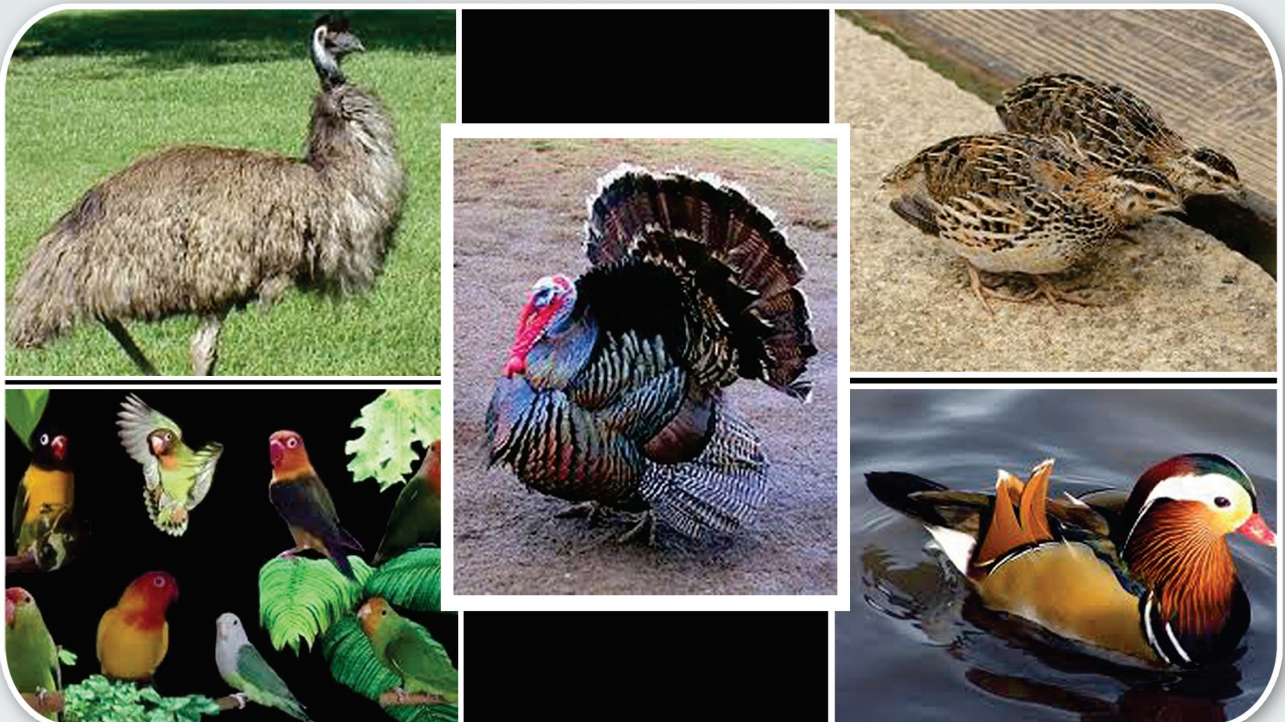


# COLOR HAND BOOK OF COMMON DISEASES AFFECTING POULTRY IN KERALA



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Published by  
Department of Animal Husbandry, Kerala

Title of the project : Micro organisms associated with mortality/low egg production in domestic poultry

Place of work : Clinical Laboratory, District Veterinary Centre, Palakkad

Principal Investigator : Dr. Sunitha Karunakaran, Veterinary Surgeon, Veterinary Clinical Laboratory, District Veterinary Centre, Palakkad

Co-Investigators : 1. Chief Veterinary Officer, DVC, Palakkad  
2. Veterinary Surgeon, District Veterinary Centre, Palakkad

**This color handbook is the outcome of the project on**  
**“Micro organisms associated with mortality/low egg production in domestic poultry”**



**Published by**  
**Department of Animal Husbandry, Kerala**



## ACKNOWLEDGEMENTS

I express my sincere gratitude to **Director of Animal Husbandry, Additional Directors, Assistant Directors and other officers** in the Animal Husbandry Directorate, Kerala for the financial aid and technical support granted to this Research and Development Project during 2008 to 2011.

I find myself at a loss of words to express my heartfelt gratitude to **Dr. M. Sumangala, District Animal Husbandry Officer, Palakkad** for her parental support and encouragement that was like a beacon guiding me across the waves of difficulties and uncertainties. Her critical analysis and valuable suggestions especially during her tenure as Chief Veterinary Officer, DVC, Palakkad have helped me a lot in the timely planning and execution of the work.

I am deeply indebted to **Dr. T. Ravishankar and Dr. T. R. Girija, Deputy Director, Palakkad and Dr. Capt. Saseendran Nair, Chief Veterinary Officer, District Veterinary Centre, Palakkad** for their timely encouragement, co-operation and farsighted guidance for the completion of this project.

It is my privilege to get the effective supervision and support from **Dr. K. R. Arun Kumar, President, Indian Veterinary Association, Kerala** throughout the course of completion of this project.

I am greatly pleased to owe my special regards and gratefulness to **Dr. G. Krishnan Nair and Dr. M. Mini, Professors, Department of Microbiology, College of Veterinary and Animal Sciences, Mannuthy** for their affectionate support and technical guidance provided to me throughout the course of study.

I treasure the generous help, understanding, moral support and constant encouragement rendered by my beloved friends and colleagues, **Dr. Asha Merina Kuriakose and Dr. Aswathy.G, Veterinary Surgeons, District Veterinary Centre, Palakkad**. I am also thankful to **Dr. Venugopalan Nair and Dr Anu Mathew, Regional Disease Diagnostic Laboratory**, for the timely help and support rendered during the course of this study.

I am grateful to the **staff members of the District Veterinary Centre and District Animal Husbandry Office, Palakkad** for their whole hearted co-operation and assistance provided during the period of this work. My special and heartfelt gratitude to my friends, **Drs. Ambili. and Ambili R, M.V.Sc and PhD students of Department of Microbiology, College of Veterinary and Animal Sciences, Mannuthy**.

I am deeply touched by the patience, love, care and support extended to me by my beloved husband **Dr. Hareesh** and my cute little daughter **Gaurika**. Above all without the help of God nothing would have been possible. I bow before the **Almighty** for the blessings showered on me for the successful completion of this project.

**Dr. Sunitha Karunakaran**





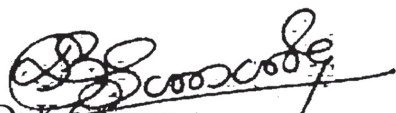
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**GOVERNMENT OF KERALA**  
**VIKAS BHAVAN, THIRUVANANTHAPURAM**  
**KERALA**

### Message

I am happy to know that a colour handbook on “Common diseases affecting domestic poultry in Kerala” is being prepared by Dr Sunitha Karunakaran, Veterinary Surgeon, Veterinary Clinical Laboratory, District Veterinary Centre, Palakkad after the completion of the Research and Development Project on “Micro organisms associated with mortality or low egg production in domestic poultry” done during 2008 to 2012. Animal Husbandry Department has been encouraging dedicated research activities in the field level so as to help Veterinarians to keep abreast of the recent advances in this field and serve the farming community better. I hope that the colour hand book is one such initiative, which will help in early and accurate diagnosis of diseases associated with mortality in domestic poultry. I also believe that this colour hand book will become a ready reference in our institutions to help the Veterinarians to specifically identify the pathogens associated with mortality in various species of domestic poultry as well as in recently domesticated, exotic birds like Emu, African Love birds etc. I wish the endeavour all success.



Dr K. G Suma



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**ANIMAL HUSBANDRY DEPARTMENT**

**GOVERNMENT OF KERALA**

**DISTRICT ANIMAL HUSBANDRY OFFICER**

**PALAKKAD**

Dr .M. SUMANGALA

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### MESSAGE

I am happy to note that a color handbook on “**Common diseases affecting domestic poultry in Kerala**” is being prepared by Dr Sunitha Karunakaran, Veterinary Surgeon, Veterinary Clinical Laboratory, District Veterinary Centre, Palakkad after the completion of the Research and Development Project on “**Micro organisms associated with mortality or low egg production in domestic poultry**”.

I understand that there are only very few studies conducted on diseases affecting domestic poultry in Kerala under field conditions. Representation of the lesions of the diseases with few remarks about the etiological agent and method of diagnosis in the form of a **color handbook** will become a ready reference to the practising Veterinarians in the field. I have also immense pleasure to note that such an initiative has come up from **Palakkad district**, which contributes a major share in the state poultry industry owing to the presence of many large, small as well as marginal farmers hailing from different corners of the district.

The earnest and dedicated effort taken by the author of this book is sincerely appreciated.

Dr .M. SUMANGALA





Dr. N. SUDHODANAN



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**DEPUTY DIRECTOR**  
**DISTRICT ANIMAL HUSBANDRY OFFICE**  
**PALAKKAD**

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### MESSAGE

Poultry industry has transformed from meager backyard farming to a well-organized scientific techno commercial industry. India is the second egg producer and the third largest broiler producer in the world. Kerala is also having the pattern of rearing both backyard and organized, in its own way. On research side quantum leaps are taking place in the international poultry husbandry practices not only in housing, feeding, breeding, management, diseases but also in biosecurity protocols. We are now discussing even on designer eggs with nutraceuticals in diet.

This work of Dr Sunitha Karunakaran places her among the poultry personalities, who contributed much in the exploration of poultry diseases and production associated infections, at field level. Veterinary experts at all levels and poultry owners could be benefited by this research and development work. Discipline in scientific work, amicability and dedicated hard work, self-explanatory photographs are the glittering qualities of Dr Sunitha's work.

It is a matter of great pleasure that this work of Dr. Sunitha will serve as a good reference to the Veterinarians in poultry disease diagnosis.

Dr. N. SUDHODANAN

# INTRODUCTION

Significant achievements in poultry development have come from the initiative taken by private sectors for commercial pure line breeding. Despite the advancements, poultry industry incurs losses due to infectious diseases viz; bacterial or viral. The disease scenario is complicated by emergence of new diseases, re emergence of hitherto controlled diseases, outbreaks caused by new variants and resultant break down of immunity, poor vaccination strategy, spread through unnatural hosts etc. The need for increased production in terms of eggs and meat has resulted in the evolution of new breeds and strains. However these new breeds and strains have low disease resistance, resulting in economic loss.

The total poultry population estimated in Palakkad district as per 2007 census is 6, 85,349 fowl, 12,212 ducks, 891 turkeys, 7529 quails and 10, 264 other birds. There are about 137 poultry farms in the district with a total population of 78,030 birds, which included commercial large scale farmers and marginal farmers who keep limited number of birds. Besides these there are migratory flocks of ducks present in the district. Annual egg and poultry meat production for the district is 1232 lakh eggs and 481 MT meat respectively. There is import of about 41.4 crores of eggs and 2 crore 85 lakhs of birds per year through the check posts to Kerala state.

Due to its close association with poultry industry in neighboring state Tamilnadu, chances of disease outbreaks among domestic flocks in the district is also very high. All these necessitated the need for accurate and scientific diagnostic methods to be available in the **Clinical Laboratory**, attached to **District Veterinary Centre**, which is functioning as a **referral centre** in the district.

Domestic poultry including chicken, ducks, quails, turkeys etc are brought to clinical laboratory by private farmers to identify cause of death. But only by doing post-mortem examination it is very difficult to arrive at a confirmatory diagnosis especially when post mortem lesions overlap in many of bacterial or viral diseases.

The project titled "**Micro organisms associated with mortality/low egg production in domestic poultry**" was completed with the aim to assess the role of bacteria like *Pasteurella*, *Salmonella* and *Escherichia coli* and viral agents like New Castle Disease Virus (NDV), Infectious Laryngo Tracheitis (ILT), Infectious Bronchitis (IB) etc in causing mortality in domestic flocks. This project also helped District Veterinary Centre to equip with modern facilities that ensured quality Veterinary care and treatment to poultry farmers based on accurate diagnosis of diseases, reduced treatment cost, reduced mortality and increased egg production by timely interference in disease process.

During the course of my work to complete the project, I came across a variety of bacterial diseases affecting not only poultry, but exotic birds like Emu. Documentation of the lesions identified in various species of poultry in the form of a color hand book will be of great help to practicing Veterinarians.

**Dr. Sunitha Karunakaran**

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# **DISEASES OF POULTRY**

## **PART-I- Bacterial Diseases**

Fowl typhoid- *Salmonella gallinarum*

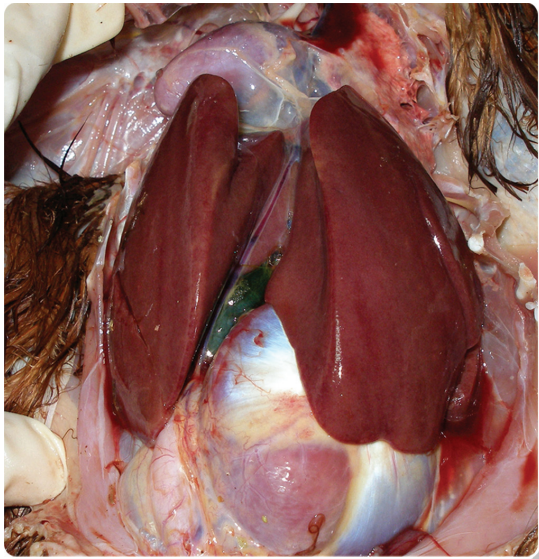


Fig. 1. Coppery liver



Fig. 2. Haemorrhage in ovary

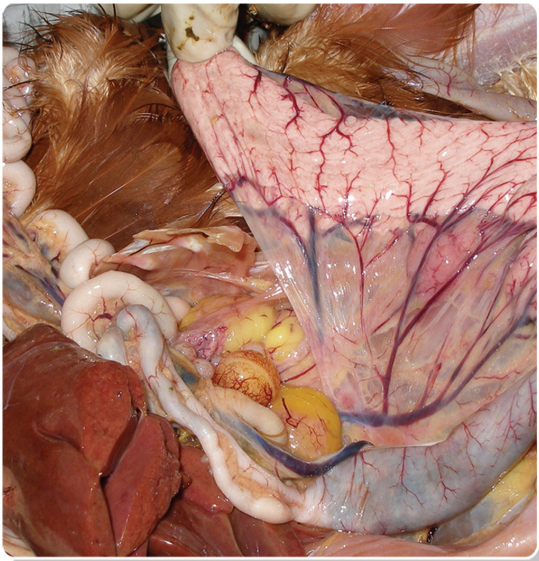


Fig. 3. Haemorrhage in oviduct



Fig. 4. Haemorrhage in intestine



# DISEASES OF POULTRY

## PART-I- Bacterial Diseases

### *Salmonella gallinarum*-Cultural characteristics

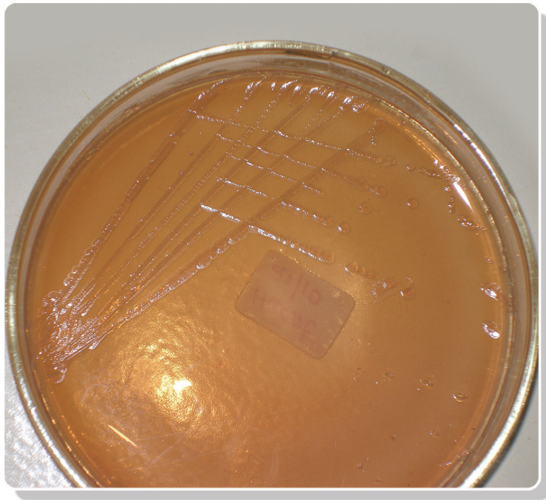


Fig. 5. Colony in Mac Conkey's agar

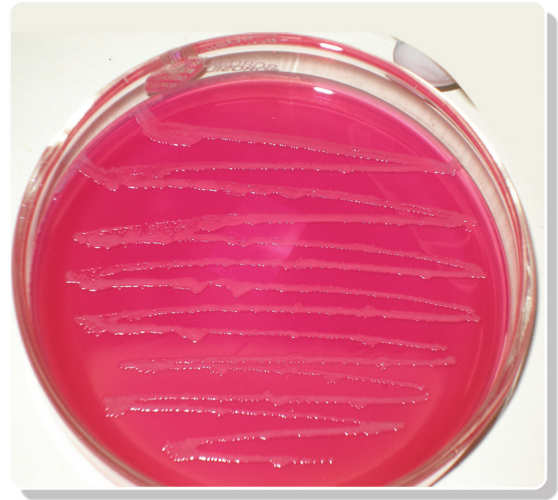


Fig. 6. Colony in Brilliant Green agar (BGA)

