



Enteric diseases and its linkage with liver lesions in Brazilian broiler industry —

Nair Massako

Katayama Ito, Ph.D., D.V.M.

“Biography”

Personal Data:

Name: Nair Massako Katayama Ito

Birth Date: 09/01/1955.

Local: Guararapes City, São Paulo State, Brazil.

Address:

***Personal: Rua Renato Egídio de Souza Aranha,
525 Vila São Francisco, CEP. 05353-050, São Paulo, Brasil.***

***Business: Rua Alvarenga Peixoto, 466 V. Anastácio
CEP: 05095-010, São Paulo, Brasil.***

Fone: (11) 3831-2984/3644-4429

E-mail: spave@uol.com.br

GRADUATION

Graduated in Veterinary Medicine, by São Paulo University, Faculty of Veterinary Medicine and Zootecny in 1977.

PhD in Experimental and Comparative Pathology and Toxicology by São Paulo University, Faculty of Veterinary Medicine and Zootecny in 1981. Thesis theme “Acute Inflammatory Process in Gallus gallus (Linnaeus, 1758) effect of steroidal and non-steroidal drugs on oedema and pain” supervised by Prof. Dr. Gyorgi Miklos Bohm from Medical School of São Paulo University.

The Elanco Global Enteritis Symposium

July 9-11, 2002

*Enteric diseases and its linkage with
liver lesions in Brazilian broiler industry — Nair Massako Katayama Ito, Ph.D., D.V.M.,
“Biography”, F-1*

Post-doctorate in Veterinary Research Institute of Stormont, Belfast, Northern Ireland supervised by Prof. Dr. Jean Brian. McFerran, studying Virology and Applied Virology in Avian species.

PROFESSIONAL EXPERIENCE

CNPq Grant for training Research from 1978 to 1979 to study Infectious Bronchitis Virus of Chickens.

From 1979 to 1986 worked as a scientific researcher-level I to III for EMBRAPA a Brazilian Research Center with branch in São Paulo University, Veterinary Medicine Faculty, Preventive Veterinary Medicine and Animal Health Department, Avian Pathology Section.

From 1986 to 1994 worked in Veterinary Medicine Faculty of São Paulo University as an Assistant Teacher Doctor giving lectures of Ornithopathology to the graduation and post-graduation.

From 1978 to 1994 acted in the diagnosis and clinic Science of Pet Avian Species into the São Paulo University Veterinary Hospital.

Since 1994 have been president of a private Avian Diagnostic Laboratory SPAVE where works as a consultant for the Avian Industry and histopathology, serology and microbiology analysis.

Since 2000 have been Teacher of Avian Pathology in Santo Amaro Private Veterinary School of São Paulo.

Enteric diseases and its linkage with liver lesions in Brazilian broiler industry

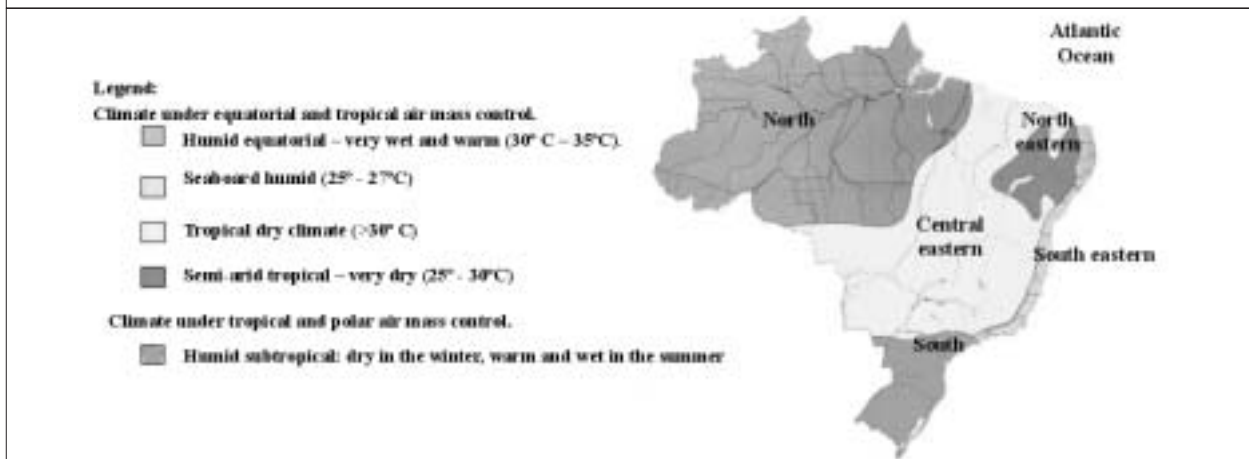
“Abstract”

*Ito, NMK, PhD, MV
Professor of Avian Pathology – UNISA-SP
Avian Private Consultant, SPAVE, SP, Brazil*

Introduction

Brazil is a large country with many faces and social problems and of course the nicest carnival of the world. Brazil is also an important world producer of broiler chickens. Last year 3.473.556 millions of broiler or 6.563.570 ton of meat (UBA/APINCO) were produced. Broiler enteritis with variable etiology influenced by climate, inadequate facilities, water quality, type of market, corn quality, management and use of drugs is seen around of the country. The major and biggest broiler industry is located in the South and Southeastern regions which occupy approximately 10% of 8.547.403 km² Brazilian territory. Since the late 90s broiler industry is growing in central eastern Brazil. Broilers are produced in the south provinces for international market (without growth promoters) and the producers of “green broiler” (without drug use) in the South and Southeastern provinces are increasing in numbers. The broiler industry in the Northeastern and in the North (see Figure F-1) is not large and it is restricted to regional market. Therefore, while the annual climate and type of market influence on the incidence of enteritis in the South and Southeastern broilers, in the rest of the country, climate, corn disponibility , inadequate facilities and water quality have an important role in the occurrence of an enteric disease.

