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Duckling Diseases and Their Control for Effective Productivity to Start A Duckery

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Abstract

Duck farming is increasing trends to meet out the increased demand for animal protein. Scientific duck rearing with intensive feed, supplement and interaction with the environment, the duck is vulnerable to different diseases during early life. Several diseases in ducklings that cause morbidity and mortality are omphalitis, curled toe, coccidiosis, aflatoxicosis, duck virus hepatitis, duck cholera, duck plague, slipped wing, hypothermia, inanition etc. The increasing incidences of traditional and emerging diseases are causing high morbidity and mortality in duck population. To combat high morbidity and mortality, we need scientific intervention to the duckling and ducks. For confirmative disease diagnosis in farmers' field conditions need close observation of clinical signs, pathological changes and post mortem lesions. Disease diagnosis, therapy and immunization program can restrict the morbidity and mortality in the economic duck population.

Introduction

The Indian people are in a transitional stage from vegetarian to non-vegetarian regime. There is an increasing demand for animal proteins are meeting out through milk, meat, eggs and fish. The growth of poultry is almost fixed and emphases being given to duckery in East, Coastal and North-East India where more water bodies prevail. Duckery is comparatively more profitable as the cost of feed, medicine and preventive is very less in comparison to chicken. In household duckery, ducks forage on fodder, plants, snail, slug, pests, fallen grains, from soil, water and water-logging crop field. Moreover, the prevalence and susceptibility of different infectious diseases in duck are meager.

Higher production could be achieved through an enhanced amount of feed, supplements, and health care. Overpopulation in shelter space and water bodies in duckery may invite different infectious, deficiency diseases and toxicities. To keep morbidity and mortality under control in duckling upto 6 weeks of age needs to follow preventive measures against the following diseases.

Omphalitis/ Yolk Sac Infection

Omphalitis is also known as "Mushy ducklings" is an inflammatory condition of the navel (umbilicus) due to some common infections of *E. coli*, *Streptococci* sp., *Proteus* sp., *Enterococci* sp., *Bacillus* sp. It is the first disease in ducklings bears from the egg environment at hatching incubator through infected eggs both ascending and descending infections. The egg infectivity may be 0.5-6 %. Embryonic death occurs at later period of incubation due to high humidity and contaminated incubator.

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Clinical Signs

Few ducklings die premature hatching in egg shell. Some show clinical signs of swollen and pendulous abdomen, edematous naval area, redness, inflammation with occasional abscission at naval. Cyanotic distended abdomen and often unabsorbed yolk materials are hanging where blood vessels are engorged with blood and necrosis leading to "mushy duckling". Other signs are dehydration, visceral gout, emaciation, diarrhea, and mild inflammatory changes in the wall of the yolk sac. The prognosis of the condition is grave.

Treatment

The condition is frustrating. Ducklings die within 5-15 days but ethically, ailing ducklings are treated with antiseptic dressing and antibiotics. Cleanliness of eggs and hatchery is of utmost importance to restrict the omphalitis.

Curled Toes

Hatching out of some ducklings showing fist like toes with the inability to move and falls down.

Causes

It may be due to genetic and inbreeding for prolonged generations. Main causes due to deficiency of vitamin B2 (Riboflavin), vitamin E and Selenium. Vitamin B2 deficiency hampers oxidative processes neuronal dystrophia in the peripheral nerve supplies at legs. Deformity during embryogenesis may be in some cases. Excessive exposure to infrared radiation in the brooder house, bacterial and fungus infections in hatchery, brooder and egg may also be the cause.

Clinical Signs

Sudden falling with abducted legs, try to stand on their hocks, marked leg weakness and toes flexion. Often ducklings stand in tangle legs with lameness.

Treatment

With vitamin B2, E and Selenium can reduce incidence rate but not cures. Prevention by avoiding inbreeding breeding, adopting cross-breeding and nutrient supplement (B2, E and Selenium). Disinfectant cleaning of brooder house regularly. Surgically, a splint may be fitted cutting three finger-like projections and fixed the toe in them for 12 hours and check the development for 3-5 days.

Coccidiosis

Thirteen species of *Eimeria* some of them namely *Eimeria truncata*, *Tyzzeria* genera, *Tyzzeria perniciosa*, *E. bosclzadis*, *Eimeria wenyonella* cause Coccidiosis in ducklings. Oocyst infection occurs through feed, water, marshy soil, contact with infected inmates. Oocysts reach to intestinal mucosae causing inflammatory change malabsorption.

Clinical Signs

Loose serosanguineous mucous feces, dehydration, gradual weakness. Sudden death in acute cases with depression and tucked appearance. Wasting, roughfled feathers in chronic cases. The morbidity as high as 80% with scanty mortality (5-10 %).

Treatment

With sulphonamides like sulphadimidine 30-50 gm/ 100 birds/ day, for 3-5 days followed by 2 days off again 3 days. Specific amprolium (250 mg/kg feed) for 3-5 days. Vitamin A and vitamin K in feed or water. Best preventives are to keep dwelling area clean and dry.