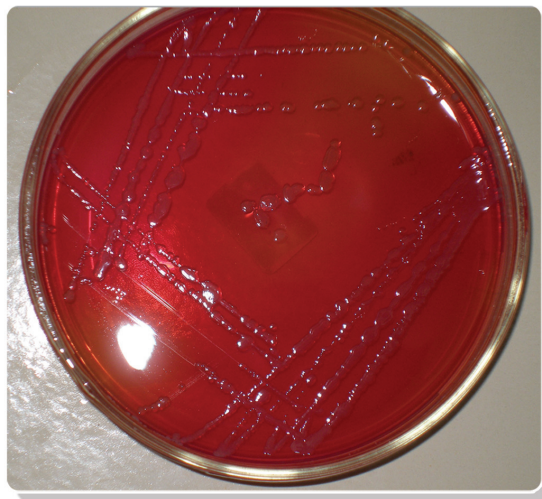


Fig. 7. Colony in Xylose Lysine Deoxycholate agar (XLD)

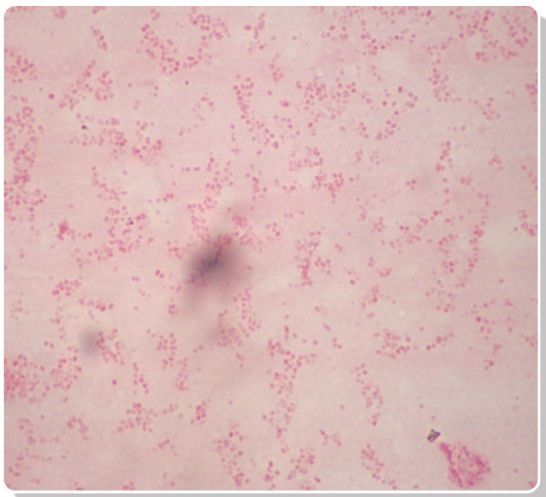


Fig. 8. Gram's staining of colony-  
Gram negative Coccobacilli



Fig. 9. Triple Sugar Iron agar-  
Yellow butt and pink slant



# DISEASES OF POULTRY

## PART-I- Bacterial Diseases

Fowl Cholera- *Pasteurella multocida*

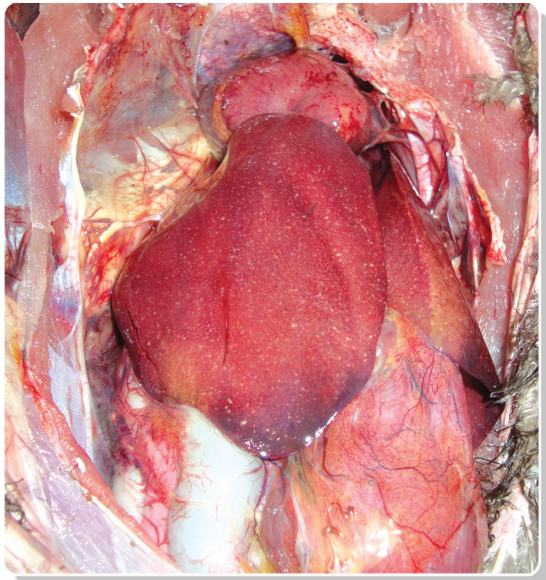


Fig. 1. Liver- Pinpoint necrotic foci and  
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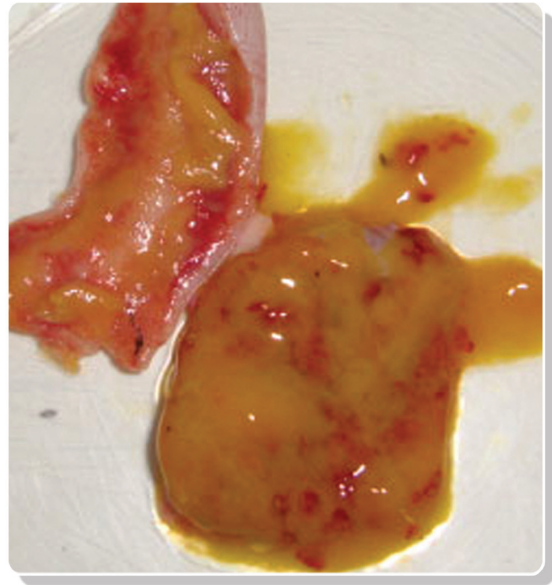


Fig. 2. Intestine-haemorrhages

### *Pasteurella multocida*-Cultural characteristics

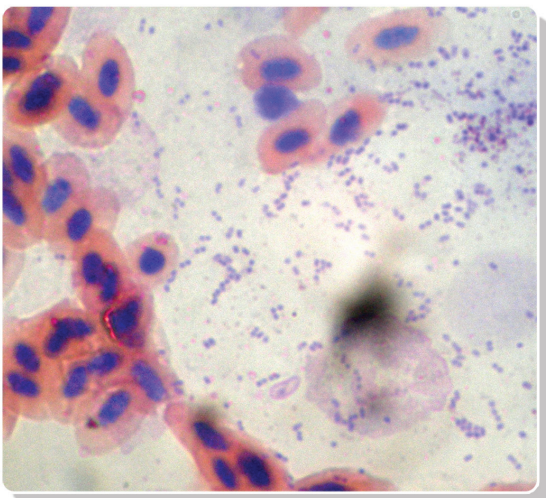


Fig. 3. Avian *Pasteurella multocida* in  
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Fig. 4. Colony of avian *Pasteurella multocida*  
in blood agar