Figure F-1: Brazil map and its climate diversity.



Diagnostic Procedure

Impairment of the daily weight gain or of the general performance is the main consequence of the enteric disease in broilers. Diagnosis was based in clinical analysis, necropsy and histopathological examinations. Gut bacteriology was done for salmonella research.

Field findings and related causes of enteritis

According to the type of market and age of birds the most common enteric diseases in broilers are:

1. In the conventional Market:

- **Early age:** *Salmonella sp.*, cloacal pasting, thyphylitis, intestine with thinned wall, hepatitis and malabsorption syndrome. The initial main cause for bacterial involvement in the early enteric disease, except for salmonella-related enteritis, are marginal nutrition and facilities or management mistakes.

Figure F-2: Early age enteritis are cause of loss of uniformity and gut with thinned wall (A). Bacterial injury is common in the caeca epithelia of seven day-old broiler-chick (1000x magnification) (B).

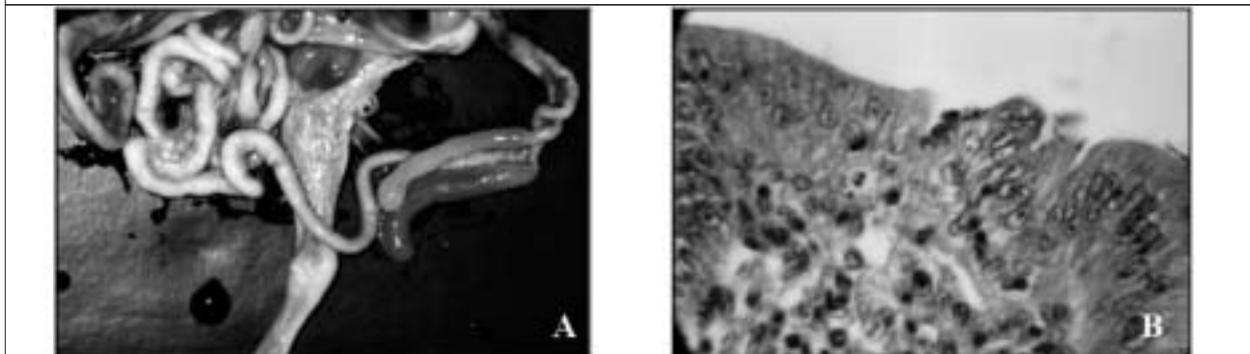
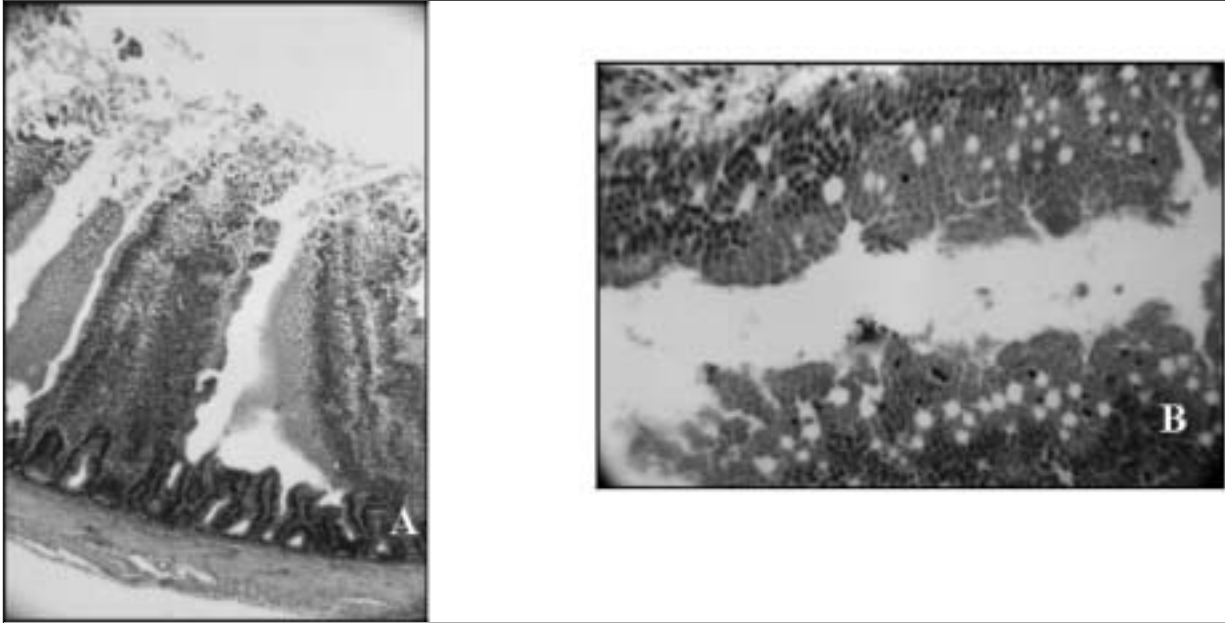


Figure F-11: Increased loss of epithelial cells in the duodenum of broiler chick with 8 days of age (100x magnification) (A). In B, (400x magnification), bacterial adherence in the mucous and brush border.



