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# A PICTORIAL GUIDEBOOK ON POULTRY DISEASES; DIAGNOSTIC TECHNIQUES AND THEIR EFFECTIVE TREATMENT

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## ABSTRACT

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The poultry industry has gained significance all over the world due to providing economical, healthier food than red meat and other protein sources. Food and Agriculture Organization (FAO) estimated 103.5 million tons of global chicken meat production annually in 2012, which contributed about 34.3% to global meat production. Generally, poultry farming has performed a leading role in the livestock sector in some others regions of the world. But poultry farming system is affected by both environmental and disease stress. Various viral, bacterial, parasitic and fungal diseases affect the production performance of birds by affecting respiratory system, reproductive system, immune system, gut system and central nervous system which, in turn, cause loss of appetite, reduction of body weight, drop in egg production, air sac infection, coughing, sneezing, difficulty in breathing, septicemia (blood stream infection), paralysis of neck, wings and legs, enteritis (intestinal infection), bloody diarrhea, immunosuppression and higher mortality which cause huge economic losses in poultry industry. Therefore, there is need to control poultry diseases. Our aim was to provide a pictorial guidebook on poultry disease; diagnostic techniques and their effective treatment which may help to diagnose the viral, bacterial, parasitic and fungal infection. This may provide an important guideline to identify and minimize diseases before their incidence.

**Contribution/Originality:** Our main objective was to provide a pictorial guidebook on poultry disease to avoid the production losses facing the global poultry industry. Several reports have theoretically addressed on poultry diseases but there is lack of sufficient data related to pictorial guidebook on avian diseases. Therefore, this study is one of very few studies which have documented on poultry diseases as a pictorial guideline; diagnostic techniques and their potential treatment.

## 1. INTRODUCTION

Poultry plays a key role in the livelihood of millions of poor rural households associated with poultry industry in many developing countries [1]. But as the global population is increasing day by day this will require 70-100% increase in food production by 2050 [2]. Food and Agriculture Organization (FAO) has estimated that this increased urbanization may demand an increase in consumption of chicken meat, eggs and animal protein which should grow at the highest rate [3]. Poultry can efficiently convert feed into egg and meat within a short period of time [4]. Poultry eggs are ranked second after cow milk in terms of nutritive value [5]. Nutritionists and agriculturists have decided that by developing the poultry industry we can fulfill the world population requirement in the incoming days [6, 7].

On the other side, poultry birds are susceptible to several types of infectious and/or non-infectious diseases [8]. These diseases affect the fast growing broiler birds and laying chickens performances via decreasing feed intake, growth rate, weight gain, survival rate, egg production (impairment in nutrition digestion and absorption), higher mortality due to respiratory infection (plaques in trachea), enteritis (inflammation of intestine), bloody diarrhea, paralysis and prostration of the head and the neck and suppression of immune responses [5, 9, 10]. The above mentioned clinical signs cause huge production losses and enhance the production cost [11, 12].

Therefore, there exists a need to provide a pictorial guidebook on poultry diseases; diagnostic techniques and their effective treatment to avoid the production losses facing the global poultry industry. Several authors have discussed the theoretical knowledge on poultry diseases but there is lack of sufficient data on poultry diseases as a pictorial guideline; diagnostic techniques and their potential treatment. Therefore, this manual may provide the helpful information of diagnostic techniques to diagnose the diseases at their initial phases which can reduce the disease risk and improve the immune status of birds by using disease specific vaccination.

## 2. MATERIAL AND METHODS

### 2.1. Viral Disease

#### 2.1.1. Avian influenza (AI)

It is caused by infection with avian influenza Type A viruses.

#### Clinical sign;



Fig-1. Free egg yolk in the body (egg yolk break brown and mix in the abdomen)