# **DISEASES OF POULTRY**

## **PART-I- Bacterial Diseases**

### **Staphylococcal infection in chicks**

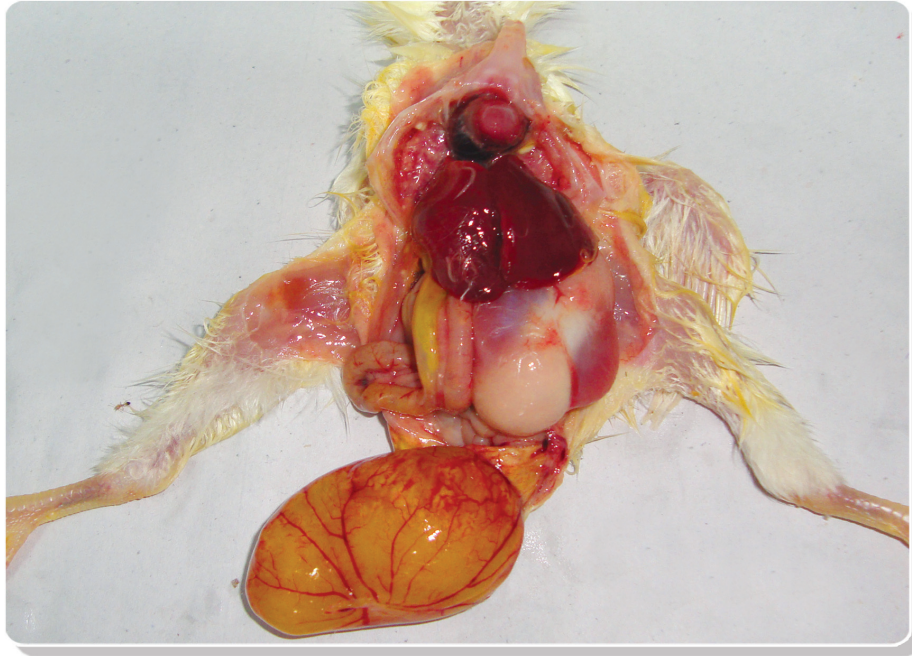


Fig. 1. Unabsorbed yolk material

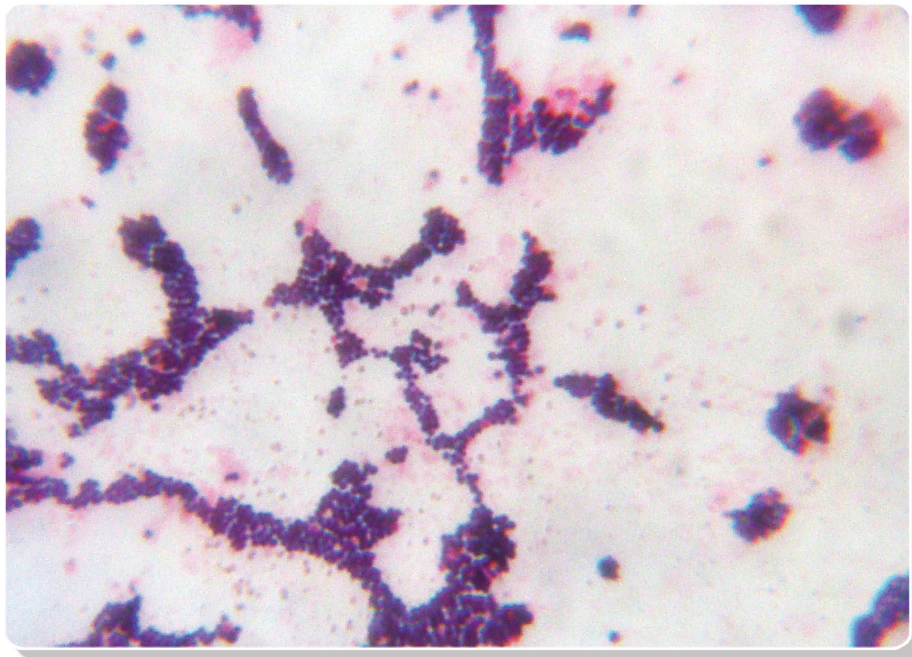


Fig. 2. *Staphylococcus aureus* –Gram's staining



## **DISEASES OF POULTRY**

### **PART-I- Bacterial Diseases**

#### **Diseases due to *Escherichia coli***

##### *Escherichia coli*-infection in chicks

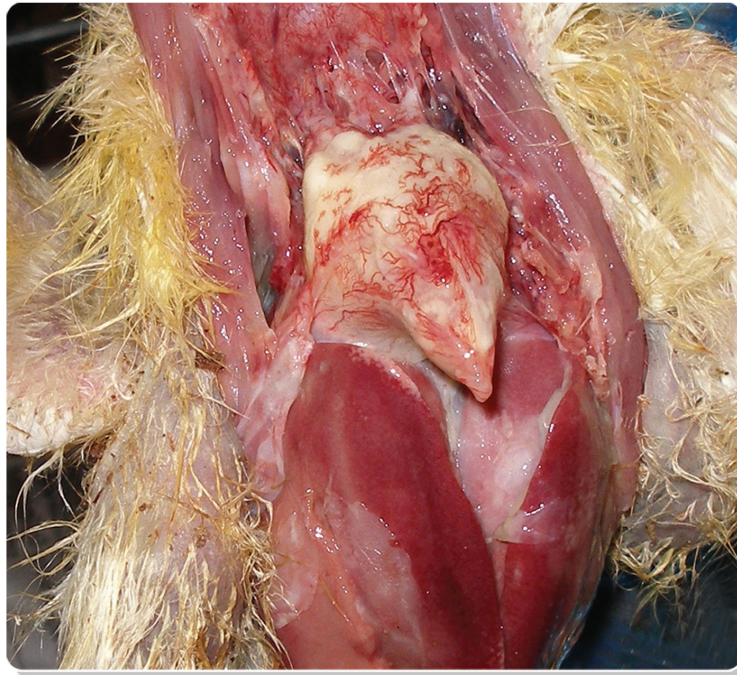


Fig. 1. Fibrinous pericarditis



Fig. 2. Fibrinous perihepatitis

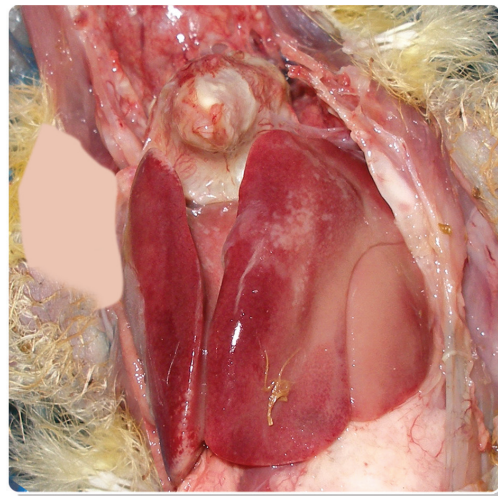


Fig. 3. Liver-necrosis and haemorrhage



# DISEASES OF POULTRY

## PART-I- Bacterial Diseases

### Diseases due to *Escherichia coli*

#### *Escherichia coli*-infection in chicks

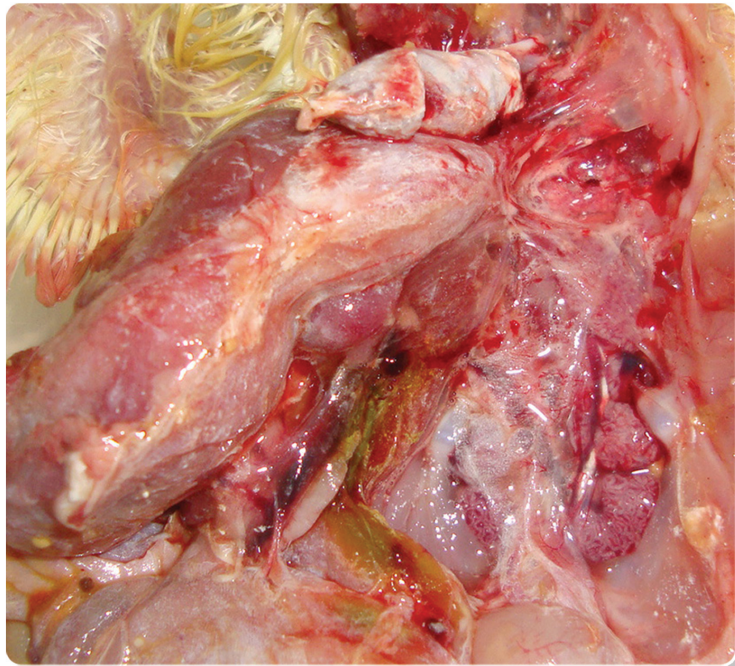


Fig. 4. Heart - Fibrin deposits in pericardium

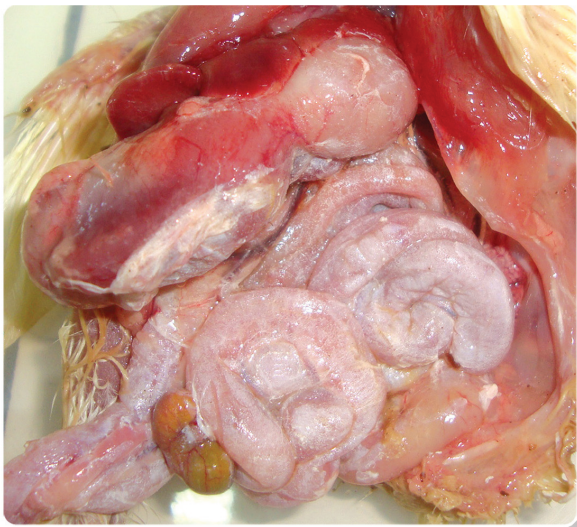


Fig. 5. Fibrin deposits covering intestine

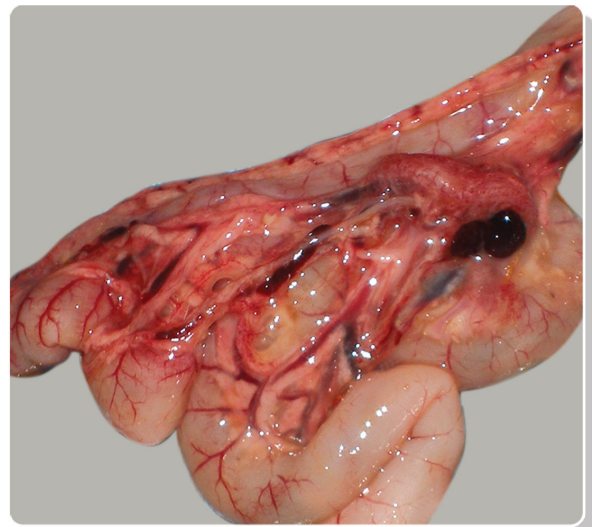


Fig. 6. Haemorrhage - Intestine

# **DISEASES OF POULTRY**

## **PART-I- Bacterial Diseases**

*Escherichia coli* infection & tapeworm infestation



Fig. 1. Intestine - Severe tapeworm infestation

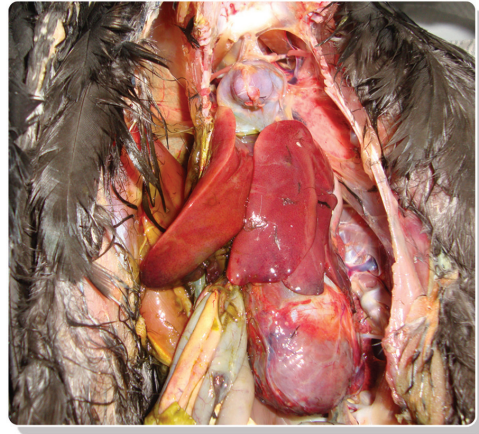


Fig. 2. Liver - Haemorrhage

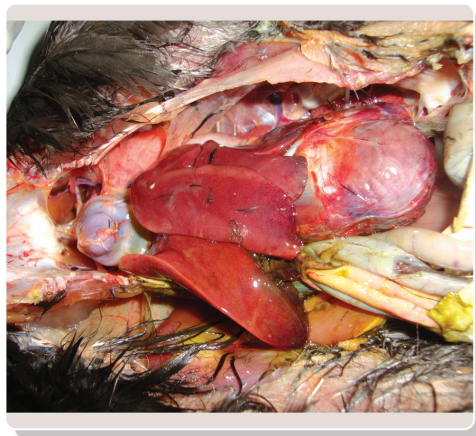


Fig. 3. Viscera

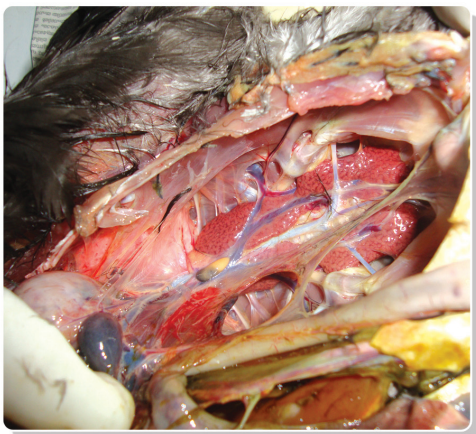


Fig. 4. Kidney - Nephritis



Fig. 5. Trachea - Blood clots



# **DISEASES OF POULTRY**

## **PART-I- Bacterial Diseases**

### **Diseases due to *Escherichia coli***

*Escherichia coli*-infection in Silky fowl



Fig. 1. Cyanosis of comb and wattles

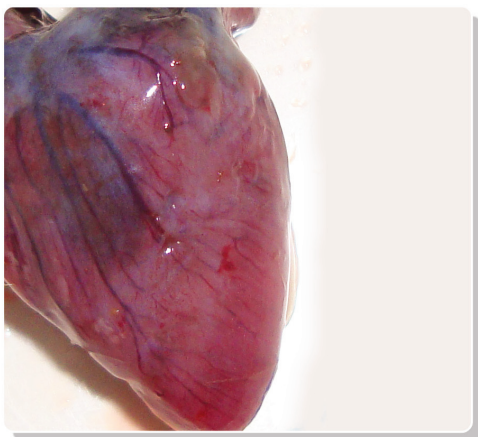


Fig. 2. Heart-haemorrhages

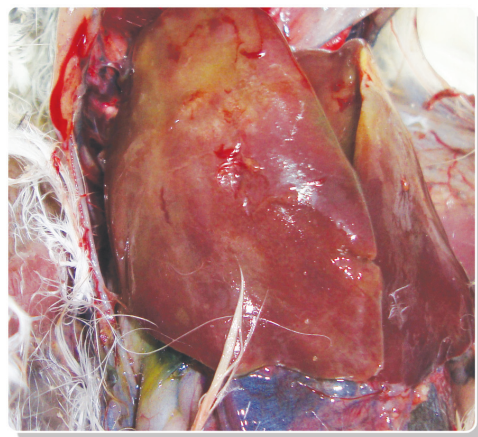


Fig. 3. Liver- necrosis and haemorrhage



## **DISEASES OF POULTRY**

### **PART-I- Bacterial Diseases**

#### **Diseases due to *Escherichia coli***

*Escherichia coli*-infection in Silky fowl

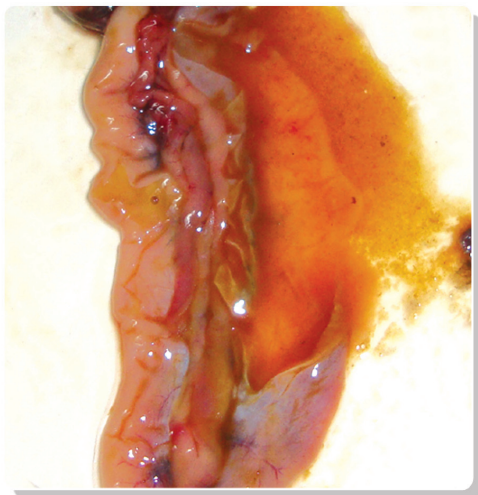


Fig. 4. Intestine-haemorrhagic enteritis



Fig. 5. Kidney-nephritis



Fig. 6. Trachea-cyanosis



Fig. 7. Cyanosis of internal organs

## **DISEASES OF POULTRY**

### **PART-I- Bacterial Diseases**

#### **Diseases due to *Escherichia coli***

*Escherichia coli*-infection in Guinea fowl

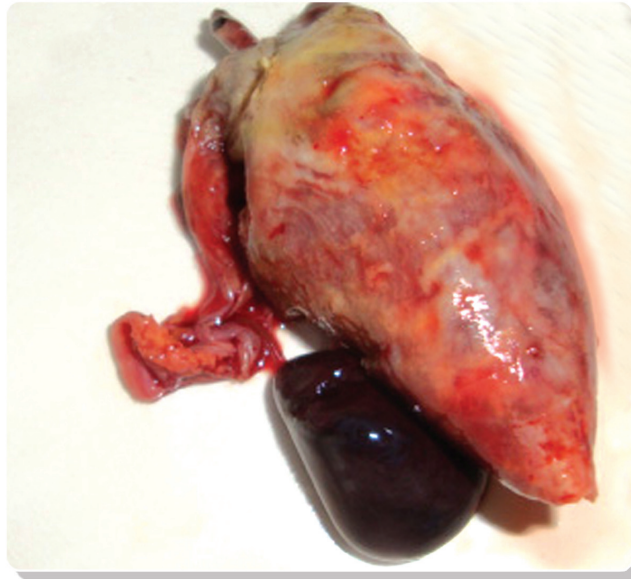


Fig. 1. Heart-fibrinous pericarditis

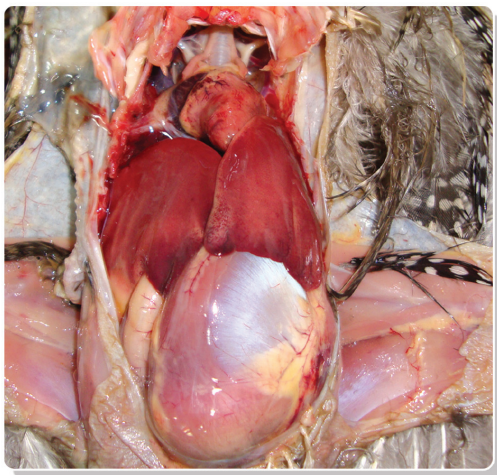


Fig. 2. Liver-necrosis and haemorrhage

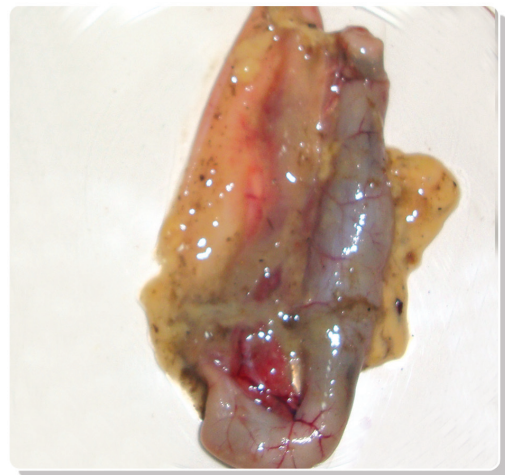


Fig. 3. Intestine - enteritis



**DISEASES OF POULTRY**  
PART-I- Bacterial Diseases  
Diseases due to *Escherichia coli*  
*Escherichia coli*-cultural characteristics



Fig. 1. Colony in Eosin Methylene Blue (EMB) agar

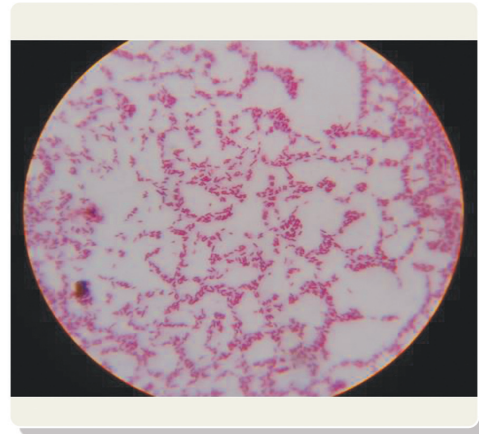


Fig. 2. Gram-negative medium sized rods

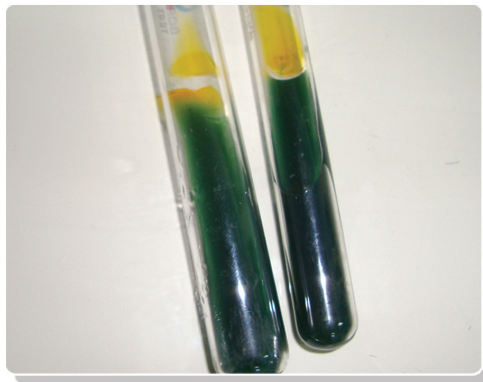


Fig. 3. Citrate negative

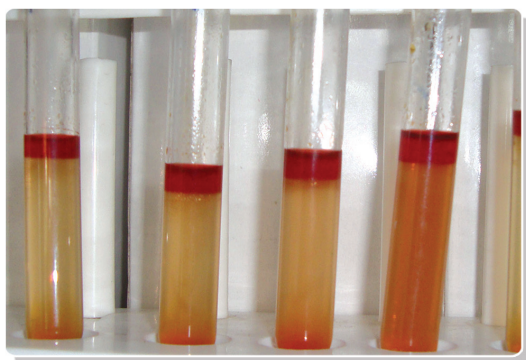


Fig. 4. *Escherichia coli*-IMVIC reaction  
- Indole positive



Fig. 5. *E. coli*-isolates - IMVIC reaction  
MR Positive, VP Negative, Citrate Negative  
TSI - Yellow butt and Yellow Slant