- **Middle age:** (25 to 37 days of age): subclinical coccidiosis, thyphylitis, subclinical necrotic enteritis and undigested food in the droppings are common findings in growing broilers. Wet droppings are seen at this period due to Gumboro disease virus challenge (mainly due to G15 molecular group of IBDV). Old corn, *Fusarium sp* mycotoxins, warm and/or humid climate, water quality, alternative feedstuffs, inclusion of blood, feather, meat and/or viscera meals in the diet, facilities and equipment management can be the starter factors. Immunossuppression induced by v.v IBDV and respiratory diseases can increase the severity and incidence of enteric problems.

Figure F-12: Subclinical enteritis (A) and severe enteritis (B) in 30-day-old broilers.

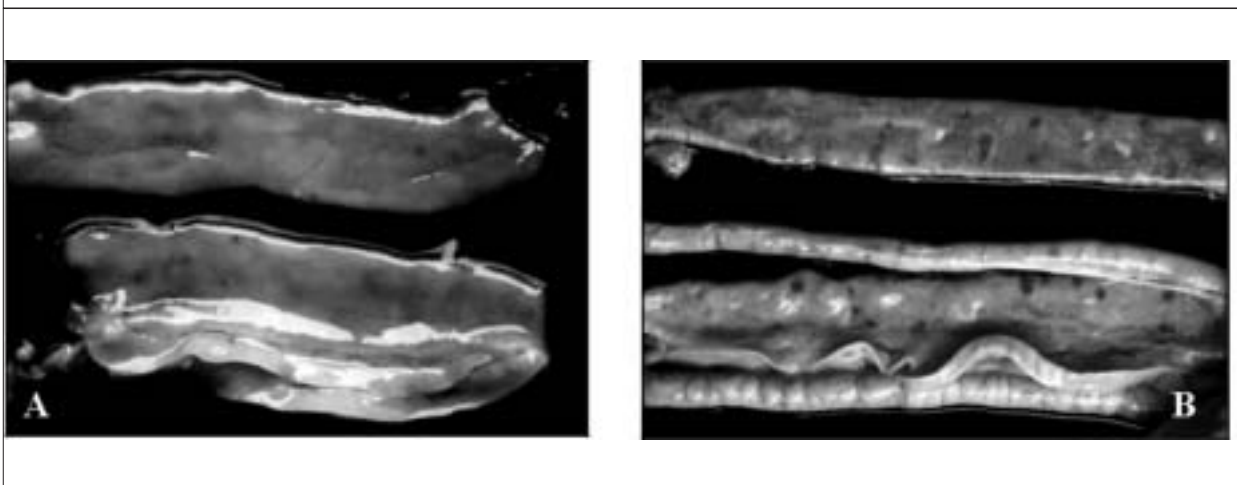
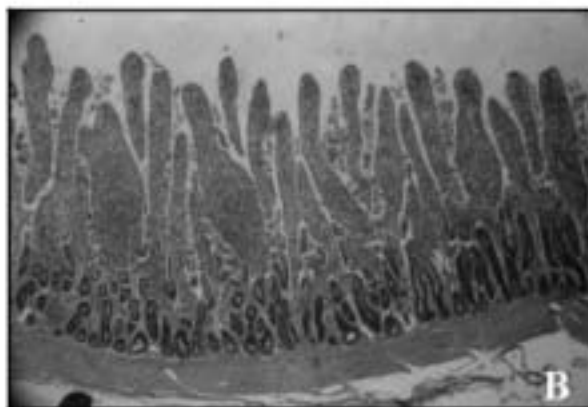
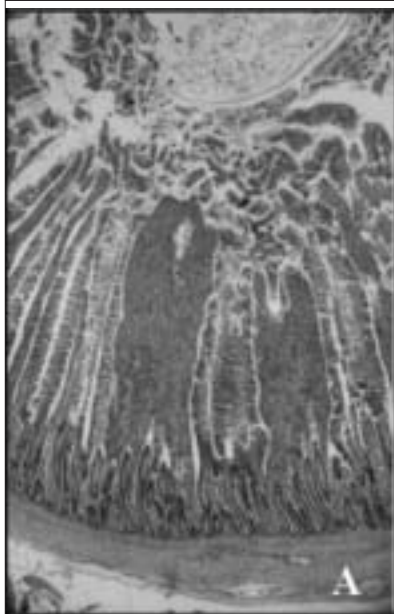