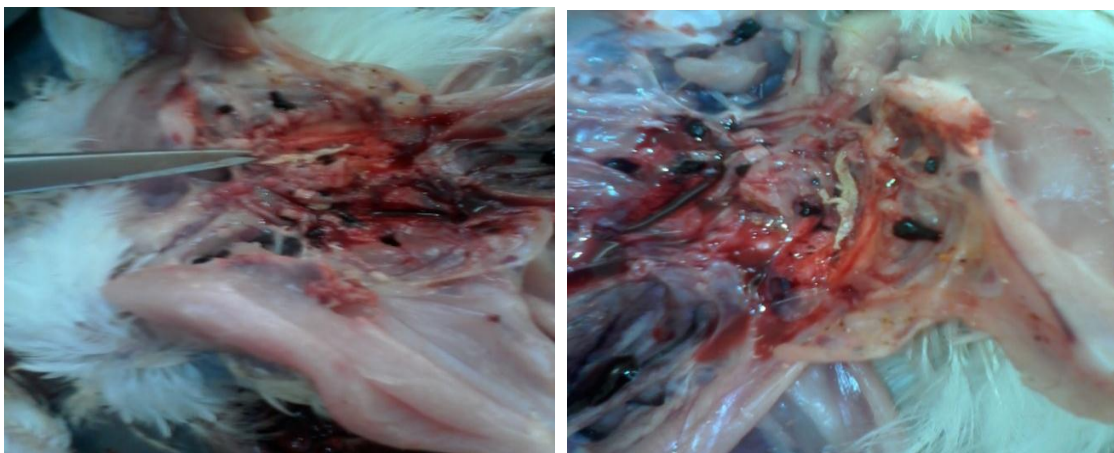


Fig-2. Plaques in the trachea

**Treatment:**

No treatment due to viral disease, but to avoid the secondary infection, we recommend the supportive therapy in drinking water.

Syp lysovit 120mg/400 L D W (liter drinking water)

Aminox (immunostimulent) or Soluvit E Plus

Layers;

150-250 gm/tonne of feed OR 5 gm/200 birds through drinking water

Broilers;

5 gm/50 birds through drinking water

Tlydox; 1-2 g/4L D W

Especially in H9 case all the flock should be buried to avoid the spreading of disease.

**2.2. Infectious Bronchitis (IB)**

IB is a coronavirus that causes disease in various others birds especially in chickens.

**Clinical sign;**

3 forms 1) Reproductive, 2) Respiratory, 3) Renal form



Fig-1. Reproductive form salpingitis



Spleen and liver enlarged





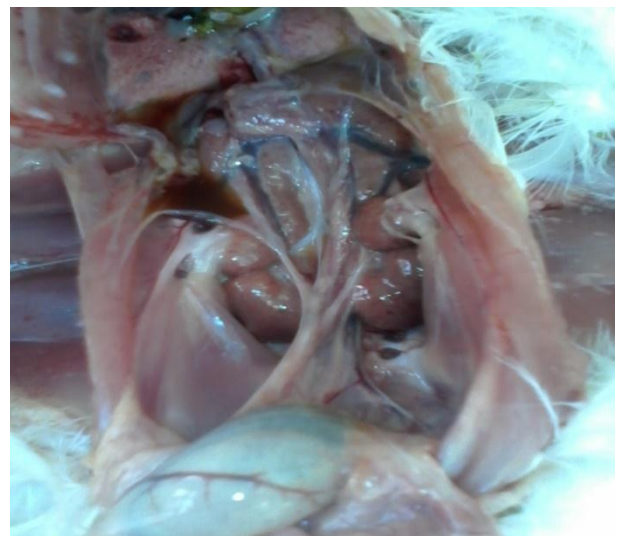
Fig-2. Salpingitis



Plaques in trachea



Fig-3. Plaques in trachea (respiratory)



Inflamed kidney (renal form)

#### Treatment:

No treatment due to viral disease, but to avoid the secondary infection, we recommend the supportive therapy in drinking water

Tylox (tylosin and doxycycline) 1-2 g/4 L D W

Aminox

Layer; 150-250 gm/tonne of feed OR 5 gm/200 birds through drinking water  
Broilers;

5 gm/50 birds through drinking water

Tlydox; 1-2 g/4L D W

#### 2.3. Chicken Infectious Anemia (CIA)

CIA is caused by the chicken anemia virus belong to the circoviridae family which is found worldwide.

**Clinical sign;**



**Fig-1.** Haemorrhages on proventriculus



Haemorrhages on thigh muscle



**Fig-2.** Haemorrhages on heart



Pale color bone marrow



**Fig-3.** Hemorrhages on thigh



Hemorrhages between proventriculus and gizzards

**Treatment:** No treatment due to viral disease, but to avoid the secondary infection, we recommend the supportive therapy in drinking water

Vit ADEK



Broilers;

5 gm/50 birds through drinking water

Syp Folad (herbal product) 120mg/400 L D W

#### 2.4. Fowl or Chicken Pox

Chicken pox (Sorehead) is caused by a virus of the family Poxviridae and the genus Avipoxvirus. This is a worldwide disease that can be transmitted by direct or indirect contact, as well as through biting insects

##### Clinical sign;



Fig-1. Diphtheritic form (plaques in trachea)



Fig-2. Dry form: wart-like nodules on the skin (combs face and wattles)

**Treatment:** No treatment due to viral disease, but to avoid the secondary infection, we recommend the supportive therapy in drinking water.