Duck Virus Hepatitis

It is a highly fatal and rapidly spreading viral disease caused by duck hepatitis picorna virus (DNA) characterized by ataxia, closed eye, spasmodic kicking, death within a few hours. There are three serovars of the virus type 1-3. Acute disease in early age with high mortality up to 95%. It is very endemic in Korea, China and other duck rearing countries. Viral is transmitted by direct contact, carriers, aerosol and some vectors. The brown rat may act as a reservoir. Vertical and horizontal transmission is possible.

Clinical Signs

Including stopping movement at brooding place, fall at the side, kick spasmodically, die in peracute cases, high mortality within 3-4 days. Ducklings pass green watery stool. Adult may be asymptomatic. Postmortem lesions are enlarged liver, kidney and spleen, hemorrhage of both petechial and ecchymotic. Solid immunity develops after infection and vaccination that passes to ducklings.

Therapeutic

Intervention with intramuscular administration of antiserum from the immune duck. Administration of immune duck egg yolk may be helpful. A broad spectrum antibiotic can be used to check infection.

Aspergillosis/ Aflatoxicosis

Aflatoxins are certain fungal toxins produced by Aspergillus species. Aflatoxin B1 and B2, produced by *Aspergillus flavus* and *Aspergillus parasiticus*. Aflatoxin G1 and G2, produced by *Aspergillus parasiticus*. Aflatoxin M1 is a metabolite of aflatoxin B. Aflatoxin M2, metabolite of aflatoxin B2 in cattle milk feeding aflatoxin-contaminated feed. Aflatoxin Q1 major metabolite of AFB1 of other higher vertebrates. Duck is most susceptible than other animals. The LD50 of a day old duckling is 0.3 mg/kg body weight. The liver is the target organ for metabolic toxic products. Aflatoxins inhibit RNA polymerase and subsequent protein synthesis at a faster rate in ducks. Chronic exposure

to aflatoxins increases the risk of developing hepatic and gall bladder cancer as aflatoxin metabolites may mutate in the P53 gene, preventing cell cycle progression when there are DNA mutations or signaling apoptosis.

Clinical Signs

It is very lethal in younger birds, exerts in inappetence, stunted, abnormal vocalizations, feather picking, purple discoloration of legs and feet, blindness and lameness. Nervous signs of ataxia, convulsions and opisthotonus lead death.

Postmortem Lesions

Livers and kidneys are enlarged and pale. Chronic cases with ascites, hydropericardium, shrunken firm nodular liver, distention of the gall bladder with bile, distended abdomen due to liver tumors and secondary to ascites.

Figure 1: Aflatoxicosis affected duck

Figure 2: Liver lesions in aflatoxicosis

Diagnosis

Based on characteristic clinical signs. Necropsy finding of enlargement of liver, kidney, intestine and lungs. Estimation of aflatoxin in feed and organs of birds be estimated by high-performance liquid chromatography.

Therapeutics

Intervention with Chemical detoxification with ammonium hydroxide, calcium hydroxide, hydrogen peroxide, sodium hydroxide, and sodium hypochlorite. Use of feed additives and immunostimulants like Selenium, antioxidants like butylated hydroxytoluene and turmeric. Toxin absorbents like activated charcoal, zeolites (hydrated sodium calcium aluminosilicate) can be used. Probiotic (*Streptococcus* sp.), toxin binder (Bentonite, glucomannan) and vitamins (A, D, K, E and B complex).

Duck Cholera

Duck cholera is a fatal bacterial disease caused by *Pasteurella multocida.* Ducklings above 4 weeks of age are very susceptible. The predisposing factors are weather change, malnutrition and excitement. Infection through contaminated feed, crates, equipment, fomites as well as vector borne transmission.

Clinical Findings

Sudden death, prior associated signs are inappetence, increased thirst, fever, ruffled feather, serosanguinous stool, respiratory stress, musculatory and joint pain. The endotoxin is a lipopolysaccharide in nature which is histamine releasing and liver-damaging cause pathogenicity. Hepatic and spleen lesions occur.

Diagnosis

Clinical findings and pathomorphological lesions. Isolation of bacteria from the clinical samples of bone marrow, heart blood, liver and localized lesions. Serologically, by blood agglutination test, plate agglutination test, agar gel diffusion tests, or even with ELISA (Liu *et al.,* 2016).

Treatment and Control

Sulphadimidine and sulphamethazine at 0.2% in drinking water or feed. Streptomycin, chlortetracycline and chloramphenicol can be used. Regular vaccination at 4 monthly intervals can protect from the disease.

Duck Virus Enteritis/ Duck Plague

An enteric disease caused by a DNA herpes virus in duck geese and swan characterized by vascular damage, tissue hemorrhage in digestive mucosal eruption, lymphoid organs and parenchymatous organs like liver and lungs. Infection is transmitted by direct contact with infected animals, fomites, feed, water (Campagnolo *et al*., 2001). Incubation period 3-7 days.