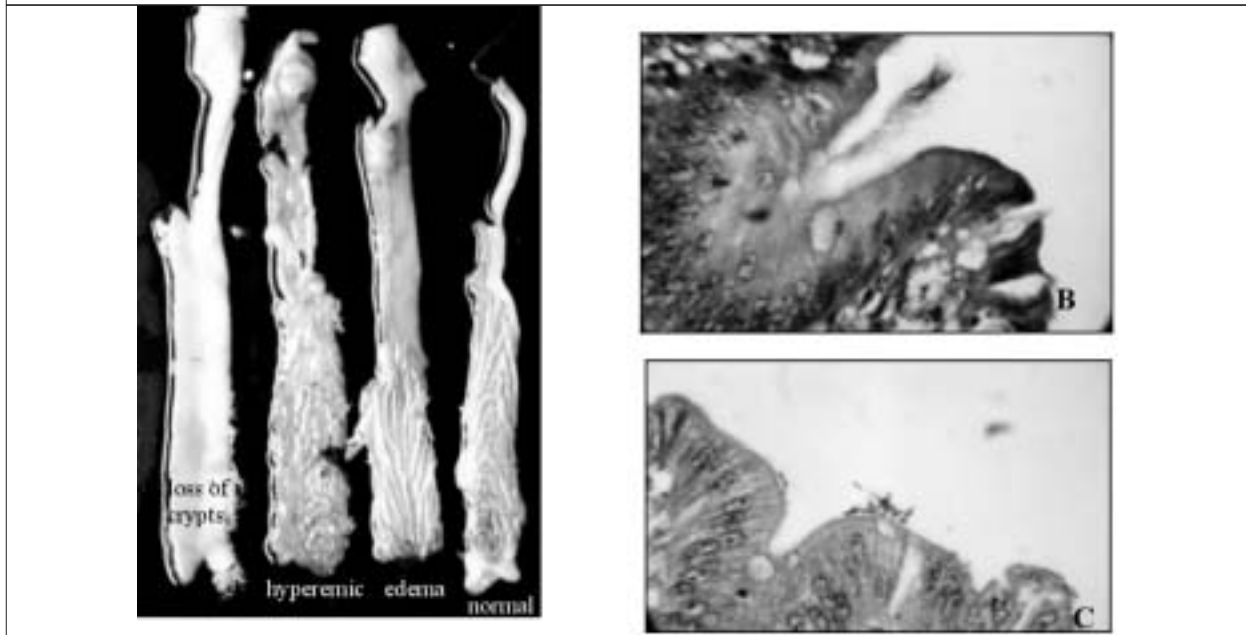
Figure F-13: Photomicrography of duodenum mucosa (100x magnification) showing loss of epithelial cells and infiltration of granulocytes and monocytes in the muscular mucosae of some villous (A) is followed by severe loss of epithelial cells and increased number of villous with inflammatory cell infiltration (B) (40x magnification).



- **Late period of rearing** (seven days before slaughtering): Worms, Cryptosporidia infection, coccidiosis and clinical necrotic enteritis are frequently seen. Thyphylitis is a common finding. The use of diet without anticoccidial drugs and growth promoters is the main factor inducing an increase of coccidia and bacteria invasion in the gut. Heat stress, alternative feedstuffs, high density, leg problems and respiratory diseases also contributed to unhealthy enteric tract.

1. International market broilers and “green broilers”: The early-age-enteric disease is the same either in broilers fed without growth promoters or with some selected drugs, but middle-age-enteric disease occurs earlier than 25 day old. Necrotic enteritis and diarrhoea are very common. Severe enteritis are present in coccidia vaccinated flocks. Associated predisposing factors are the same as described above.

Figure F-6: Thyphylitis in broiler. In the figure A different grades of mucosa injury are presented. Increased bacterial adherence and epithelial injury (1000x magnification) is shown in B and C.

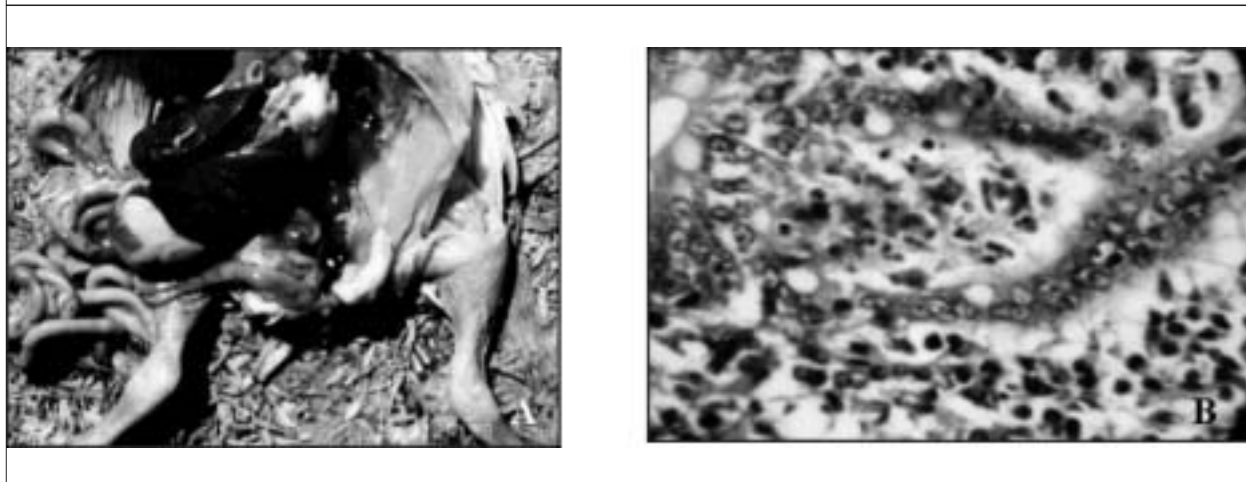


Liver lesion

Liver lesions found in the Brazilian slaughter facilities are routinely attributed or related with *E.coli* infections due to respiratory diseases. Differential diagnosis for liver necrosis is not routinely done.