# DISEASES OF POULTRY

## PART-II- Viral Diseases

### New Castle Disease (Ranikhet disease) in poultry

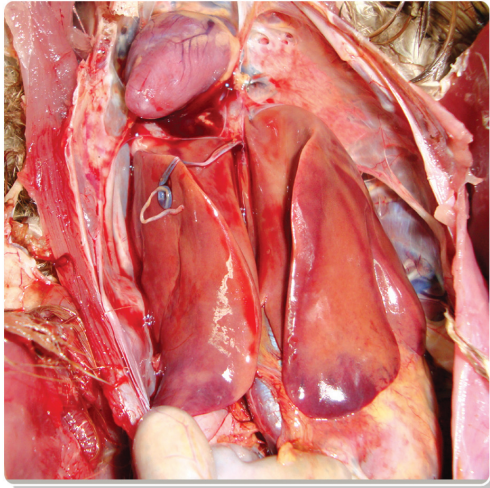


Fig. 1. Liver-Necrosis



Fig. 2. Heart and Spleen - Splenomegaly

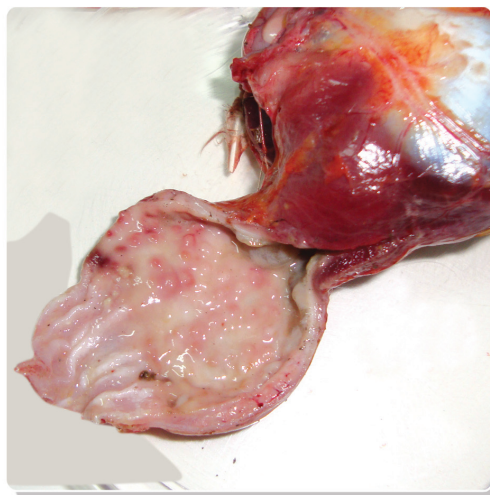


Fig. 3. Haemorrhage in proventriculus



Fig. 4. Enteritis



## **DISEASES OF POULTRY**

### **PART-II- Viral Diseases**

New Castle Disease (Ranikhet disease) in Kangayam fowl



Fig. 1. Liver-Necrosis



Fig. 2. Trachea-Haemorrhage



Fig. 3. Spleen-Necrosis

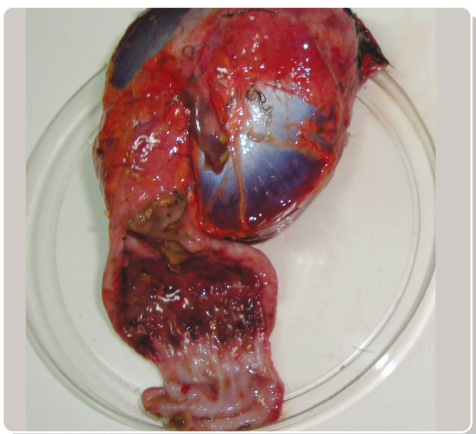


Fig. 4. Haemorrhage in tip of proventricular glands

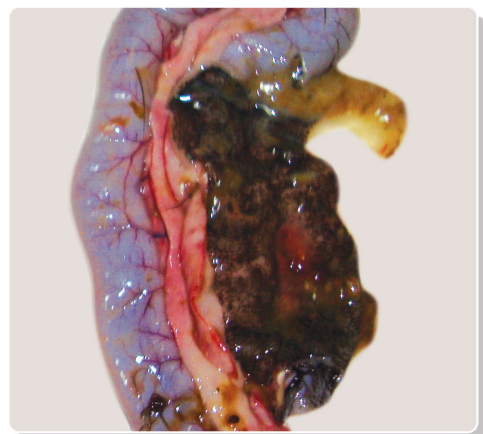


Fig. 5. Intestine-Haemorrhage

# **DISEASES OF POULTRY**

## **PART-II- Viral Diseases**

### **Infectious Bursal Disease (IBD)**

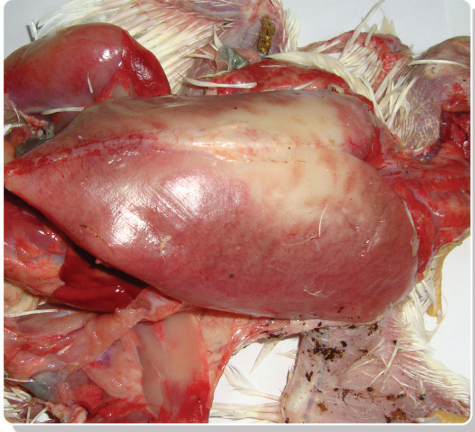


Fig. 1. Haemorrhage in breast muscles

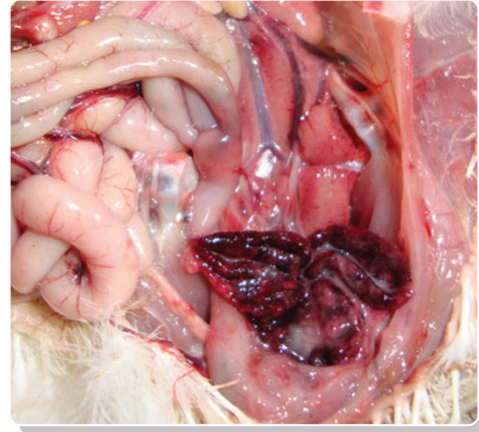


Fig. 2. Haemorrhage in bursa

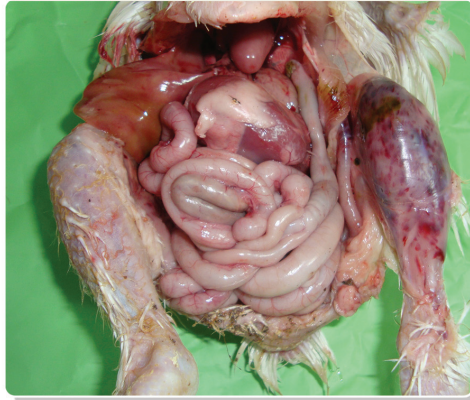


Fig. 3. Haemorrhage in thigh muscles



Fig. 4. Liver and spleen

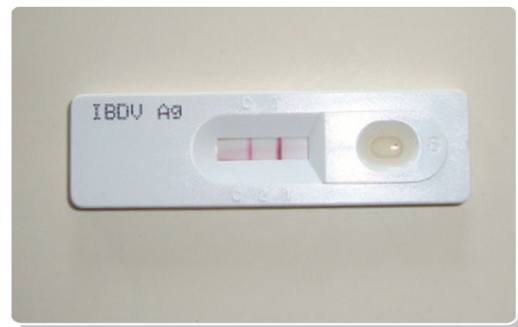


Fig. 5. Antigen detection ELISA-Positive

# **DISEASES OF POULTRY**

## **PART-II- Viral Diseases**

### **Infectious Bursal Disease (IBD)**



Fig. 6. Affected Bird - Head

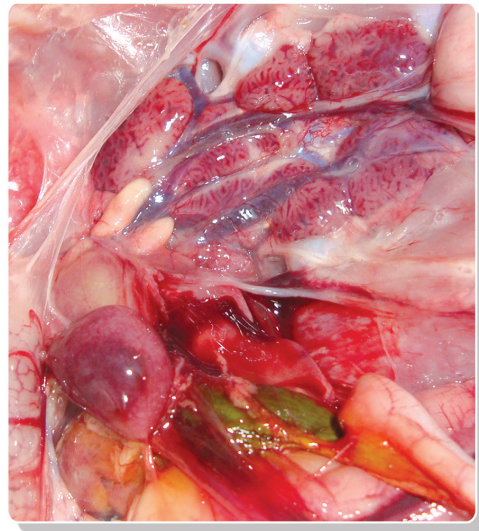


Fig. 7. Spleen & Kidney - Haemorrhage

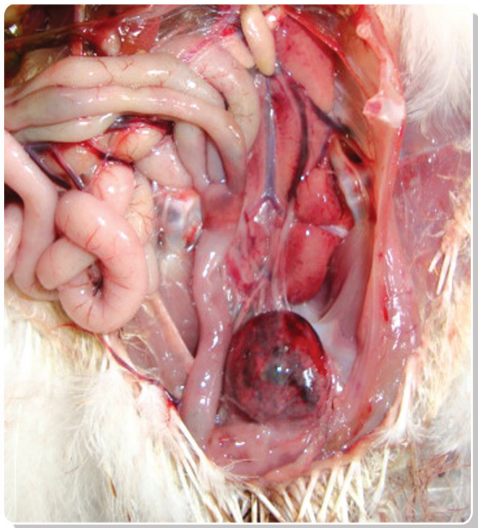


Fig. 8. Bursa - Enlarged & Haemorrhagic

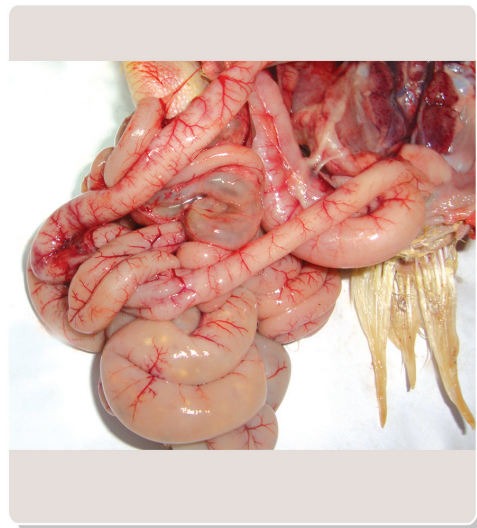


Fig. 9. Intestine - Serosal blood vessels - congestion



# DISEASES OF POULTRY

## PART-II- Viral Diseases

### Infectious bronchitis - (IB) in poultry

#### Chick embryo inoculation

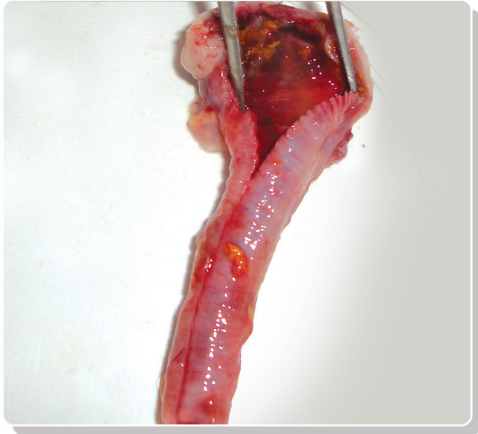


Fig. 1. Trachea - Haemorrhage



Fig. 2. Control embryo - Right, Inoculated embryo - Left  
Dwarfing of inoculated embryo