Oxytetracycline 300mg/gallon D W or Teramycin

5g iodine/ gallon D W (drinking water)

#### 2.5. Newcastle Disease (ND)

NDV is caused by avian paramyxovirus serotype 1 (PMV-1).

**Clinical sign;**



Fig-1. Haemorrhages on proventriculus



Tracheitis



Fig-2. Caecal tonsillitis



Petechial haemorrhages and ulcer on intestine

**Treatment :** No treatment due to viral disease, but to avoid the secondary infection, we recommend the supportive therapy in drinking water.

Electrovit C plus

Broilers:

5 gm/50 birds through drinking water

Syp Brofin (ibuprofen) 120 mg/400 Litter water

Enrofloxacin 10g/100 ml DW

**2.6. Infectious Bursal Disease (IBD or Gumboro)**

IBD is caused by a birnavirus (infectious bursal disease virus; IBDV) that is most readily isolated from the bursa of Fabricius but may be isolated from other organs. It is shed in the feces and transferred from house to house by fomites. It is very stable and difficult to eradicate from premises.

**Clinical sign;**



Fig-1. Hemorrhages on thigh region



Bursa inflamed and reddish



Fig-2. Cheesy material in Bursa



Haemorrhages on thigh region

**Treatment:** No treatment due to viral disease, but to avoid the secondary infection, we recommend the supportive therapy in drinking water.

Electrovit C plus or soluvit E plus

Syp Brofin (ibuprofen) 120mg/400 L D W

Tylodox (tylosin + doxycycline) 1-2 g/4L D W

**2.7. Lymphoid Leucosis**

Lymphoid leucosis is caused by certain group of avian retroviruses. It can induce lymphoid leucosis in chickens are commonly called avian leukosis viruses.

**Clinical sign;**



Fig-1. White nodules on liver surface





Fig-2. White nodules on liver surface



Necrotic lesion on kidney

**Treatment:** No treatment due to viral disease, but to avoid the secondary infection, we recommend the supportive therapy in drinking water.

T.S.O (trimethoprim+sulphadiazine) Liquid 1-2 g/ 4L D W

Syrup Hepacon-B12 (vitamin-12) 1-2g/4L D W

Oral rehydration solution (ORS) 1-2g/4L D W

Dextrolyte or Electrovit C plus (260,00mg Sodium Chloride, 150,00mg Potassium Chloride, 290,00mg Trisodium Citrate, 1350,00mg Dextrose (glucose) Anhydrous)

### 2.8. Inclusion Body Hepatitis (IBH)

It is a disease of chickens characterized by acute mortality, often with severe anemia, caused by an adenovirus.

#### Clinical sign;



Fig-1. Liver pale colored



Fig-2. Hydropericardium



Kidneys are enlarged with hemorrhages

**Treatment:** To avoid the secondary infection, we recommend the supportive therapy in drinking water.  
Syrup Hepacon-B12 (vitamin-12) 1-2g/4L D W  
Dextrolyte or Electrovit C plus  
Amoxi (amoxycycline) 50% 1g/1L D W

### 3. BACTERIAL DISEASES

#### 3.1. Salmonellosis

It is caused by salmonells (*Salmonella Enteritidis* and *S.Typhimurium* ).

#### Clinical sign;



Fig-1. Egg yolk hyperemic and abnormal ovum



Inflammation of the intestine



Fig-2. Spleen enlarged



Enlarged liver is mottled with millitary necroses

**Symptoms:** Lethargy, diarrhea, conjunctivitis, liver, spleen, and kidney enlarged.

#### Treatment;

To avoid the secondary infection, we recommend the specific and supportive therapy in drinking water.  
Gentamycin: Dosage: .01 mg to one gram of body weight intramuscularly once daily. Or 25 mg in 120 ml of drinking water.  
Trimethoprim/Sulfamethoxazole Suspension: Dosage .002 ml to one gram of body weight orally twice daily.  
Sodium Sulfachiorpridazine Powder: Dosage ¼ tea spoon in 120 ml drinking water.



### 3.2. Chronic Respiratory Disease (CRD)

This Infection is caused by *Mycoplasma gallisepticum* is associated with slow onset, chronic respiratory disease in chickens and others birds.