Hepatitis associated with enteric disease (Fig F-7) can be seen in any age and closely related with a particular farmer or some flocks. Focal necrosis in the liver is usually associated with intestine mucosa necrosis (Fig F-12, F-13). Inflammatory cell infiltration in the Lieberkühn crypts and surrounding connective tissue is a common finding in the small intestine (Fig F-7B).

Figure F-7: Broiler chicken with necrotic foci in the liver and green contents in the gut (A). Photomicrography of inflamed Lieberkühn crypt in the duodenum (1000x magnification).



Muco catarrhal enteritis associated with hyperaemic mucosa has been seen in chickens with yellowish and friable livers (Fig. F-8A) or slightly consistent livers with lesioned borders (Fig.F-8B). This kind of problem seems to be related with enterotoxemic affection since bacteria are not seen in the gut lumina. Histopathological examination suggests toxemia because the hepatocytes are vacuolated and mononuclear cells are the main cells found into the sinusoidal space (Fig. F-9A). Liver with border lesion show hyaline thrombi in the vascular space (Fig. F-9B) and the altered tissue was represented by a ischaemic necrotic focus.

Figure F-8: Liver of broiler with fatty change (A) and focal necrosis in the border (B).

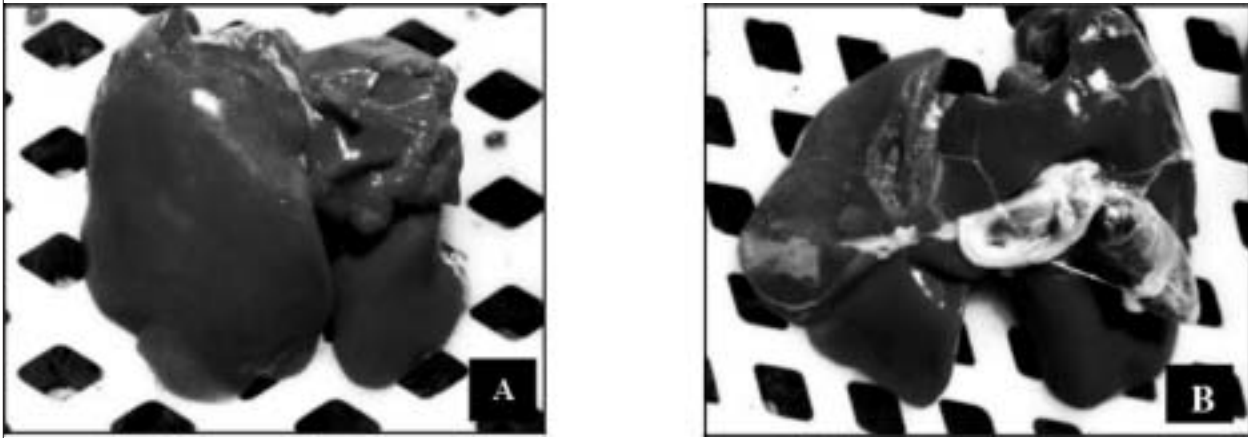
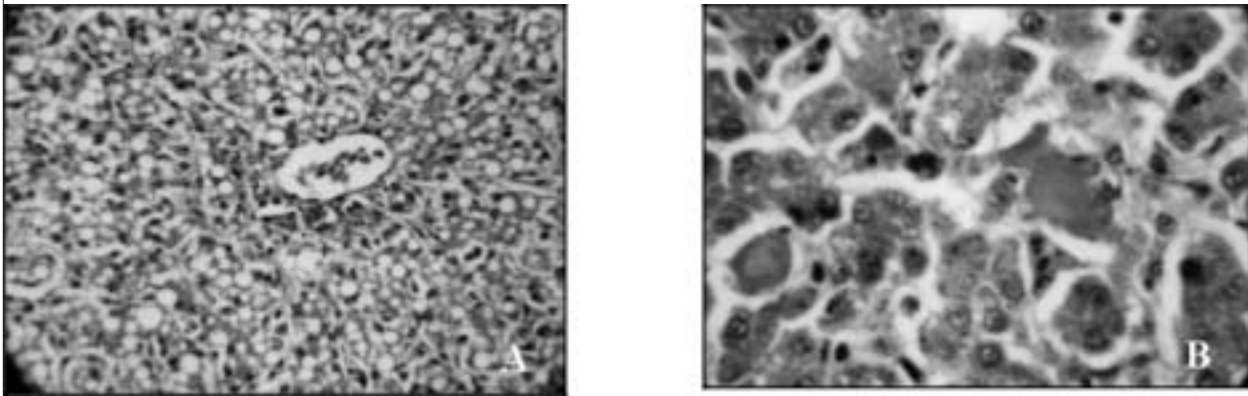


Figure F-9: Photomicrography of liver sections stained with haematoxylin-eosin. Figure A (400x magnification) refers to thin section of yellowish liver which showed a hepatocyte vacuolation. In the figure B at 1000x magnification, hepatocellular degeneration is associated with the presence of hyaline thrombi into the vascular space.



According to the literature enterotoxemic gut and liver injury has been currently associated with *Clostridium perfringens* hyper colonization in the intestine and subsequent toxin synthesis and release. There are many factors that could be a starter of an imbalance of bacteria colonization in the gut. The inadequate use of alimentary additives can also be considered as a cause of loss or imbalance of bacteria flora.

