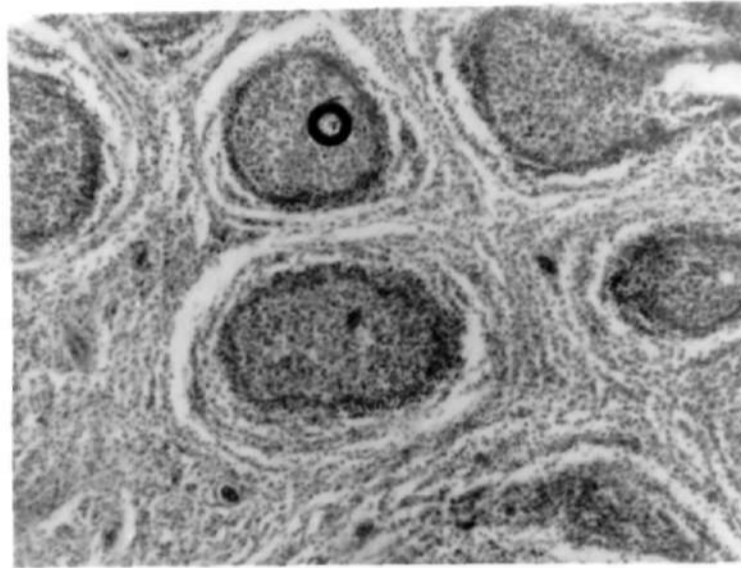


Plate 8: Degenerating bursal follicles in IBD. Note
necrosis in some follicles(O) - H&E - 16

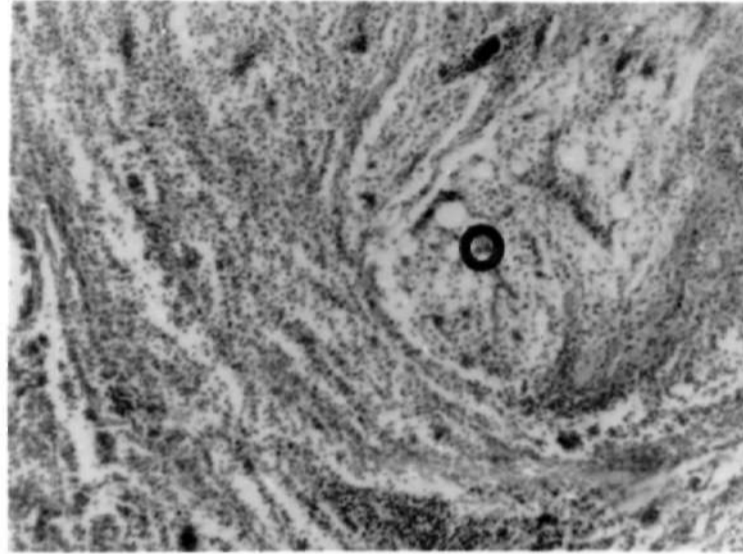


Plate 9: Ghost: bursal follicles after degeneration and
necrosis in MCD (O) H & E x16.

240x24

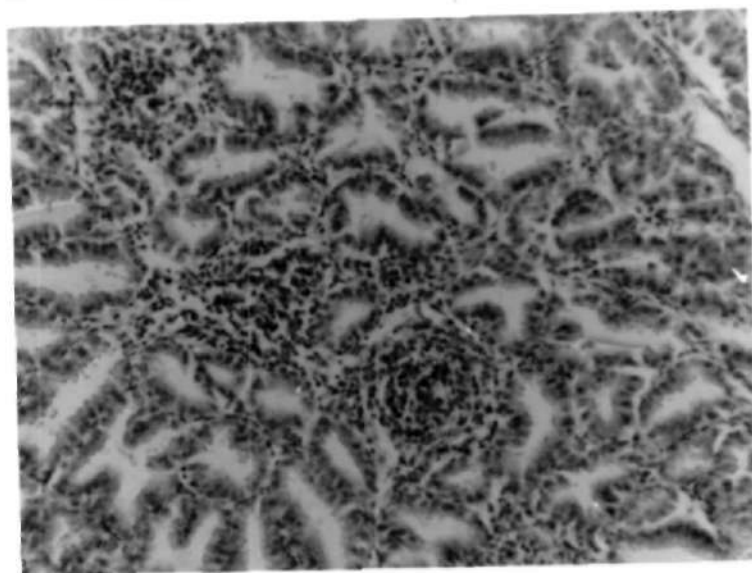


Plate 10: Proventricular Congestion and Hemorrhages. In MCD.