#### Clinical sign;



Fig-1. Cloudy air sac



Cloudy air sac



Fig-2. Cloudy air sac



Tracheitis

**Treatment:** To avoid the secondary infection, we recommend the specific and supportive therapy in drinking water.

T.S.O (trimethoprim+sulphadiazine) Liquid 1-2 g/ 4L D W

Oral rehydration solution (ORS) 1-2g/4L D W

Dextrolyte 1g/2L D W

### 3.3. Colibacillosis (*E-coli*)

Colibacillosis is an infectious disease caused by the bacterium *Escherichia coli* (also known simply as **E. coli**), and is seen in poultry flocks worldwide. **E. coli** can cause an infection under the skin, known as cellulitis, and is commonly associated with respiratory disease in birds, which in severe cases leads to septicemia and death.



**Clinical sign;**



Fig-1. Serous coats (peritoneum)



Serofibrinous polyserositis on liver



Fig-2. Serous coats on pericardium



Tracheitis

**Treatment:** To avoid the secondary infection, we recommend the specific and supportive therapy in drinking water.

Hepasil or Soluvit E plus

Layer;

5 gm/200 birds through drinking water

Broilers;

5 gm/50 birds through drinking water

Doxycol (doxycycline) 100 g powder per 25-50 litres drinking water.

### 3.4. Spirochetosis

Avian intestinal spirochetosis (AIS) is an enteric disease that affects all bird species. AIS is a potentially zoonotic disease that is caused by infection with spirochete bacteria of the genus *Brachyspira*. The bacteria colonize in the chicken's intestines (specifically in the cecum and rectum) and disturb the digestion.

**Clinical sign;**



Fig-1. Inflamed liver and spleen



Inflamed caeca

**Treatment:** To avoid the secondary infection, we recommend the specific and supportive therapy in drinking water.

Oxytetracycline 1g/4L D W

T.S.O (trimethoprim+sulphadiazine) Liquid 1-2 g/ 4L D W

#### 4. PARASITIC AND PARASITIC DISEASES

##### 4.1. Coccidiosis

Coccidiosis is caused by protozoa of the **phylum Apicomplexa**, family **Eimeriidae**. In poultry, most species belong to the genus *Eimeria* and infect various sites in the intestine

**Clinical sign;**



Fig-1. Dark and blood mixed feces



Fig-2. Dark and blood mixed feces

**Treatment:** To avoid the secondary infection, we recommend the specific and supportive therapy in drinking water.

Doxycel 1g/2L D W

Dextrolyte 1g/1L D W

T.S.O (trimethoprim+sulphadiazine) Liquid 1-2 g/ 4L D W

#### 4.2. Nematode (Round Worm)

Roundworms (nematodes) are a type of parasite that lives freely in the chicken's intestine, feeding off of the partially digested intestinal contents. *Ascaridia galli* is an important species of roundworms found in chickens.

#### Clinical sign;



Fig-1. Round worm in intestine

#### Treatment:

To avoid the secondary infection, we recommend the specific and supportive therapy in drinking water. Albendazole (dewormer) or Systemix in drinking water

### 5. FUNGAL DISEASES

#### 5.1. Aspergillosis

Aspergillosis is caused by *Aspergillus*, a common mold (a type of fungus). It is an infectious fungal disease in poultry which affect the birds respiratory system. The disease is contracted by inhalation when there is a high spore count in the air.

#### Clinical sign;



Fig-1. Lesions (yellow or gray nodules and/or plaques in the lungs and on air sac.



**Symptoms:** respiratory distress, gasping, breathing.

**Prevention:** Minimize stress and overcrowding. Provide proper ventilation

**Treatment:** To avoid the secondary infection, we recommend the specific and supportive therapy in drinking water.

Nilstate (nystatin) powder 1ml/2L D W (drinking water)

Soluvit E plus

Layer;

5 gm/200 birds through drinking water

Broilers;

5 gm/50 birds through drinking water

Tlydox; 1-2 g/4L D W

## 6. ENVIRONMENTAL STRESS PROBLEMS

### 6.1. Ascites

Ascites is a **disease of broiler chickens** occurring worldwide but especially at high altitude. The disease has a complex etiology and is predisposed by reduced ventilation, high altitude, and respiratory disease.

#### Clinical sign;



Fig-1. Fluid in the abdomen

**Treatment:** To avoid the secondary infection, we recommend the specific and supportive therapy in drinking water.

BIO-BANTOX PLUS or Oligotox or A T B ( authentic toxin binder) 1 kg/ton of feed.