Conclusion

1. Subclinical enterotoxemia and bacterial enteritis is a common finding in growing broilers fed rations with growth promoters. Many factors are discussed as a starter cause. Coccidiasis is a common finding.
2. Necrotic enteritis and bacteria septicaemia a found at an early age and in broilers before slaughtering fed rations without growth promoters.
3. “Green broilers” have a high incidence of enteritis. Many primary factors are involved.

(Page left intentionally blank.)

Enteric diseases and its linkage with liver lesions in Brazilian broiler industry

“Slide Presentation”

*Ito, NMK, PhD, MV
Professor of Avian Pathology – UNISA-SP
Avian Private Consultant, SPAVE, SP, Brazil*

Figure F-10.

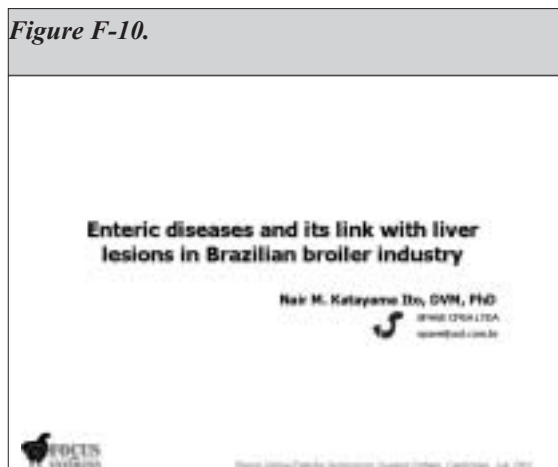


Figure F-11.

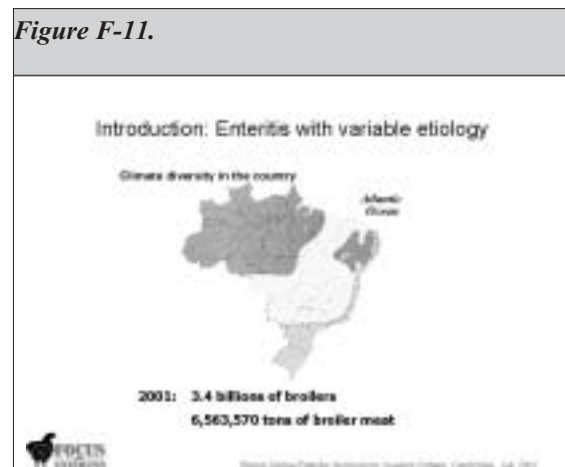


Figure F-12.

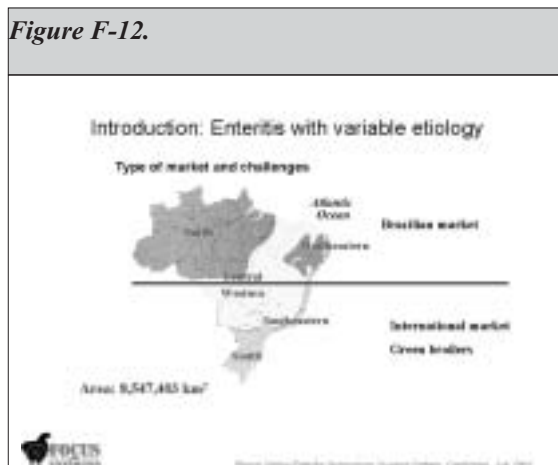


Figure F-13.

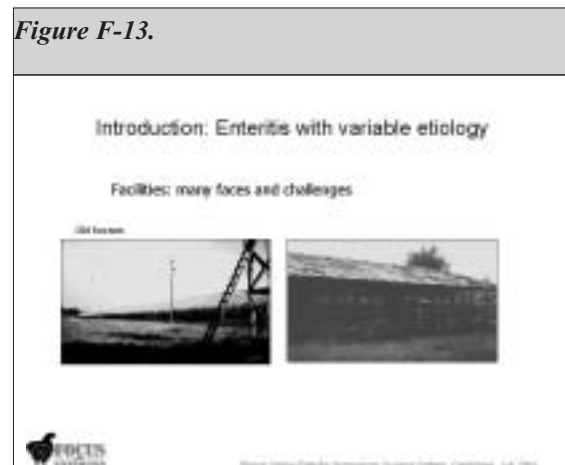


Figure F-14.

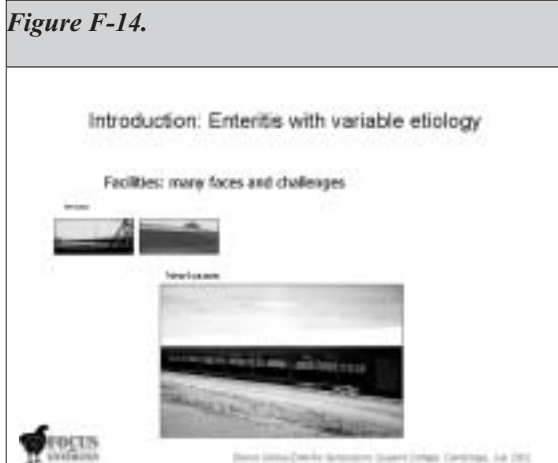


Figure F-15.