Fig. 3. Dwarfing and congestion of inoculated embryo



Fig. 4. Liver of inoculated embryos



Fig. 5. Liver of inoculated embryo

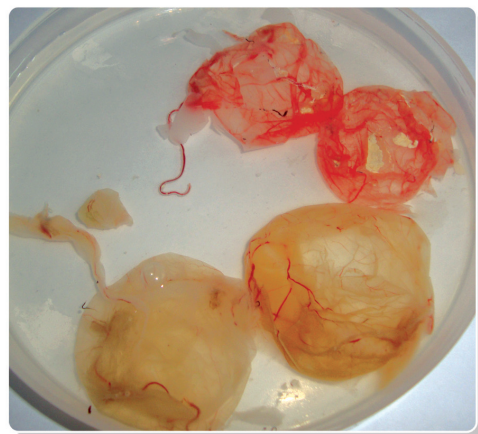


Fig. 6. Chorio allantoic membranes of inoculated embryos

## **DISEASES OF TURKEY**

### **PART-I- Bacterial Diseases**

#### **Pasteurellosis - *Pasteurella multocida***



Fig. 1. Liver-Necrotic foci



Fig. 2. Heart-pinpoint haemorrhages



Fig. 3. Spleen-Necrosis

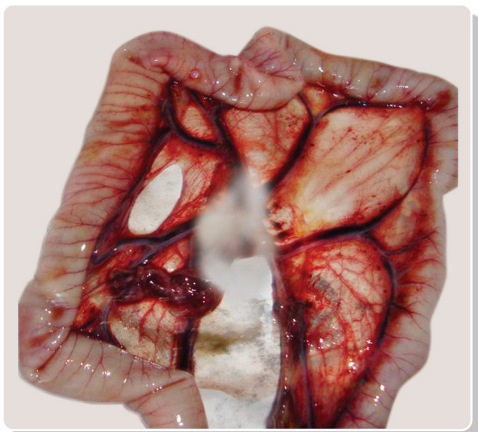


Fig. 4. Intestine-Haemorrhages in mesentery

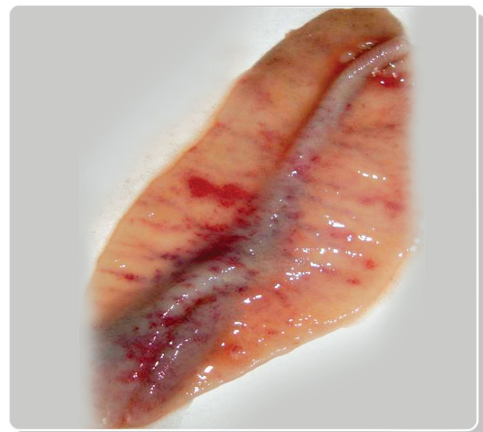


Fig. 5. Intestine- Mucosal haemorrhages

# **DISEASES OF TURKEY**

## **PART-I- Bacterial Diseases**

### **Pasteurellosis - *Pasteurella multocida***



Fig. 6. Colony in blood agar

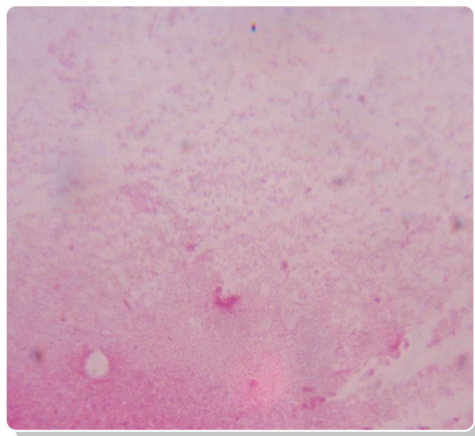


Fig. 7. Gram's staining-Gram negative cocco bacilli

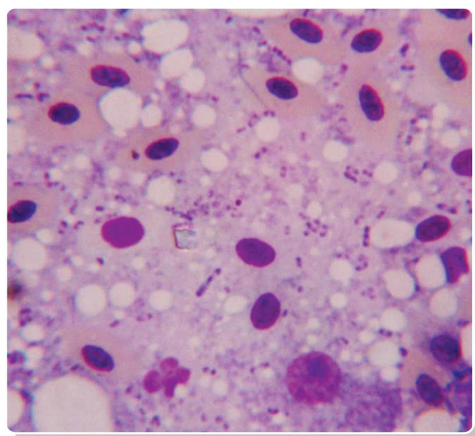


Fig. 8. Heart blood smear-bipolar bacterium



# DISEASES OF QUAILS

## PART-I- Bacterial Diseases

Pasteurellosis - *Pasteurella multocida*



Fig. 1. Haemorrhage in liver



Fig. 2. Liver pinpoint haemorrhages

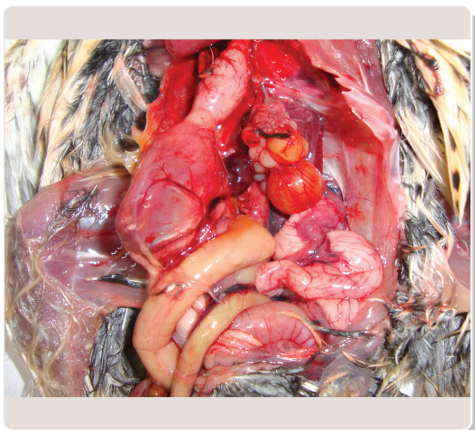


Fig. 3. Haemorrhage - Ovary



Fig. 4. Haemorrhage in serosa of proventriculus and gizzard

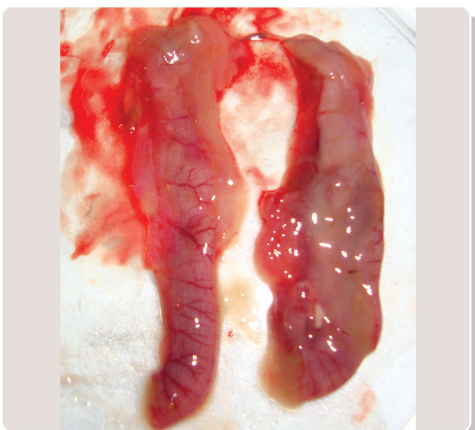


Fig. 5. Intestine - Haemorrhages



Fig. 6. Haemorrhage in trachea

# **DISEASES OF QUAILS**

## **PART-I- Bacterial Diseases**

Diseases due to *Escherichia coli*



Fig. 1. Pinpoint haemorrhages and necrosis - Liver



Fig. 2. Haemorrhage in Ovary

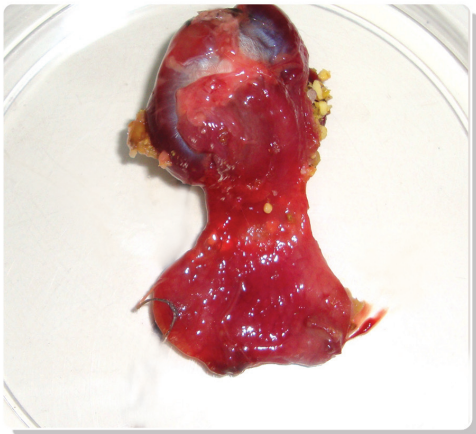


Fig. 3. Gizzard and proventriculus - Haemorrhage



Fig. 4. Haemorrhage in Oviduct



Fig. 5. Haemorrhagic enteritis

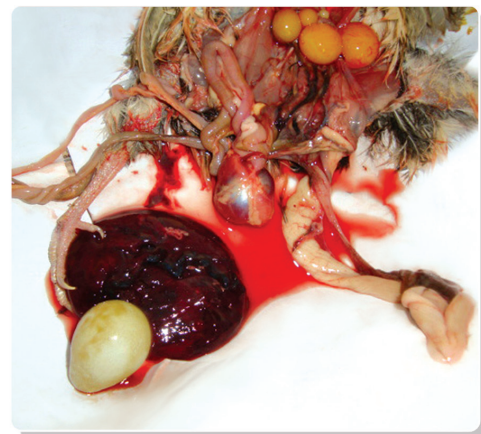


Fig. 6. Oviductal haemorrhage



# **DISEASES OF QUAILS**

## **PART-I- Bacterial Diseases**

Diseases due to Micrococcus



Fig. 1. Haemorrhages and necrosis - Liver



Fig. 2. Enteritis



Fig. 3. Colony of bacteria in nutrient agar

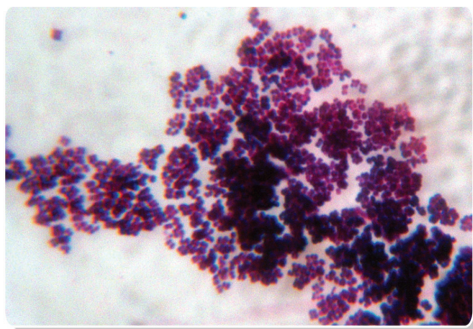


Fig. 4. Gram's staining - Gram positive cocci



# DISEASES OF QUAILS

## PART-II- Fungal Diseases

*Aspergillus- Aspergillus fumigatus*



Fig. 1. Nodules in lungs



Fig. 2. Growth of fungus in nodules in lungs

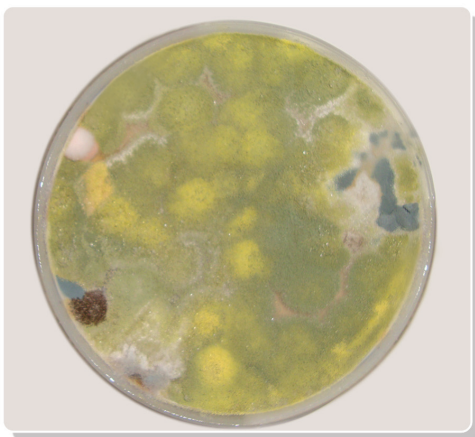


Fig. 3. Fungal colony in SDA - 3 to 4 days

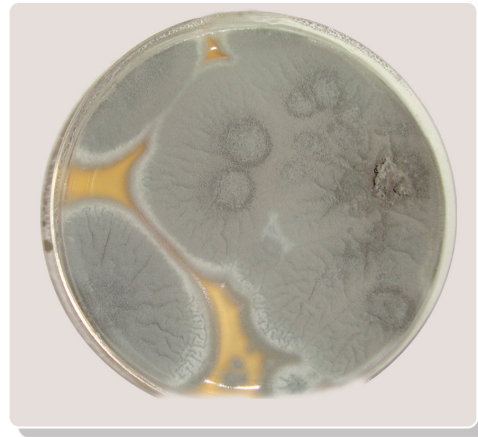


Fig. 4. Fungal colony in SDA - 7 to 8 days

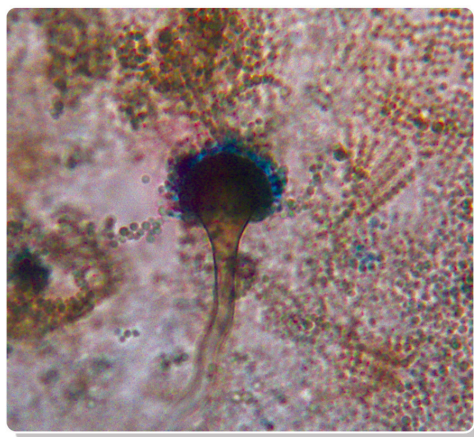


Fig. 5. Microscopic morphology of *Aspergillus* sp

# **DISEASES OF DUCKS**

## **PART-I- Bacterial Diseases**

Diseases due to *Escherichia coli*

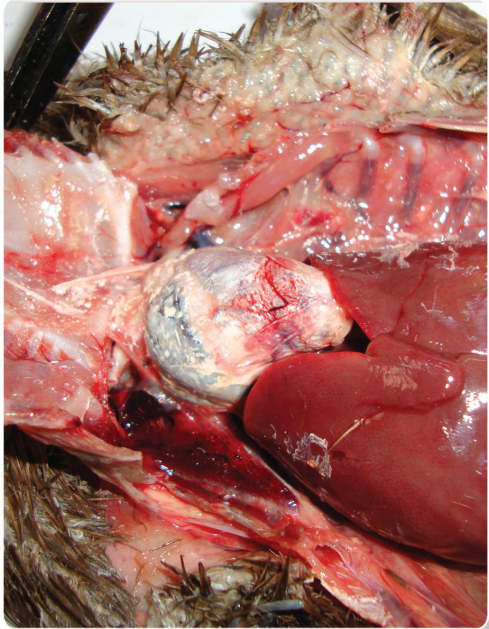


Fig. 1. Fibrinous pericarditis



Fig. 2. Fibrinous pericarditis and perihepatitis

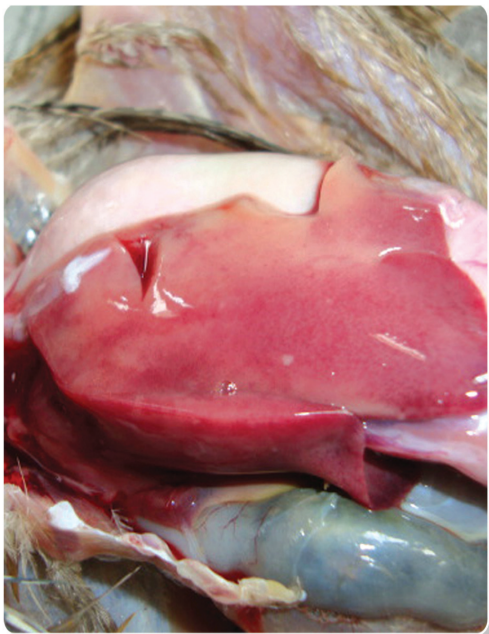


Fig. 3. Haemorrhage in liver



Fig. 2. Liver - fibrin deposits



# **DISEASES OF DUCKS**

## **PART-I- Bacterial Diseases**

Diseases due to - *Escherichia coli*



Fig. 1. Affected Bird - Carcass

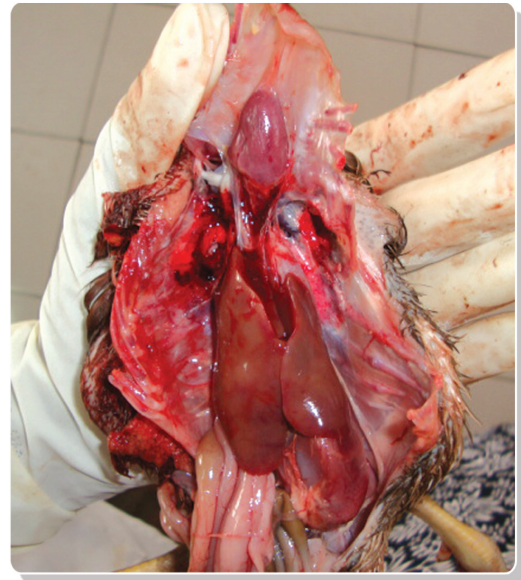


Fig. 2. Liver - Haemorrhage



Fig. 3. Lesions in footpad



Fig. 4. Liver, Spleen & Heart



# DISEASES OF DUCKS

## PART-I- Bacterial Diseases

New Duck Disease - *Riemerella anatipestifer*