H & E - 25

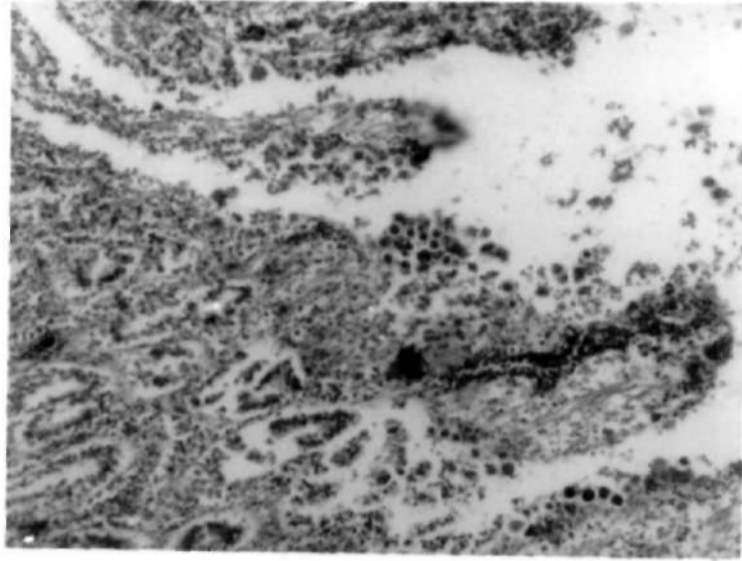


Plate II: Necrosis and epithelial sloughing of the small
intestine in NCD 16.

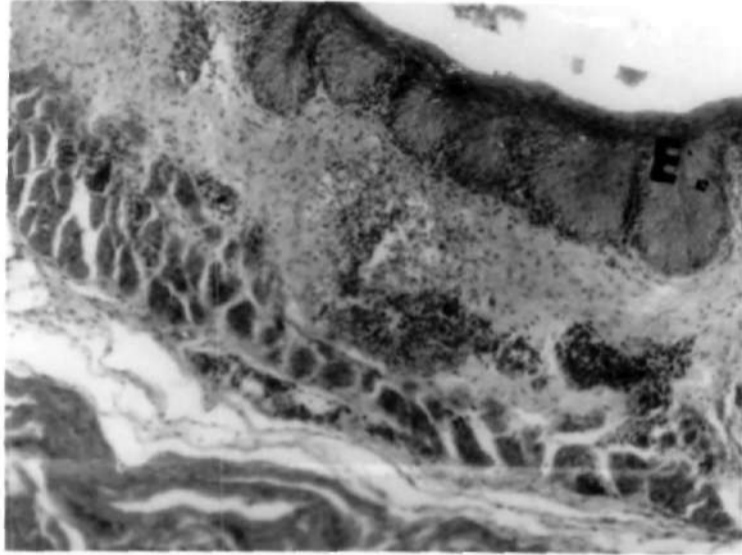


Plate 12: Hyperkeratosis (E) of the esophagus in vitamin A deficiency. Note subepithelial lymphoid aggregates. H & E x 10.

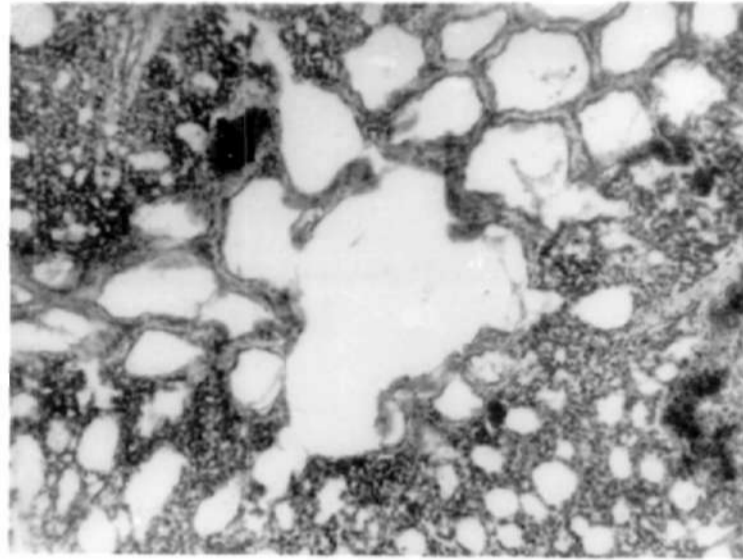


Plate 13: Pneumonia caused by *E. coli* in 4-day-old chick.

Note severe congestion (N) edema,
emphysema and heterophilic infiltrations.
H & E - 25.