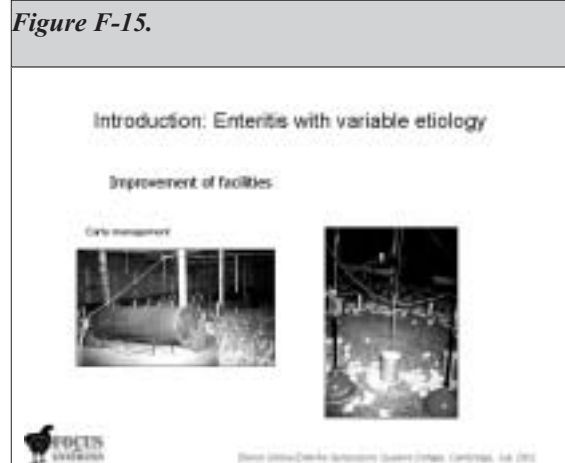


Figure F-16.

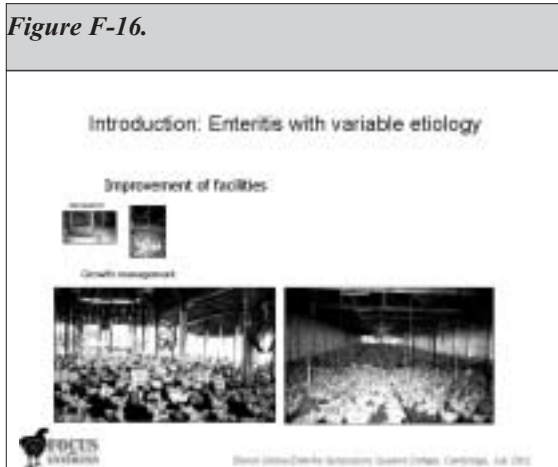


Figure F-17.



Figure F-18.

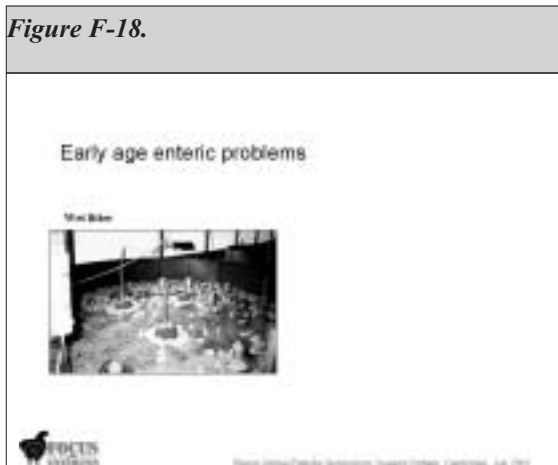


Figure F-19.

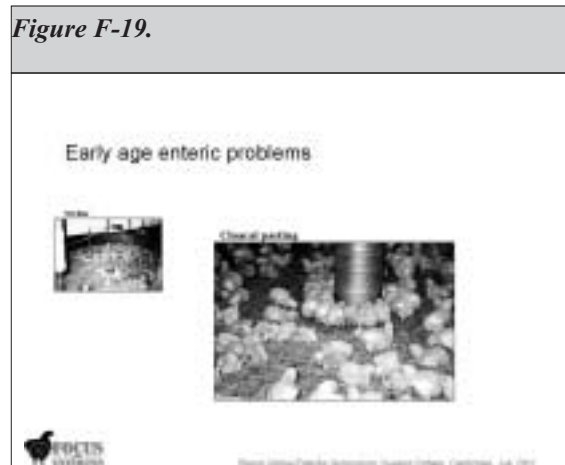


Figure F-20.

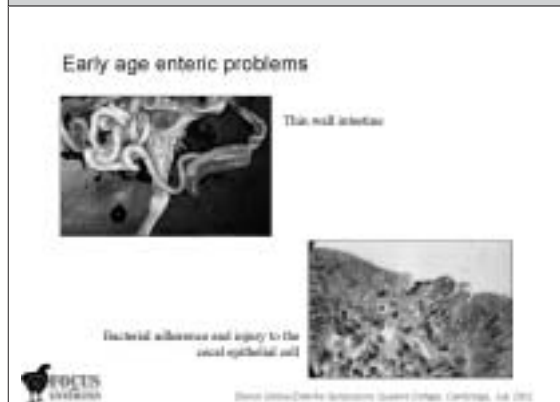


Figure F-21.



Figure F-22.



Figure F-23.

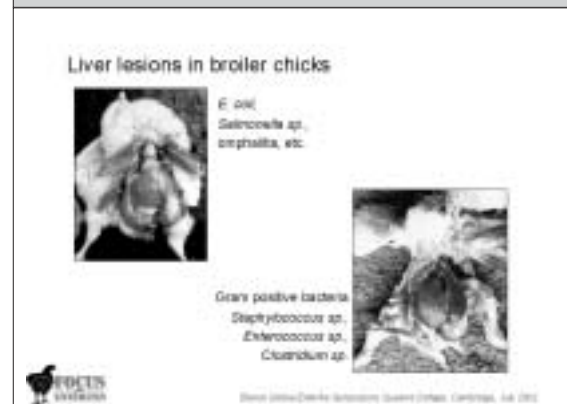


Figure F-24.



Figure F-25.

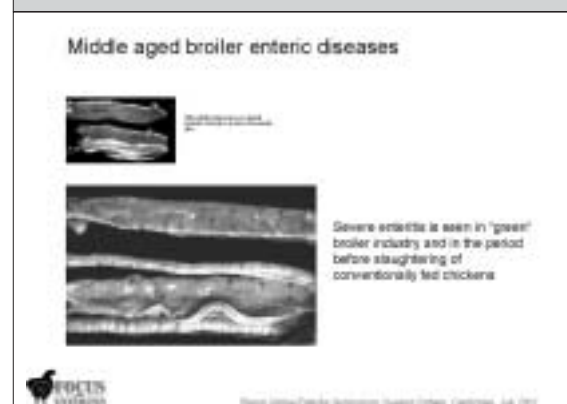


Figure F-26.