Fig. 1. Incoordination and nervous signs affected ducklings

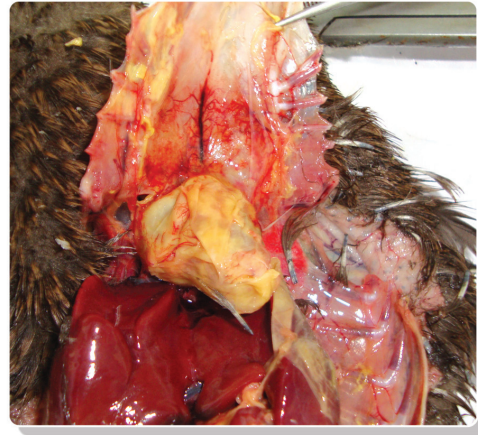


Fig. 2. Fibrinous pericarditis

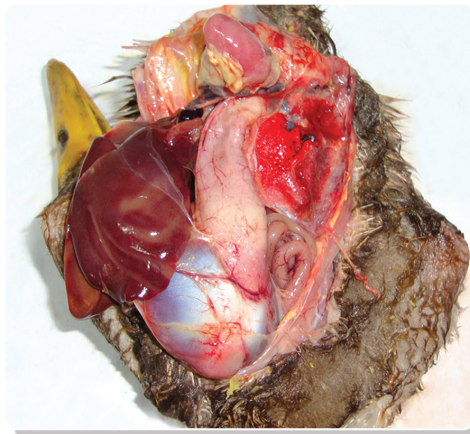


Fig. 3. Necrosis of liver



Fig. 4. Liver - hepatitis



Fig. 5. Fibrinous polyserositis

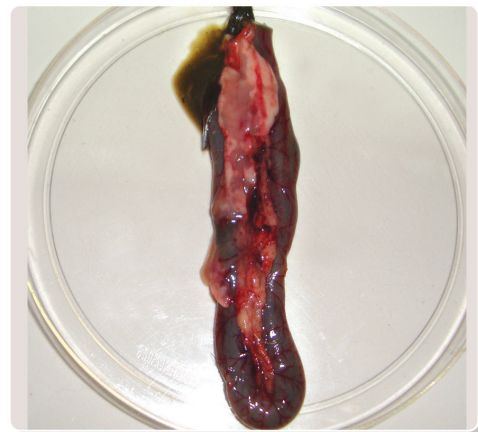


Fig. 6. Intestine and pancreas

# **DISEASES OF DUCKS**

## **PART-I- Bacterial Diseases**

Pasteurellosis - *Pasteurella multocida*

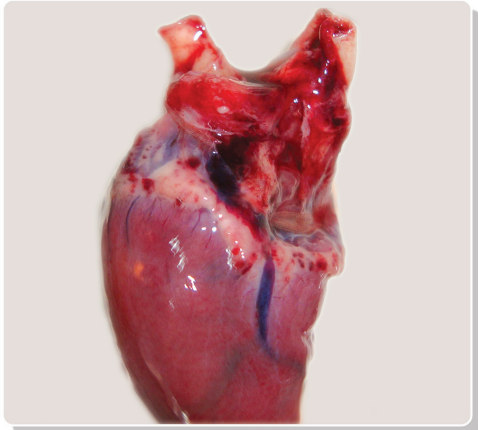


Fig. 1. Heart- pinpoint haemorrhages

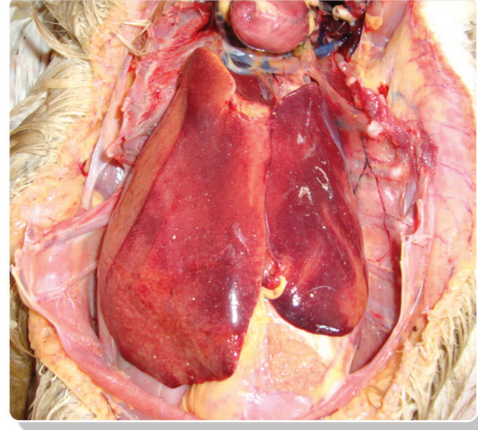


Fig. 2. Liver - Pin point necrotic foci

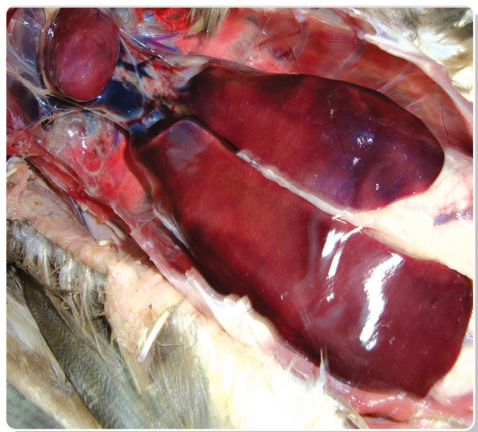


Fig. 3. Liver - pinpoint necrotic foci

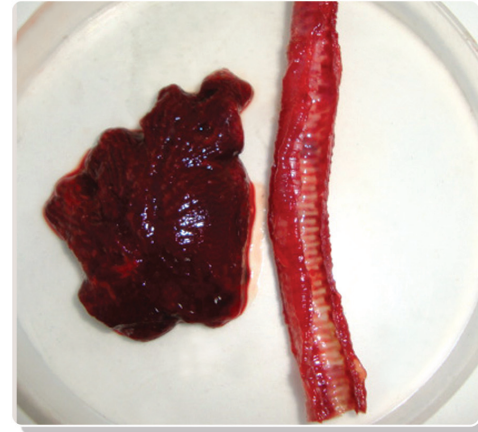


Fig. 4. Trachea and lungs - Haemorrhage

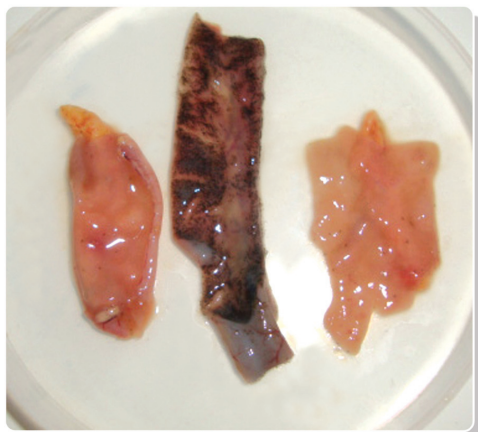


Fig. 5. Intestine - Enteritis and haemorrhages



Fig. 6. Pinpoint haemorrhages in intestinal mucosa



## **DISEASES OF DUCKS**

### **PART-I- Bacterial Diseases**

Pasteurellosis - *Pasteurella multocida*

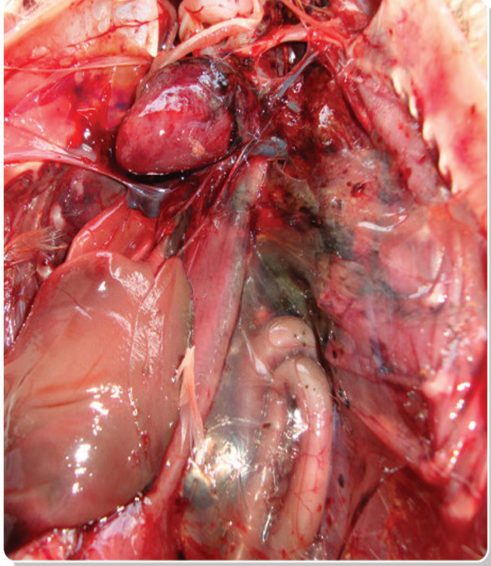


Fig. 7. Petechial haemorrhages - air sacs

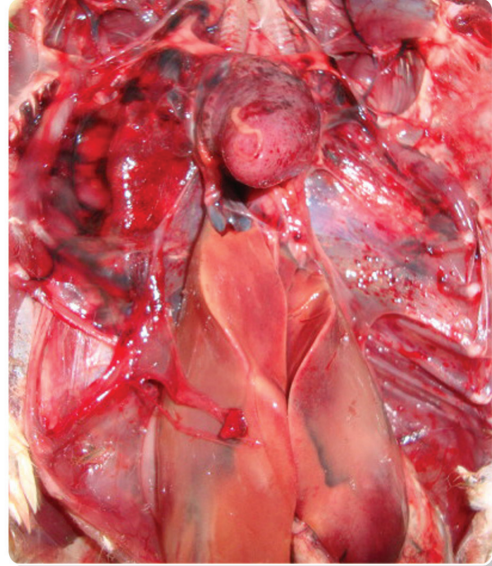


Fig. 8. Petechial haemorrhages - heart and airsacs

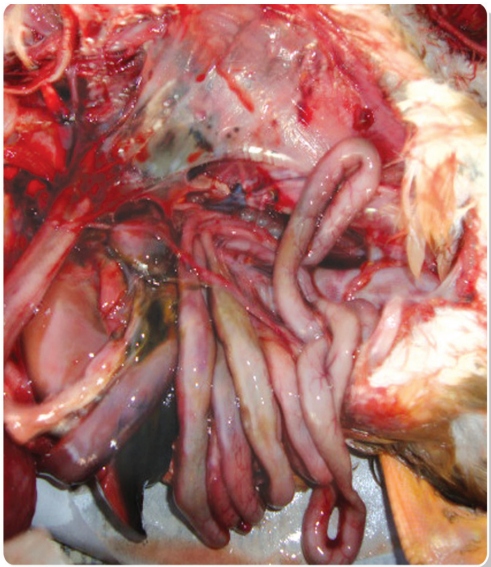


Fig. 9. Haemorrhages - serosa

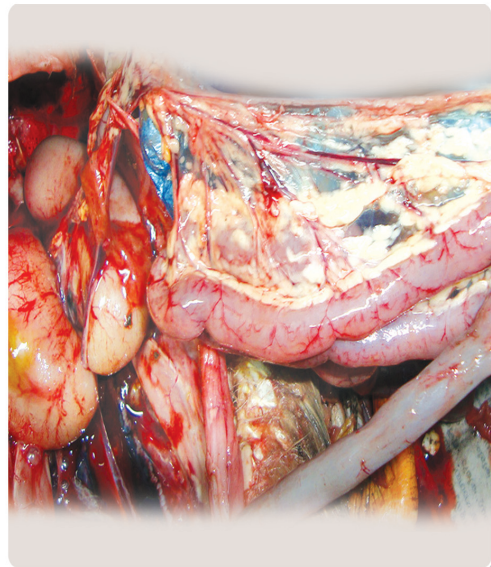


Fig. 10. Petechial haemorrhages - mesentery



## DISEASES OF FLYING DUCKS

### PART-I- Bacterial Diseases

Pasteurellosis - *Pasteurella multocida*



Fig. 1. Liver - pinpoint necrotic foci and haemorrhages

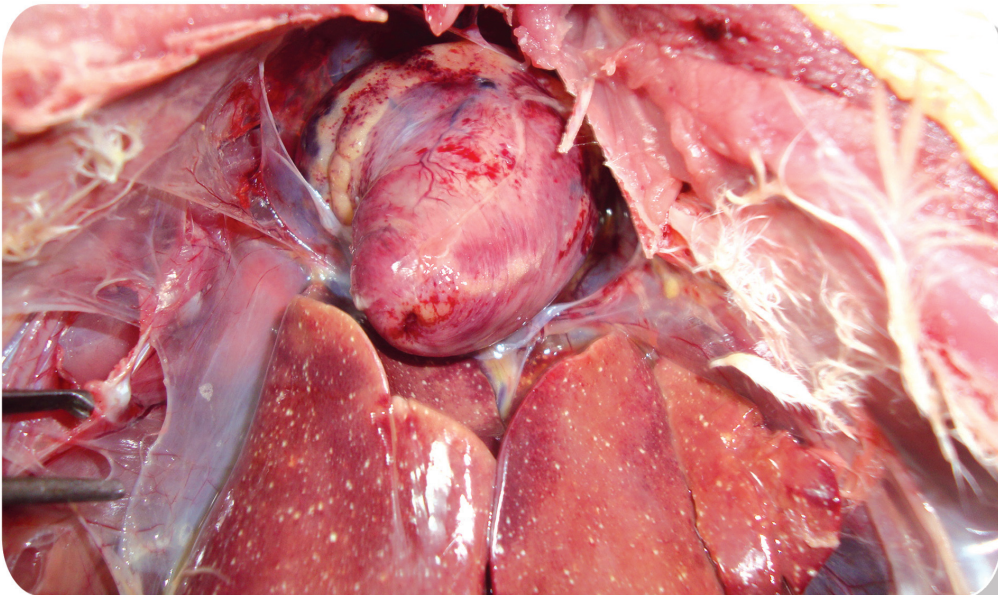


Fig. 2. Heart - petechial haemorrhages

## DISEASES OF DUCKS

### PART-I- Bacterial Diseases

Tuberculosis - *Mycobacterium avium*



Fig. 1. Duck - infected with avian tuberculosis



Fig. 2. Emaciated breast muscles

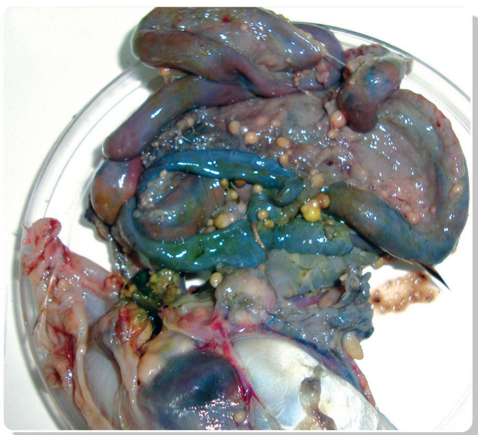


Fig. 3. Nodules in gastrointestinal system



Fig. 4. Nodules associated with GI system



Fig. 5. Lungs

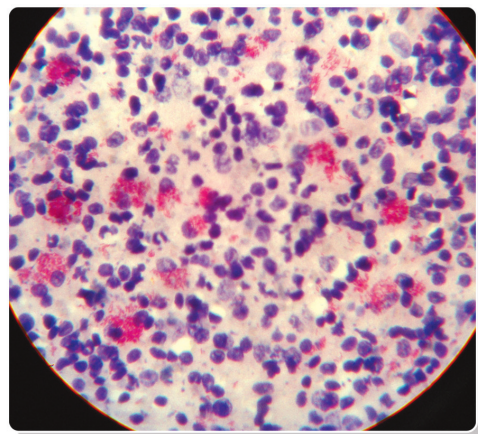


Fig. 6. Acid fast bacilli - Nodule impression smear



# DISEASES OF DUCKS

## PART-II- Fungal Diseases

Aspergillosis - *Aspergillus* species

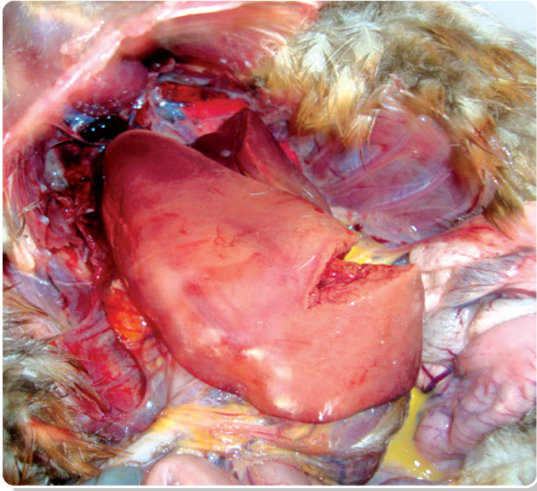


Fig. 1. Liver

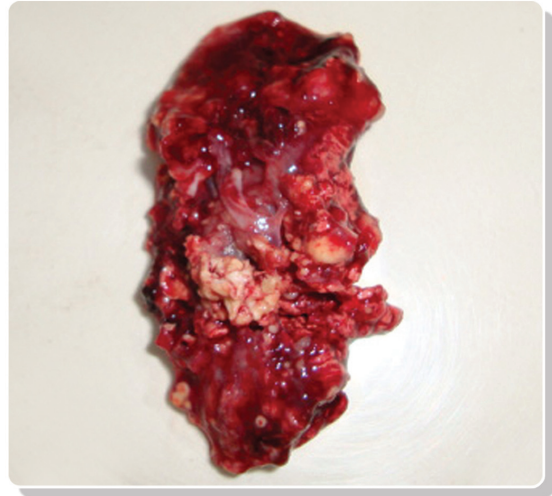


Fig. 2. Lungs with nodules

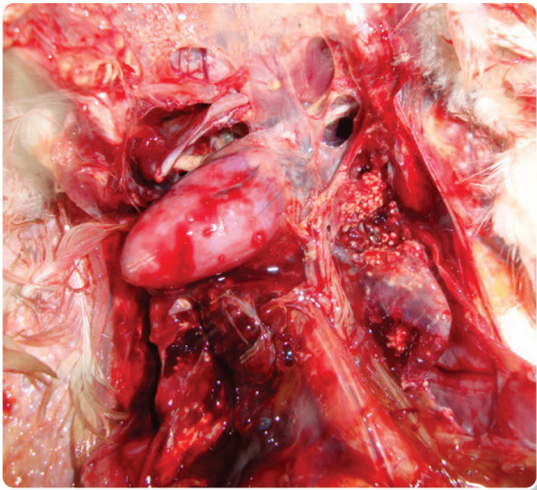


Fig. 3. Nodules in lungs and air sacs



Fig. 4. Fungal culture in SDA

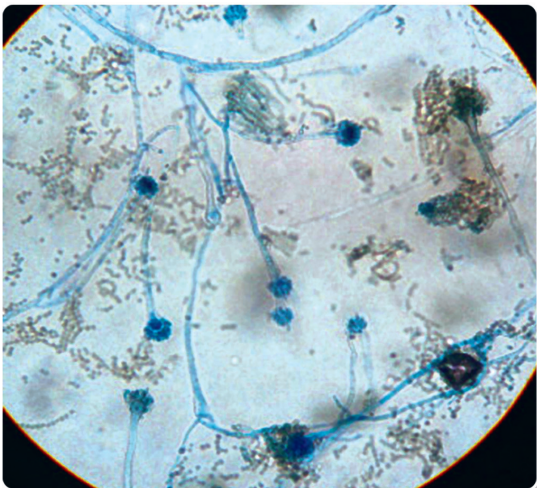


Fig. 5. Lactophenol cotton blue staining fungal culture

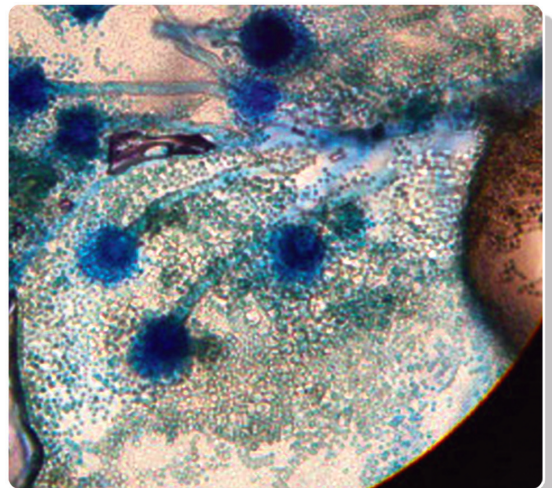


Fig. 6. Conidiophore vesicle *aspergillus* species - LPCB



## **DISEASES OF EMU**

### **PART-I- Bacterial Diseases**

Yersiniosis - *Yersinia enterocolitica*

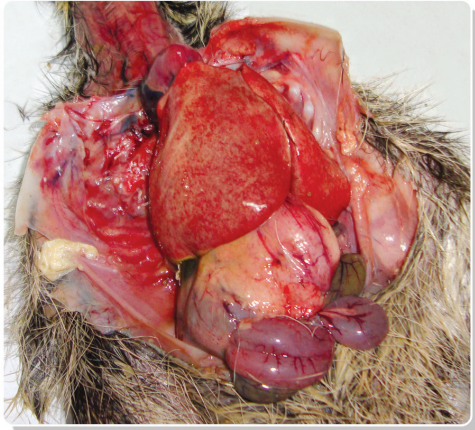


Fig. 1. Haemorrhages - Liver



Fig. 2. Heart - haemorrhages

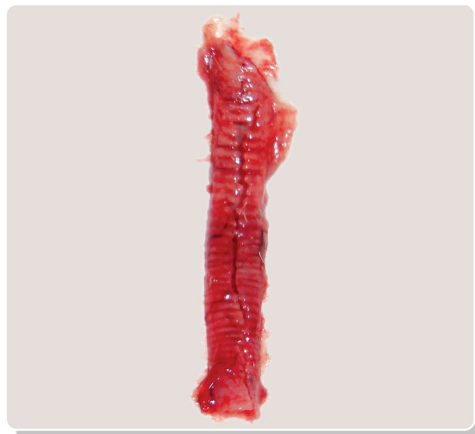


Fig. 3. Trachea - haemorrhages

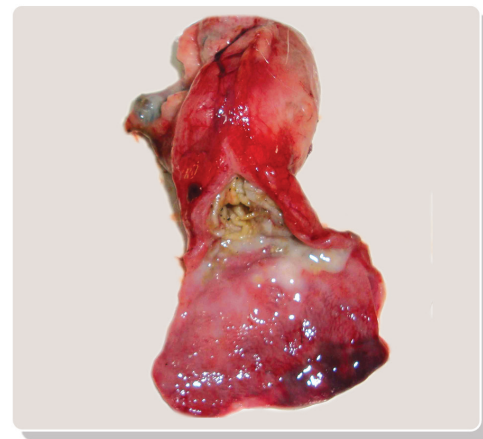


Fig. 4. Proventriculus and gizzard - haemorrhages

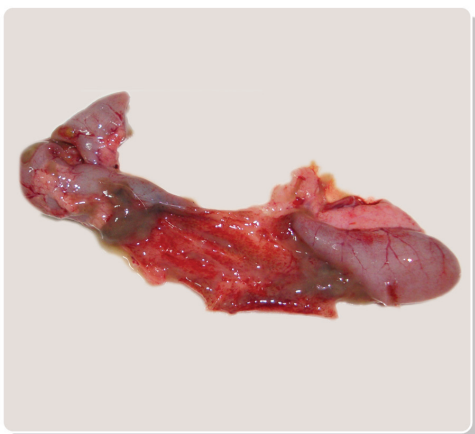


Fig. 5. Intestine - haemorrhagic enteritis

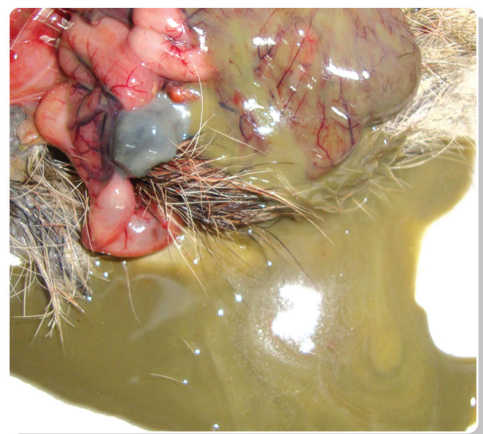


Fig. 6. Greenish and watery diarrhoea

# **DISEASES OF EMU**

## **PART-I- Bacterial Diseases**

Yersiniosis - *Yersinia enterocolitica*

