

TECHNICAL NOTES ON

1. DISEASES OF DESI POULTRY & THEIR PREVENTION.
2. INCUBATION AND CANDLING OF DESI EGGS.
3. PREDATION IN DESI BIRDS.
4. FEEDING OF DESI CHICKENS.

Nicholas Sparks

Thomas Acamovic

Czech Conroy

D. Chandrasekaran

A. Natarajan

K. Anitha



Department for International Development, UK.

Veterinary College and Research Institute,
Namakkal, TN, India.

Scottish Agricultural College and University of
Greenwich, UK.

DISEASES OF DESI (SCAVENGING) **POULTRY AND THEIR PREVENTION**

Introduction:

Poultry keeping has been a part of the social and cultural development in our country. In rural areas, poultry birds are reared by poor farmers on small scale in the backyards of village households. As the desi poultry keeping provides small but regular income to the rural households and satisfies their day-to-day requirement, it is considered as an important asset of rural people. These birds are raised mostly as scavengers, they are easily prone for various diseases, and their poor unbalanced nutrition is further compounded by the heavy worm infestation in their digestive tract and ill health due to viral and bacterial diseases.

The common diseases that occur in these birds are,

1. Viral diseases

1. Newcastle disease (ND)
2. Fowl Pox

2. Parasitic infestation

a. Endoparasites

1. Round worms
2. Tape worms

b. Ectoparasites

Ticks, lice, mites, fleas and mosquitoes

3. Bacterial Diseases

Among the various diseases, Newcastle disease (Ranikhet) and parasitic infestation are very important in desi birds. While the parasites reduce the productivity of birds, disease like ND not only causes sudden death of infected birds and also wipes off the whole population in that locality.

Viral diseases

1. New Castle or Ranikhet disease

It is the most common viral disease affecting desi chicken. It is caused by *Avian Paramyxovirus*. It may affect all age group of birds. While the occurrence of disease can be seen throughout the year, it is very high during the summer months. Infection occurs either by inhalation of virus in aerosol form or ingestion of contaminated feed and water. There are three forms of infection namely velogenic, mesogenic and lentogenic form.

The virus affects respiratory tract, digestive tract, brain etc., and manifested by respiratory infection, greenish diarrhoea, sudden drop in egg production, drastic weight loss, depression, torticollis, paralysis and death. Morbidity and mortality are very high in velogenic (acute onset) form of disease.

Gross lesions: In the respiratory tract it may produce inflammation and hemorrhage, and diphtheritic ulcers in the digestive tract. Typical lesion of ND is prominent haemorrhages throughout the digestive tract especially in the mucosa of the proventriculus and caecal tonsils.

Prevention and control :

At the time of outbreak, disease vaccination has to be carried out with Lasota strain through water. For prevention, vaccination is done as follows:

1st: 7th day : "F" strain (Ocular)

2nd to 8th week: Lasota (Ocular)

Afterwards every 6 months: RDVK @ 0.5 ml / kg of bird through wing S / C or I / M route.

2) Fowl Pox

It is commonly seen during summer season. It is caused by *avian pox virus*, which primarily affects the unfeathered areas of skin or mucosa of upper gastro-intestinal tract and respiratory tract. It primarily spreads through the scab containing poxvirus particles that may contaminate water, feed or even through mosquito bite. The unfeathered areas of skin like comb, wattle, eyelid and legs may have typical pox nodules. These types of lesions may also occur in the upper gastro intestinal tract and respiratory tract, producing diphtheretic lesions. The affected birds may develop active immunity from natural infection or vaccination. Mortality is usually low but in diphtheretic forms it may be high due to asphyxia. Birds becoming blind may die of starvation.

Prevention and control

Fowl pox vaccine should be administered through wing web puncture method at approximately 6-8 weeks of age.

2. Parasitic infestation

a. Endoparasites

Internal parasites are very common in chickens in the backyard type. Due to its free ranging habit, the village poultry is in permanent contact with soil and insects, which serve as an important reservoir for parasitic disease in desi birds. The presence of a few parasites does not usually cause a problem. However, large numbers can have a devastating effect on growth, egg production, and over-all health.

Roundworms:

Ascaridia galli

It is the commonest roundworm of backyard poultry in India. Young birds are affected more severely. They are found mostly in the duodenum. Though mortality is not significant, in heavy load, they interfere with feed absorption causing poor growth and production.

***Heterakis gallinarum*:**

It is also commonly prevalent in desi birds. It is found in the caecum. Its chief economic importance lies in its role as a carrier of the protozoan organism *Histomonas meleagridis*, which causes deadly disease in turkeys known as Histomoniasis or Blackhead.