Improve ventilation

### 6.2. Heat Stress and/or Toxicity

There is no specific etiology. But samples should be collected for potential analysis in cases of suspected toxicities include dead or recently euthanized birds that showed clinical signs, 2 lb (1 kg) of the feed available when the birds were showing clinical signs, and 500 mL of drinking water. For the safety of workers as well as poultry, the grower should have access to material safety data sheets for each chemical used on the premises. Carcasses should be refrigerated as soon as possible for examination by the veterinarian or laboratory diagnostician.

**Clinical sign;**



**Fig-1.** Kidney enlarged and emaciated and pale color muscle.

**Treatment:** To avoid the secondary infection, we recommend the specific and supportive therapy in drinking water.

Glucose+ Tab Disperin+ Tylodox 1-2g/4L D W

## 7. CONCLUSION

The poultry industry provides healthier food than red meat and other protein sources. Food and Agriculture Organization (FAO) has estimated that chicken meat contribute about 34.3% to global meat production. But several common and important diseases are threat to poultry industry which can affect the respiratory, reproductive, gut and immune systems of birds and cause huge production losses. Therefore, this picture guidebook on poultry diseases has been assembled for veterinary medical students, extension workers and farmers to diagnose the diseases correctly and to minimize them by using specific disease vaccination. This manual may provide important clinical information to diagnose the diseases depending on their specific sign that can reduce the economic losses in the poultry industry.

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**Contributors/Acknowledgement:** All authors contributed equally to the conception and design of the study.

## REFERENCES

- [1] F. K. R. Stino and F. S. Nassar, *Poultry production in the middle East and African States: Situation, future and strategies*. Giza 21613, Egypt: Department of Animal Production, Faculty of Agriculture, Cairo University, 2012.
- [2] A. Nawab, I. Fahar, L. Guanghui, K. Barbara, W. Jiang, and L. Wenchao, "Heat stress in poultry production: Mitigation strategies to overcome the future challenges facing the global poultry industry," *Journal of Thermal Biology* vol. 78, pp. 131–39, 2018. Available at: <https://doi.org/10.1016/j.jtherbio.2018.08.010>.
- [3] FAO, *FAO statistical pocketbook world food and agriculture*. Rome: Food and Agriculture Organization of the United Nations, 2015.
- [4] I. Leinonen, A. Williams, and I. Kyriazakis, "The effects of welfare-enhancing system changes on the environmental impacts of broiler and egg production," *Poultry Science*, vol. 93, pp. 256–266, 2014. Available at: <https://doi.org/10.3382/ps.2013-03252>.
- [5] G. B. Adesiji and S. T. Baba, "Effects of climate change on poultry production in Ondo State, Nigeria," *Russian Journal of Agricultural and Socio-Economic Sciences*, vol. 2, pp. 55–60, 2010.

- [6] FAO, "Livestock country reviews, Poultry Sector Mozambique. FAO Animal Production and Health Livestock Country Reviews. No. 5. Rome," 2013.
- [7] H. K. Sebho, "Exotic chicken status, production performance and constraints in Ethiopia: A review," *Asian Journal of Poultry Science*, vol. 10, pp. 30-39, 2016. Available at: <https://doi.org/10.3923/ajpsaj.2016.30.39>.
- [8] J. Roberts, R. Souillard, and J. Bertin, "Avian diseases which affect egg production and quality," ed: In Book of Improving the Safety and Quality of Eggs and Egg Products: Egg Chemistry, Production and Consumption, Woodhead Publishing Series in Food Science, Technology and Nutrition, 2011, pp. 376-393.
- [9] H. Guis, C. Caminade, C. Calvete, A. P. Morse, A. Tran, and M. Baylis, "Modelling the effects of past and future climate on the risk of bluetongue emergence in Europe," *Journal of the Royal Society Interface*, vol. 9, pp. 339-350, 2012. Available at: <https://doi.org/10.1098/rsif.2011.0255>.
- [10] É. Gocsik, H. Kortés, A. O. Lansink, and H. Saatkamp, "Effects of different broiler production systems on health care costs in the Netherlands," *Poultry Science*, vol. 93, pp. 1301-1317, 2014. Available at: <https://doi.org/10.3382/ps.2013-03614>.
- [11] T. E. Abbas, "Poultry welfare in developed and developing countries," *Animal and Veterinary Sciences*, vol. 2, pp. 1-4, 2014. Available at: [10.11648/j.avsc.20140201.11](https://doi.org/10.11648/j.avsc.20140201.11).
- [12] M. Pattison, P. F. McMullin, J. M. Bradbury, and D. J. Alexander, *Poultry diseases*, 6th ed. Philadelphia: Pennsylvania, USA, 2008.

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