Figure F-27.



Figure F-28.

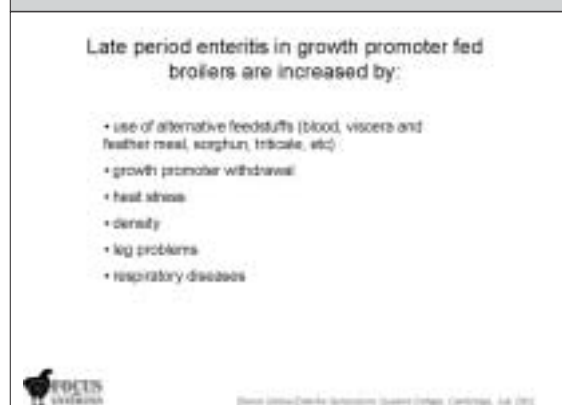


Figure F-29.



Figure F-30.



Figure F-31.

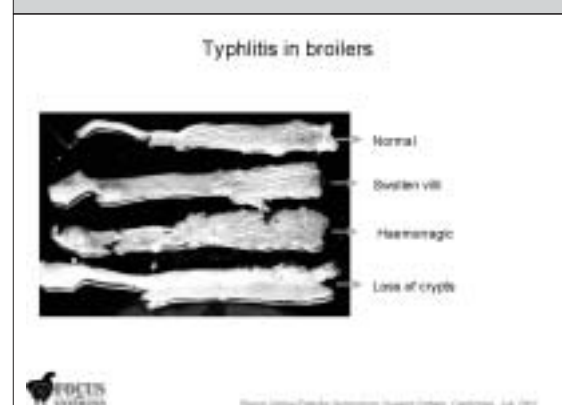


Figure F-38.

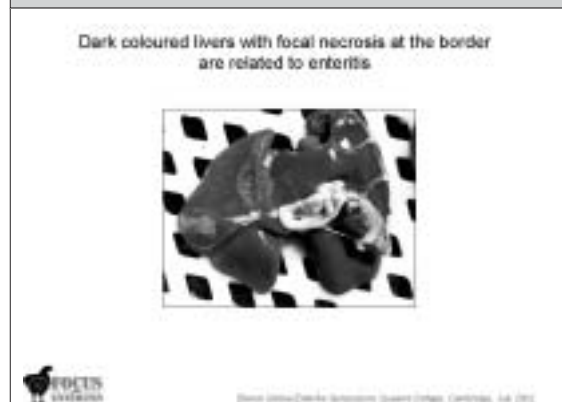


Figure F-39.

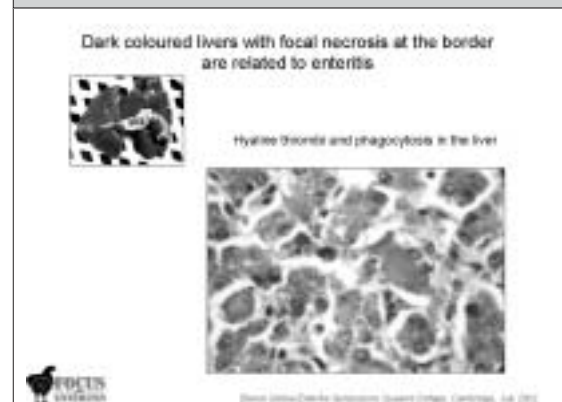


Figure F-40.

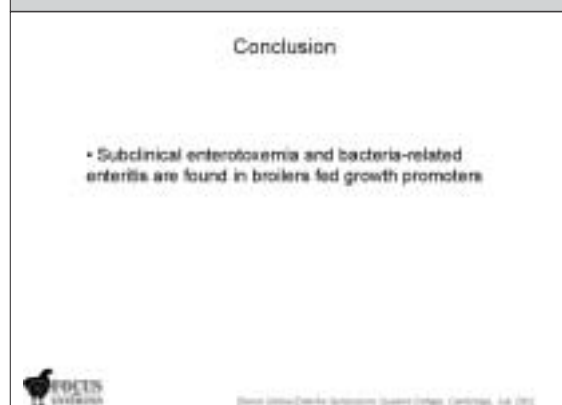


Figure F-41.

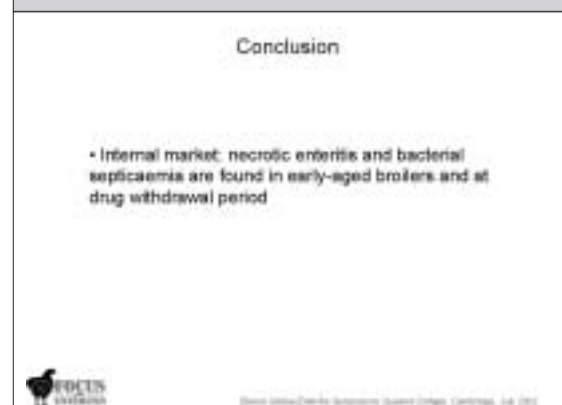


Figure F-42.



Figure F-43.



Figure F-44.