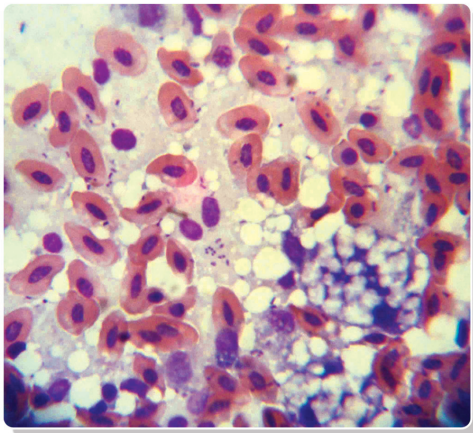


Fig. 1. Bipolar bacterium in heart blood smear-Giemsa staining

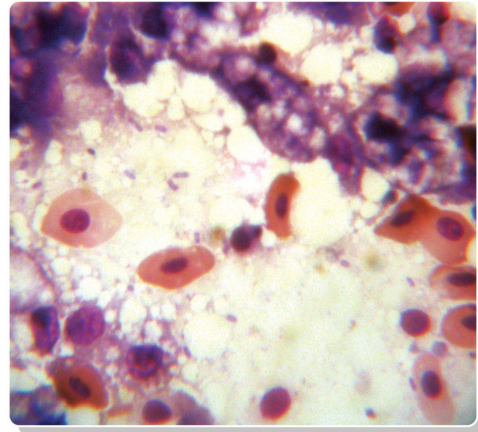


Fig. 2. Bipolar bacterium

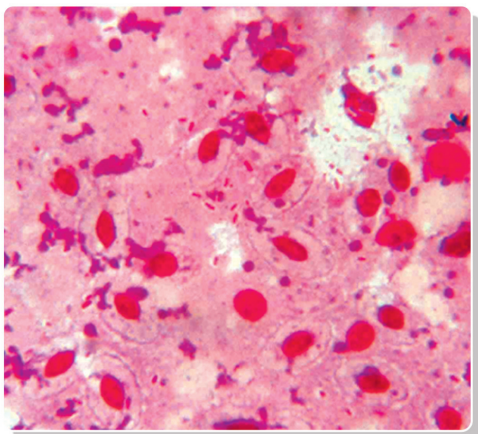


Fig. 3. Gram's staining of liver impression smear rod shaped bacterium

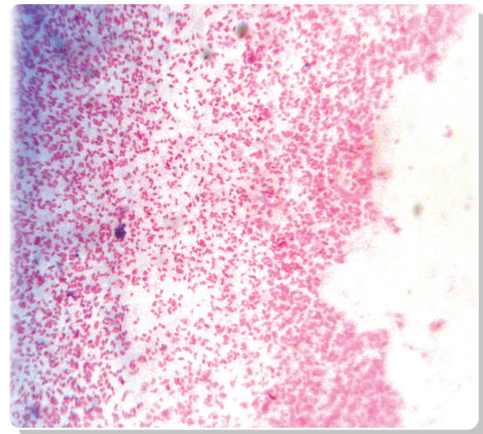


Fig. 4. Gram negative cocco bacilli

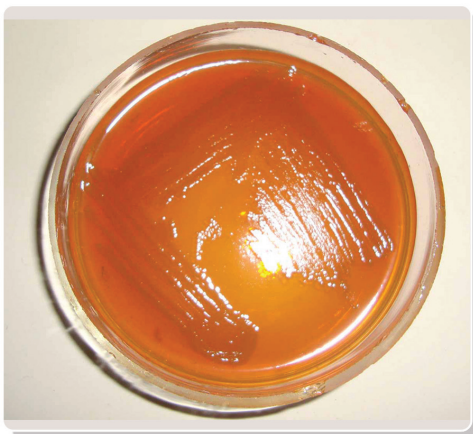


Fig. 5. Colony in Yersinia isolation agar

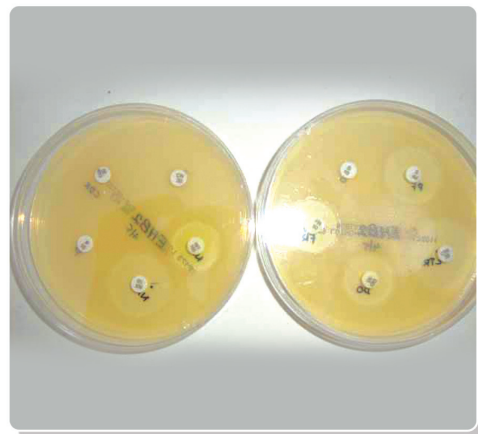


Fig. 6. Antibiotic sensitivity test - MHA



## **DISEASES OF EMU**

### **PART-I- Bacterial Diseases**

*Escherichia coli* infection

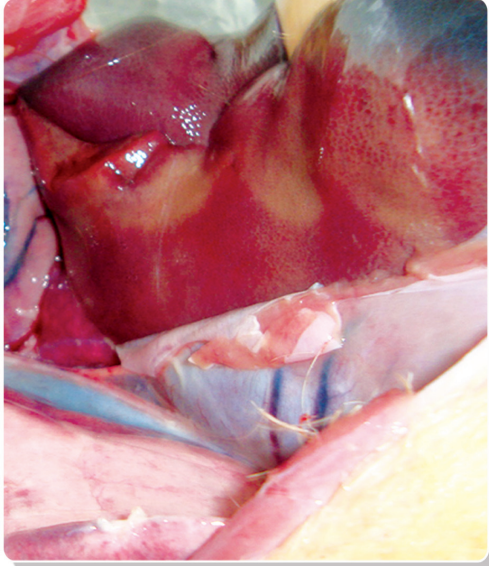


Fig. 1. Liver - haemorrhage and necrosis

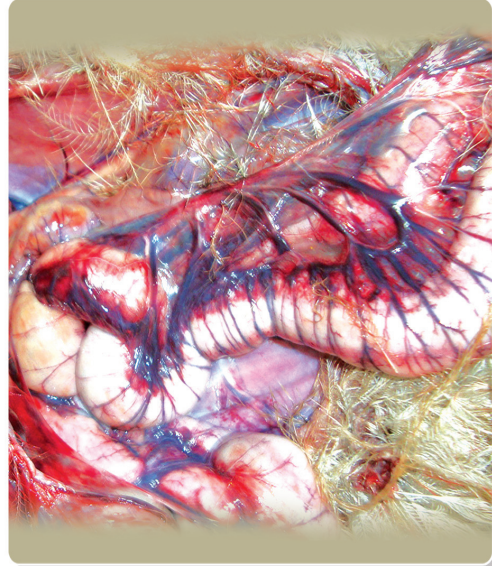


Fig. 2. Mesenteric blood vessels - congested

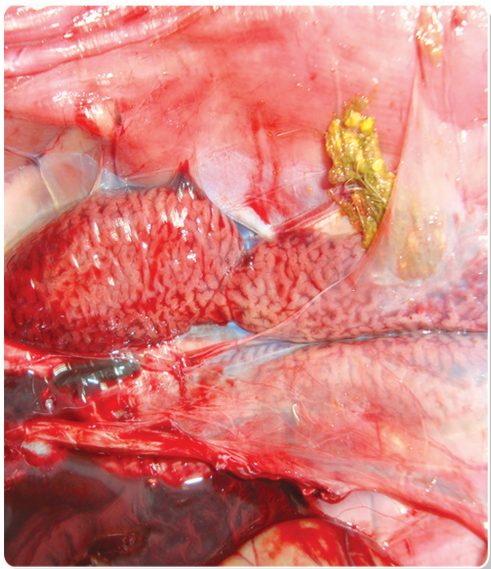


Fig. 3. Kidney - nephritis

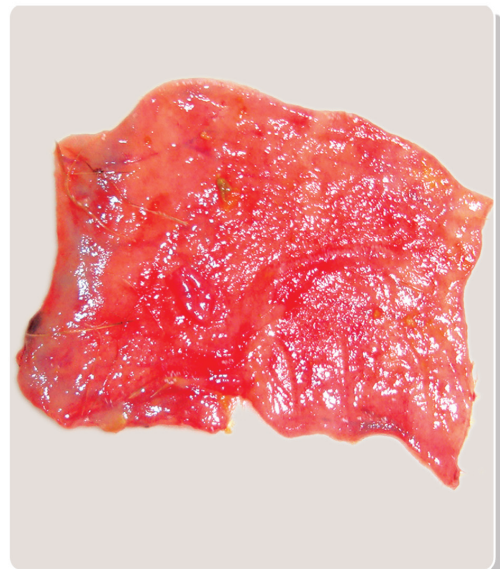


Fig. 4. Intestinal mucosa - haemorrhage

# **DISEASES OF EMU**

## **PART-I- Bacterial Diseases**

### **Staphylococcal infection**

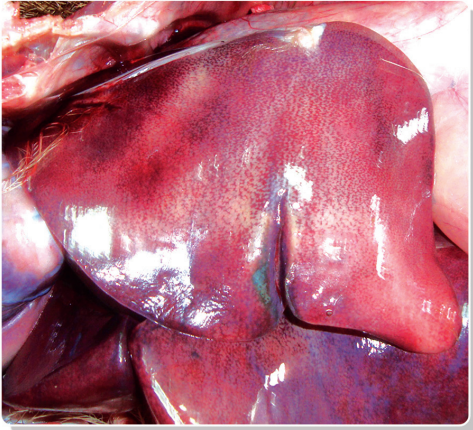


Fig. 1. Liver - pinpoint haemorrhages

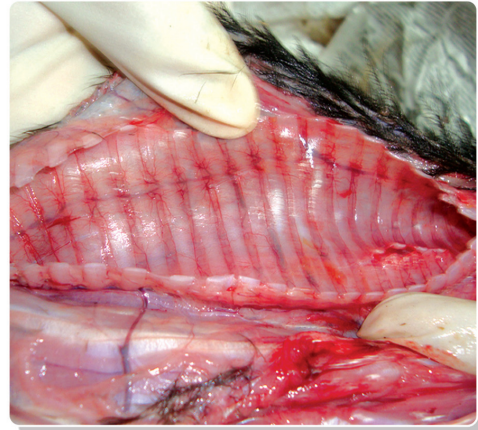


Fig. 2. Trachea

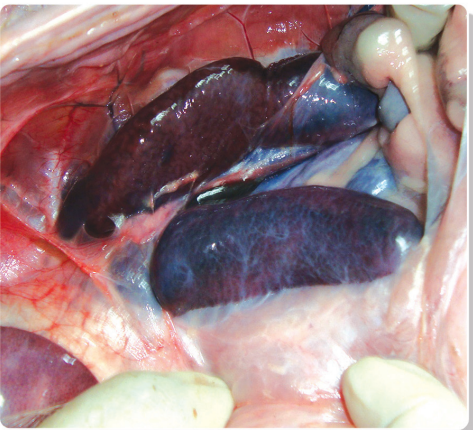


Fig. 3. Kidney

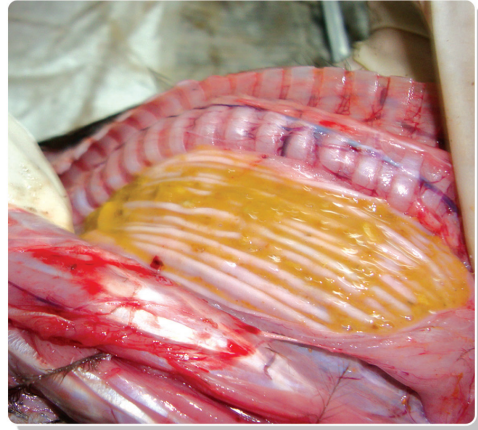


Fig. 4. Esophagus

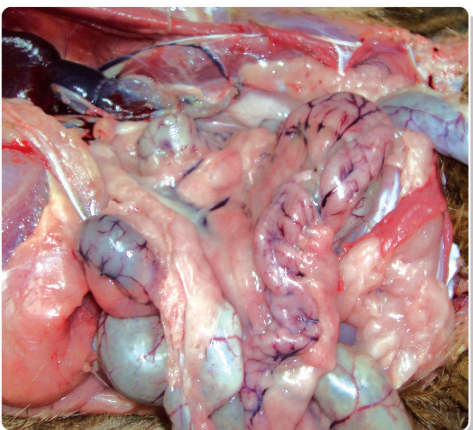


Fig. 5. Intestine



Fig. 6. Enteritis



# **DISEASES OF EMU**

## **PART-II- Fungal Diseases**

### **Aspergillosis**

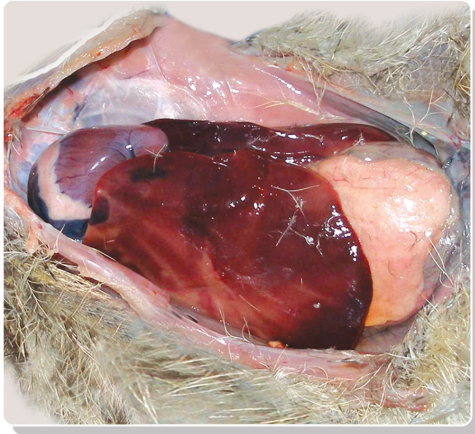


Fig. 1. Liver - Necrosis

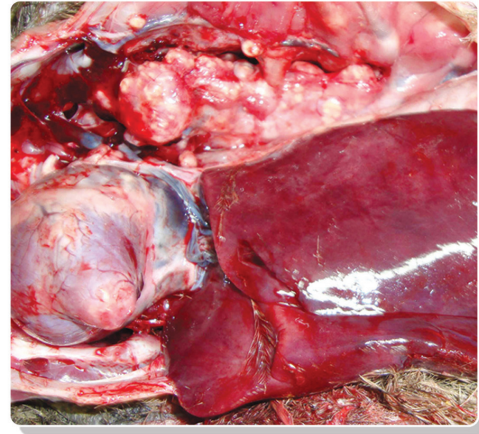


Fig. 2. Nodules in lungs

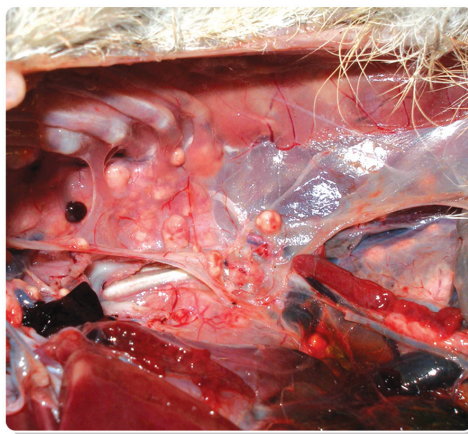


Fig. 3. Nodules in lungs and air sacs

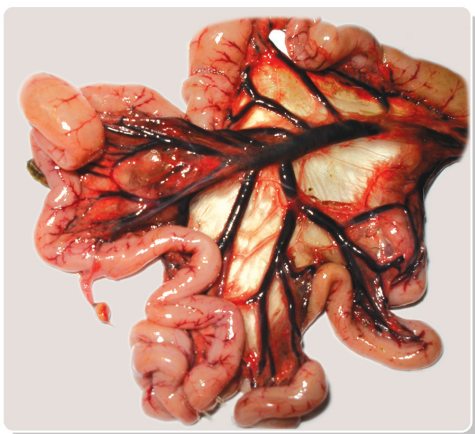


Fig. 4. Intestine and mesentery



Fig. 5. Meningeal blood vessels

## **DISEASES OF EMU**

### **PART-II- Fungal Diseases**

*Aspergillus fumigatus* - Aspergillosis

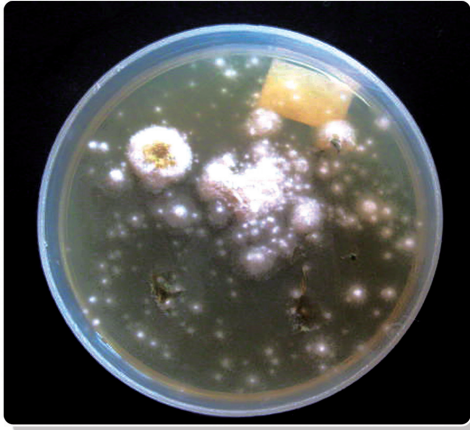


Fig. 1. *Aspergillus fumigatus* colony in SDA - 3 days

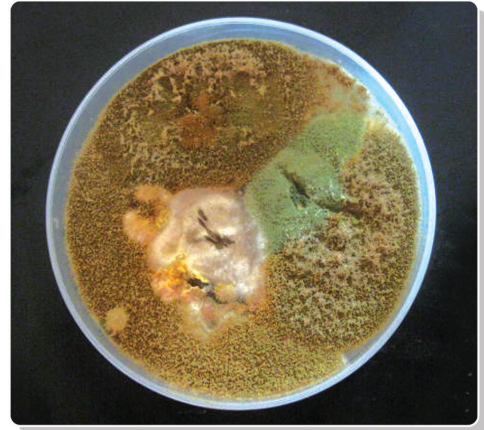


Fig. 2. *Aspergillus fumigatus* colony in SDA - 5 days

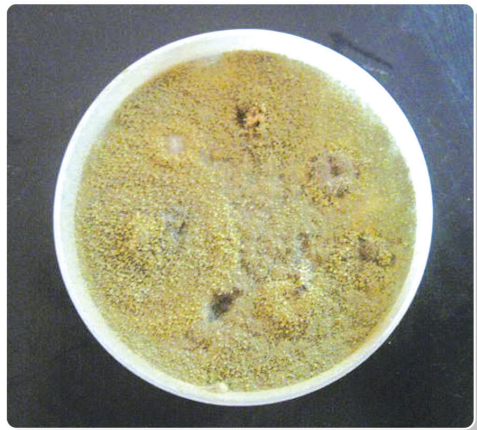


Fig. 3. *Aspergillus fumigatus* colony in SDA - 7 days

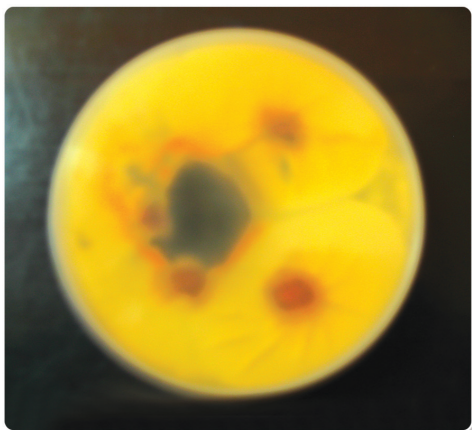


Fig. 4. Reverse of fungal colony in SDA



Fig. 5. *Aspergillus fumigatus* in lacto phenol cotton blue staining



## **DISEASES OF EMU**

### **PART-II- Fungal Diseases**

#### **Aspergillosis - Histopathology**

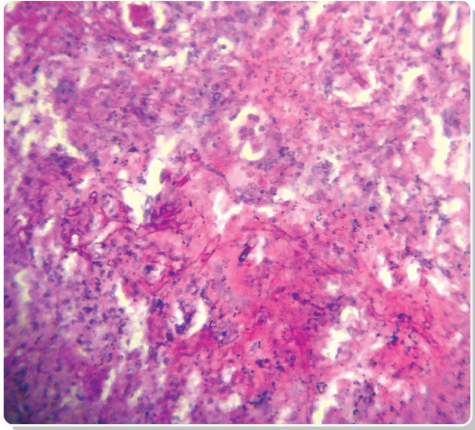


Fig. 1. PAS staining of fungal hyphae in nodules of lungs and air sacs

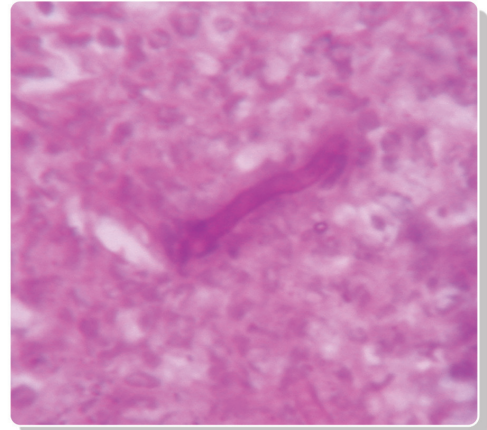


Fig. 2. PAS staining - fungal hyphae

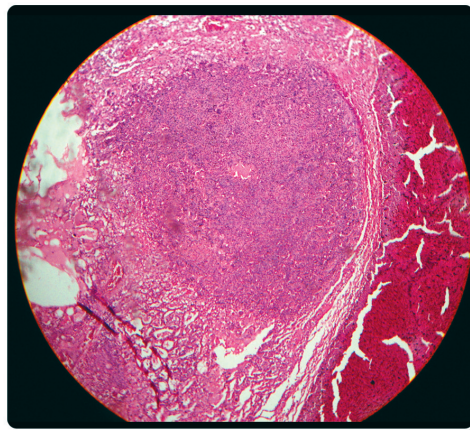


Fig. 3. Micro abscess formation - Nodule

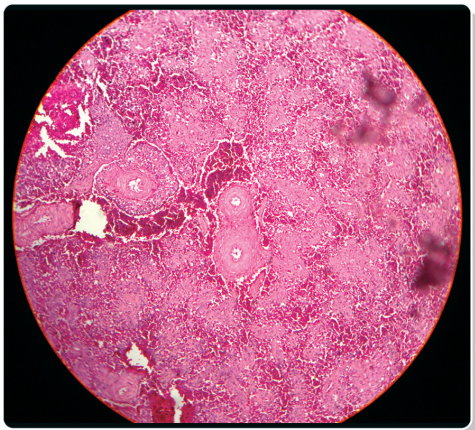


Fig. 4. H&E staining-spleen showing hyperplastic lymphoid follicles and diffuse areas of necrosis

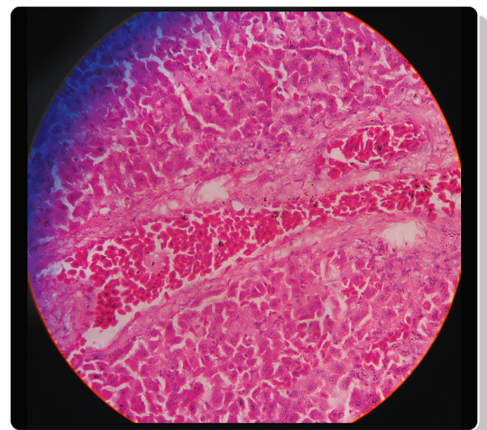


Fig. 5. H & E staining of liver tissue showing sinusoidal congestion

# DISEASES OF AFRICAN LOVE BIRDS

## PART-I- Bacterial Diseases

Bacterial hepatitis  
*Escherichia coli*, *Klebsiella pneumoniae* & *Pseudomonas*