Clinical Signs

Sudden death with high mortality. In an adult sudden death with prolapse of penis, egg drops, photophobia, half-closed eyelids, inappetence, thirst, drooping, ataxia, ruffled feather, nasal discharges, vent soiled with feces, dehydration, loss of weight, blue beak, conjunctivitis, lacrimation, opisthotonus, convulsion and nasal discharge. High mortality 5-100 % in adults. Active immunity develops with disease and vaccination.

Diagnosis

By clinical signs, viral isolation, viral neutralization and identification in well-established lab. Precise diagnosis by PCR, passive haemagglutination test, immunoperoxidase staining.

Treatment

No specific treatment, symptomatic therapy with antibiotics, rehydration therapy and vitamins. Vaccination with an inactivated vaccine.

New Duck Syndrome

An acute or chronic septicemic disease caused by *Riemerella anatipestifer*, syn: *Pasteurella*, or *Moraxella*. Turkeys, chickens, game birds and wild waterfowl are also susceptible. Transmission through direct, bird-to-bird, feed, water, scratches with toe- nail of the foot, or respiratory epithelium. Environmental stress acts as a predisposing factor.

Clinical Signs

Weakness, head and neck tremor, in coordination to movement, walk and hyperexcitability, respiratory distress, oculo-nasal discharges and clogging of nasal passage. Low morbidity but high (70%) mortality in young ducks. Pathological lesions are mild perihepatitis, pericarditis and air sacculitis with lung involvement. Spleen, liver and oviduct may be inflamed. Exudates in affected synovial cavity showing arthritis. Disease diagnosis by clinical signs, pathological lesions, isolation and identification of organism in suitable media.

Therapeutic

Intervention with a suitable antibiotic such as sulphonamides, potentiated sulphonamides.

Slipped Wing

Wing feathers turn outwards and drops downwards is slipped wing is very common. It is also called Angel wing, airplane wing, drooped wings. In this condition, the last joint (carpal) of the wing is twisted with the wing feathers pointing out laterally. It is common younger males than females.

Causes

Deficiency of vitamin A, D, E and mineral of manganese in feed for rapid growth. Usually, both the wings are affected while if single-wing it is left one.

Clinical Signs

Spreading of feathers laterally outwards, unable to perform better swimming and flapping, stripped remiges, protruded feathers is dirty and sickly bluish, the condition may relapse in later age during development but in adult, in duck, the probability of healing is grave and tends toward death.

Figure 3: Slip wings

Prevention

Providing a balance ration with vitamins and minerals for beginners. Change of stock, feed and ingredients.

Hypothermia

Hypothermia is a condition in ducklings where body temperature reduces from the normal range of 104-107 °F. Factors responsible are low brooder house temperature (normal 90-93 °F), wet, marshy brooder pen, inclement weather like a storm, hail, snowfall heavy rainfall, low level of nutrition, restriction in exercise, loss of insulating feathers, cold wave flow, over exposure in the water body.

Figure 4: Huddle together due to Hypothermia

Clinical Signs

Chilly sensation, huddle together, wet wings, bedraggled appearance; shivering and fallen dead. Body temperature may be 90-98 °F or below. If survived, septicemia at later stage, pneumonia and gastrointestinal problems.

Diagnosis

Observing the brooder house, feeding standard and environmental parameters. The brooding place must be dry and clean. Venture in the water bodies to be a limited time at in early age.

Inanition

Inanition is a condition where birds are suffering from scarcity of food in stomach or inability to ingest food due to pathological conditions. Inanition or starvation is a critical deficiency in caloric power, nutrient, and vitamin intake. At early ages long starvation may lead to permanent organ damage and finally death. Starvation affects the skeletal, nervous and gastrointestinal systems rapidly.

Causes

Acute infections, impaired cognition, cardiac dysfunction, dysphagia, depression, deficiency of vitamins and nutrition, malignancies and adverse effects of medicines. Inanition depends on the environment as well as the physiological condition of ducklings. Due to inclement weather during winter, sudden rain and storm where sudden drops in body temperature affect severely. Weaker and low age ducklings cannot compete grabbing feed, need separate feed supply.

Conclusion

For effective duck production needs to control several diseases in ducklings although duck also very sensitive to few diseases. During early life, the ducklings are vulnerable to several diseases and mortality in duckling is main hurdle for duck production. There are several diseases such as omphalitis, curled toes, coccidiosis, duck virus hepatitis, aflatoxicosis, duck cholera, duck plague, new duck disease, hypothermia, inanition that could be restricted with effective preventive measures. Disease diagnosis and actual therapeutic intervention also helps to control diseases. Suitable vaccines (duck plague, duck cholera), balance ration, supplementation of vitamin/ mineral, hygienic duck shed and brooder management can check morbidity and mortality.

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