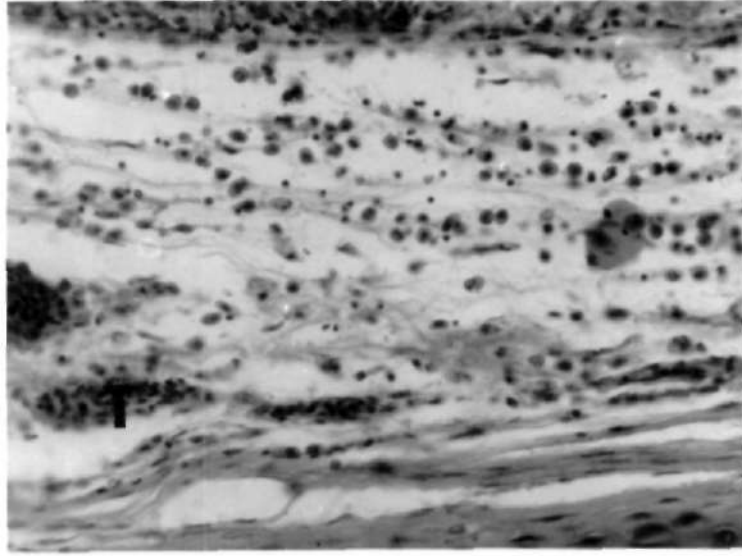


Plate 14: Tracheal subepithelium in OGD. Note congestion

The 4 seasonal periods considered also did not show significant differences in association with mortality.

Diseases as expected were statistically significant in causing mortality. This means that disease is the most significant single factor causing mortality in poultry (Hanson, 1965; Gordon, 1970; Stevens, 1971; Gwin, 1976) followed by management differences and seasonal variations.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	
Non specific conditions	-	-	3	1	1	1	1	1	-	-	3	-	11
TOTAL	5	27	32	9	16	17	17	13	10	26	24	23	240

Appendix B Summary of Gross and Microscopic Lesions of Coot Diseases Encountered

Disease	Gross Lesions	Histopathologic Lesions
Newcastle disease (ND)	<ul style="list-style-type: none"> - Intestinal hemorrhages and necrosis. - Hemorrhages of proventricular glands - Catarrhal or hemorrhagic tracheitis. 	<ul style="list-style-type: none"> - Generalized congestion of organs. - Hemorrhages and necrosis of intestinal mucosa. - Necrosis of the spleen - Subepithelial tracheal lymphoid infiltration. - Hyperplasia and edema of alveolar walls in the lungs.
Infectious bursal disease (IBD)	<ul style="list-style-type: none"> - Dehydration - Intramuscular hemorrhages in the thigh and breast muscles. - Enlarged edematous bursa of Fabricius. - Hemorrhages at proventricular-gizzard junction. - Hemorrhages, congestion and edema of the bursa of Fabricius. 	<ul style="list-style-type: none"> - Kidney shows interstitial congestion and hemorrhages. - Tubular degeneration and necrosis. - Necrosis and sloughing of intestinal epithelia. - Follicular necrosis of the bursa of Fabricius. - Fibroplasia and infiltration by macrophages. - Congestion and fatty degeneration of the liver.
Lymphoid and other neoplasms	<ul style="list-style-type: none"> - Presence of nodules in visceral organs or diffuse enlargements of the organs. - Large masses in the subcutis or the abdominal cavity - Cauli flowerlike ovaries. 	<ul style="list-style-type: none"> - Proliferation of lymphoid cells in the affected organs. - Infiltration by heterophils.
Salmonellosis	<ul style="list-style-type: none"> - Generalized congestion - Necrosis of the liver and spleen - Catarrhal to hemorrhagic enteritis. - Ophthalmitis - Oophoritis with severe congestion - Peritonitis from ruptured ova - Enlarged bronzed livers. - Gray white foci on the heart gizzard, liver and spleen. 	<ul style="list-style-type: none"> - Hyperemia - Necrosis of the liver, spleen and myocardium. - Mononuclear infiltration and proliferation of reticulum cells
E. coli	<ul style="list-style-type: none"> - Generalized hyperemia - Peritonitis, pericarditis, ophthalmitis, pneumonia and peritonitis from broken ova - Liver and spleen enlarged and congested. 	<ul style="list-style-type: none"> - Generalized hyperemia, necrosis of the liver and spleen. - Mononuclear infiltrations

Summary of Parasitological Findings

Parasite	Organs Affected	Disease	No out-breaks
Menacanthus species	Skin	Anemia and dermatitis	1
Coccidia tenella	Ceca	Coccidiosis	2
Eimeria species	Cecum and small intestine	Coccidiosis	1
Coccidia species	Large intestine and rectum	Coccidiosis	1
Eimeria species	Small intestine	Coccidiosis	9

Appendix 3 Z-test of Seasonal Variations in Diseases
at P=0.05 (Z=1.96)

Data source	Statistical analysis	Variables	Conditions affected	Significant Z values	Remarks
Appendix 3	Z-test (compari- -son)	Wet and dry seasons	Diseases generally	Z=-2.7110	Significant dry seasons effect
Appendix 3	Z-test	Wet and dry seasons	Mycoplasmosis	Z=-2.236	Significant dry seasons effect
Appendix 3	Z-test	Wet and dry seasons	Coccidiosis	Z=-3.203	Significant dry seasons effect
Appendix 3	Z-test	Wet and dry seasons	Egg peritonitis	Z=-2.064	Significant dry seasons effect
Appendix 3	Z-test	Wet and dry seasons	Asphyxiation	Z=-2.000	Significant dry season effect