Fig. 1. Prominent keel bones



Fig. 2. Visceral organs

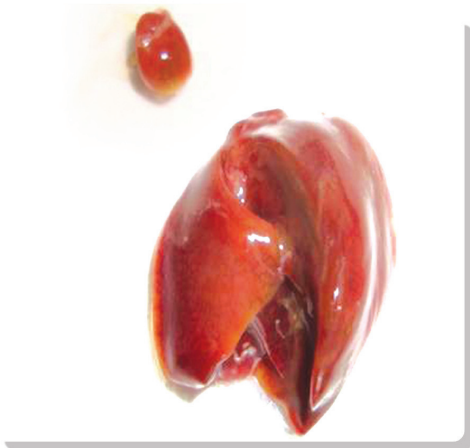


Fig. 3. Liver and spleen



Fig. 4. Enteritis

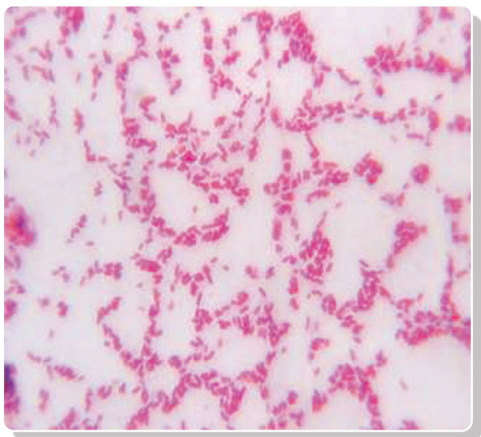


Fig. 5. Gram negative medium sized rods - *E coli*

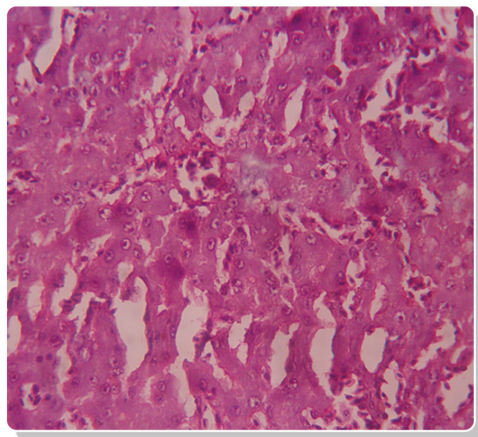


Fig. 6. Liver - Histopathology



## **DISEASES OF AFRICAN LOVE BIRDS**

### **PART-I- Bacterial Diseases**

Bacterial hepatitis  
*Escherichia coli*, *Klebsiella pneumoniae* & *Pseudomonas*

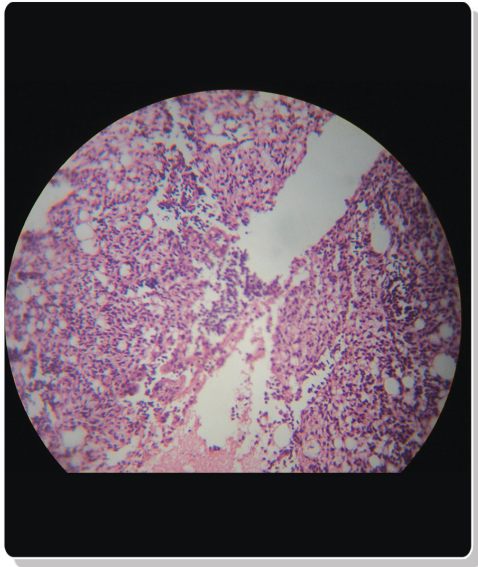


Fig. 7. Lymphocytic collection in lung

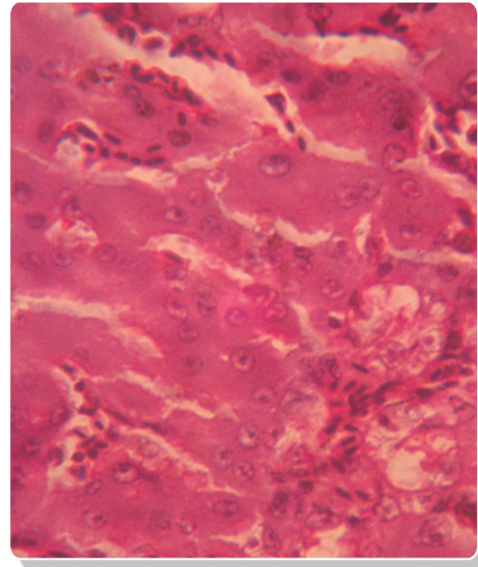


Fig. 8. Vacuolated cytoplasm - Liver

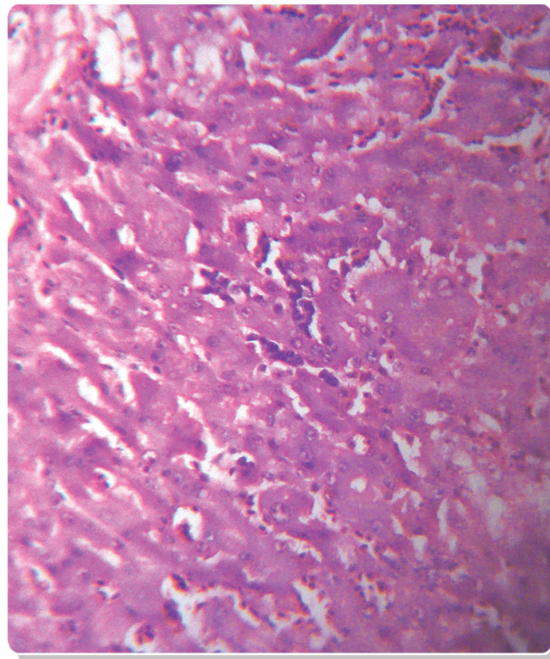


Fig. 9. Vacuolated cytoplasm and lymphocytic collection-hepatocytes

# **DISEASES OF PIGEON**

## **PART-I- Bacterial Diseases**

*Escherichia coli* - septicaemia

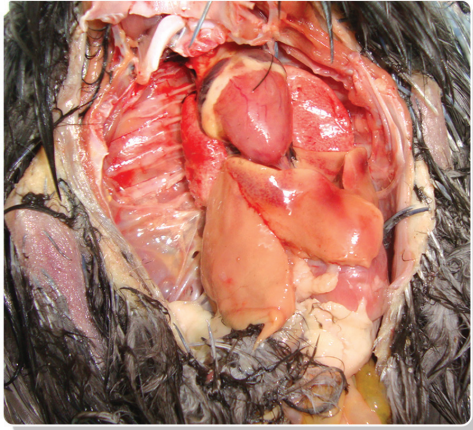


Fig. 1. Liver - Haemorrhage & Necrosis

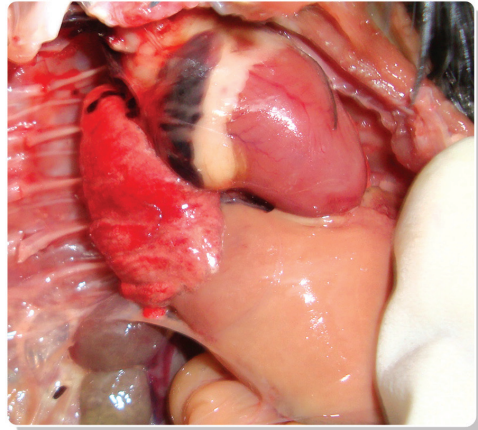


Fig. 2. Lungs - Haemorrhage

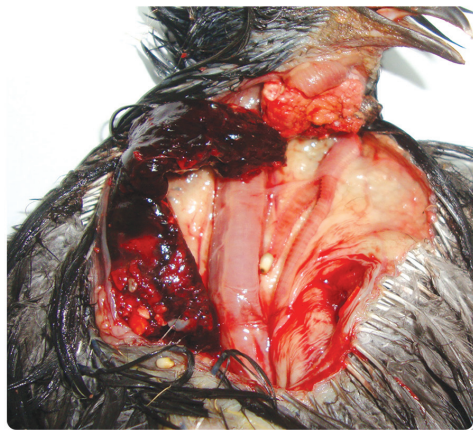


Fig. 3. Blood clots in esophagus

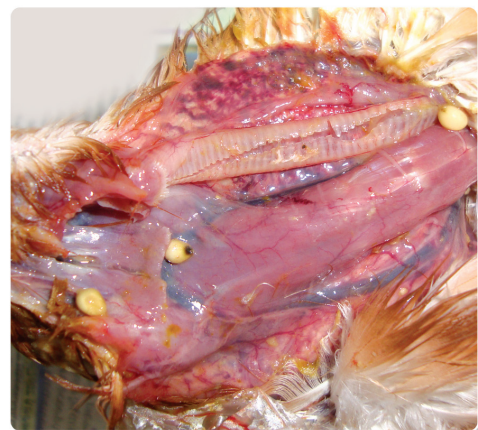


Fig. 4. Congestion - mucosa of neck



Fig. 5 Intestine - Haemorrhagic enteritis



Fig. 6. Intestine - enteritis



## DISEASES OF PIGEON

### PART-I- Bacterial Diseases

*Escherichia coli* - septicaemia

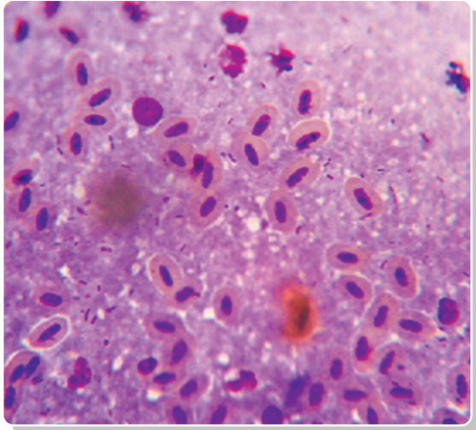


Fig. 7. Liver - Impression smear - Giemsa staining medium sized rods



Fig. 8. ABST - Isolate highly resistant to antibiotics

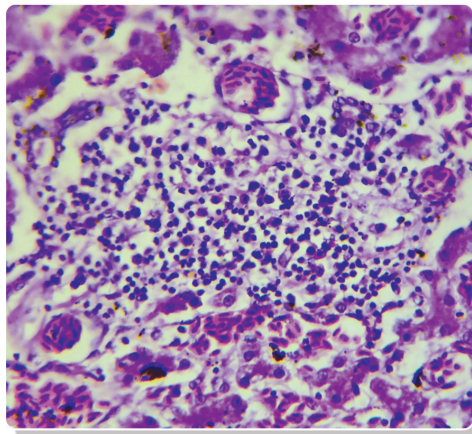


Fig. 9. Histopathology - Liver - H & E staining - focal hepatitis

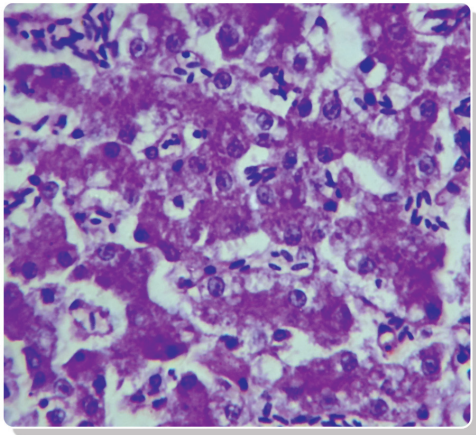


Fig. 10. Liver - focal hepatitis

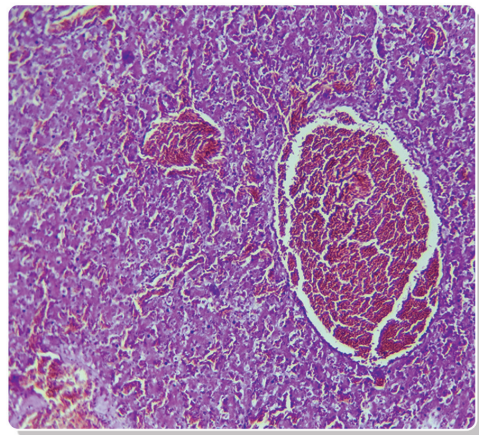
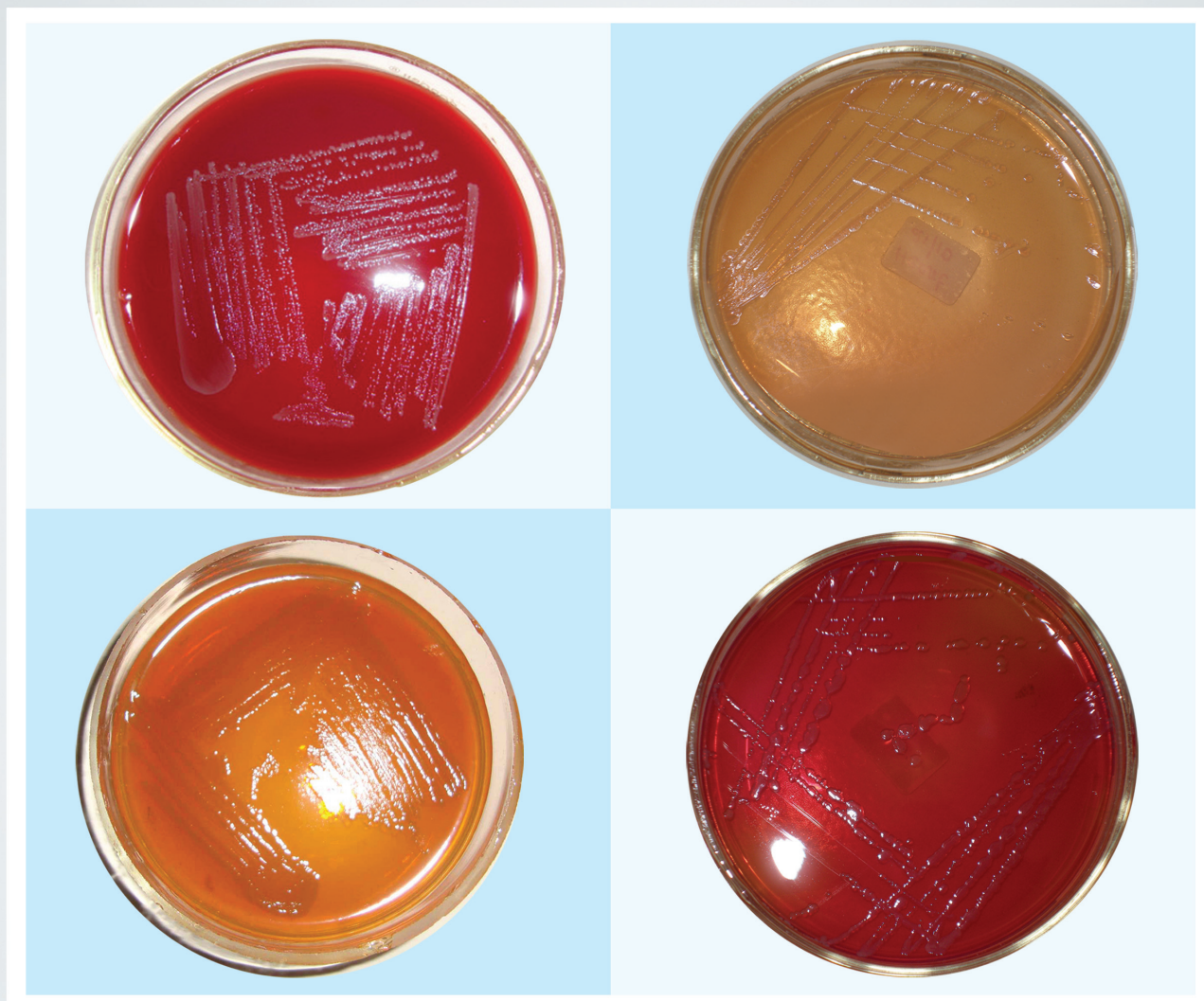


Fig. 11. Liver - H & E- sinusoidal congestion and dilatation

# COLOR HAND BOOK OF COMMON DISEASES AFFECTING POULTRY IN KERALA



## Research & Development Project

"Micro organisms associated with mortality or low egg production in domestic poultry"



Published by  
Department of Animal Husbandry, Kerala





Dr. Sunitha Karunakaran, working as Veterinary Surgeon, Veterinary Clinical Laboratory in District Veterinary Centre, Palakkad. She has acquired BVSC & AH (2001) from the College of Veterinary and Animal Sciences, Kerala Agricultural University, Mannuthy, Thrissur and completed MVSC in Veterinary Microbiology (2002-2004) from College of Veterinary and Animal Sciences, Mannuthy. Joined Animal Husbandry Department as Veterinary Surgeon, CFSP, Palakkad in 2005 and later joined as Veterinary Surgeon, Clinical Laboratory, DVC, Palakkad in 2006. Completed one **Research and Development Project** titled **"Micro organisms associated with mortality/low egg production in domestic poultry"** for a total financial outlay of rupees 3.68 lakhs funded by Department of Animal Husbandry, Kerala - 2008 to 2012 and one project for **Improving diagnostic facilities of District Veterinary Centre, Palakkad under Backward Region Grant Fund (BRGF) scheme funded by District Panchayath, Palakkad** for a total financial outlay of rupees **twenty lakhs during 2010-2012**. She has 41 research articles to her credit.