Tapeworms

Commonly present tapeworms in backyard poultry are *Railletina tetragona*, *R. Echinobothrida*, *Cotugnia dignopora*, *hymenolepsis* and *Davainea Sp.* These worms complete their life cycle through an intermediate host, such as snail, slug, beetles, ants etc. Fifty percent of the intestinal tract of desi birds may contain tapeworms. A few worms may exist without marked symptoms. When they are numerous they cause anaemia, weakness, enteritis and occlusion of the lumen.

The birds pick up the parasitic eggs and segments directly by ingesting contaminated feed, water or indirectly by eating snails, earthworms, or other insects / vectors carrying the parasitic eggs and or tapeworm segments.

Clinical signs of parasitism are unthriftiness, poor growth, feed conversion, decreased egg production, and even death in severe infections. Further more parasites can make the flock less resistant to disease and exacerbate existing disease condition.

As a part of scheme work, 125 intestinal tracts of desi birds were examined to assess the internal parasites. Of which, 101 digestive tracts (80.8 %) had internal parasites. The commonest roundworms encountered were *Tetrameres* in the proventriculus (glandular stomach), *Heterakis* in the caeca (blind guts) and *Ascaridia* in the small intestine. The commonest tapeworms were *Raillietina*, *Hymenolepis* and *Cotugnia*, all in the small intestine

Treatment: Deworming

The birds should be dewormed periodically (once in two months) with any one of the following drugs:

1. Albendazole 2.5%: @ 20-30 ml / 100birds for one day as a top dressing on feed/ mixed with water.
2. Piperazine hydrate @ 50ml /100 birds for nematodes (round worms)

Other drugs like Niclosamide (Niclex) : 1g in 1 kg feed, Minthex - M : 3% solution 0.1 - 0.15 ml and Levamisole (effective against nematodes) 1gm / 60 chicks or 30 growers can be utilized. Electrolytes can be given as supportive treatment (1g/ litre of water).

Prevention and control

1. Deworming periodically
2. Gamaxine 5%: dusted to control ants.

Ectoparasites

The ectoparasites of backyard birds are ticks, lice, fleas, mites and mosquitoes. Of these lice appear very commonly. Lice and fleas suck blood and cause irritation to birds. The common soft ticks *Argas persicus* not only sucks blood but also transmit *Borrelia anserina* causing spirochetosis in southern states of India. To control ectoparasites, the birds should be dipped in butox 1-2 % (Deltamethrin) containing solution @ 1 ml in 1 litre of water. It is also sprayed on cracks in sheds and barks of trees

Bacterial Diseases

1. Coliseptecaemia

The disease is most common in young chicken. It is caused by *Escherichia coli*. It may produce respiratory infection or diarrhoea. It causes pericarditis, perihepatitis, pneumonia, air

Treatment:

Mortality can be suppressed by administration of antibiotics such as Enrofloxacin (50mg / ml): 1ml / litre, Gentamicin: 0.2 mg/ chick and 2.5 mg / bird I / M, Furazolidone (100mg/kg feed) and sulphonamides. Hygienic management should be practiced for prevention of disease.

2. Fowl cholera

It is caused by *Pasteurella multocida* and may occur sporadically or as enzootic. It produces acute septicemia or chronic infection. In acute cases, the affected birds may die within a few hours. They may show high fever, anorexia, ruffled feathers, mucous nasal discharge, diarrhoea and increased respiratory rate. The head and comb may be swollen and cyanotic. In chronic cases, localised infection of wattle, sinuses and joints may occur.

Grossly, necrotic foci of liver, hemorrhages in the duodenum, petechiae in different organs may be seen. In chronic cases, fibrinous pneumonia, suppurative meningitis and arthritis may occur.

Treatment

1. Sulfonamide and other antibiotics are effective.
2. Enrofloxacin (50mg/ml) : 1ml / litre
3. Gentamicin : 0.2 mg/ chick and 2.5 mg / bird I/M

Protozoan Disease

Coccidiosis

Among the protozoan diseases only coccidiosis is occasionally seen and is usually not a problem in desi birds under field condition. It is caused by *Eimeria* Sp. (*E. tennella* - Caecal coccidiosis, *Eimeria necatrix* - intestinal coccidiosis). It causes bloody diarrhoea in birds. Grossly haemorrhagic lesions of intestine can be appreciated in severe cases.

Treatment

1. Sulphadiazine and trimethoprim in acute cases @ 0.5 gm / litre of water for 3- 10 days

Deficiency Diseases

Leathery eggs are occasionally encountered in desi birds, which may be due to feeding birds exclusively with rice. This practice may result in calcium deficiency and birds may start laying leathery eggs.

Prevention : Shell grits may be mixed with grains and fed to birds.

Conclusion

There is a need to develop appropriate systems for providing health care as well as improving the productivity of these scavenging poultry birds.

The ways to improve the health of birds are:

1. Periodical vaccination against ND and Fowl pox should be done. The farmers or one or two educated youths should be educated about the prevalence of fatal diseases and trained them in vaccinating the birds.
2. A proper de-worming schedule should be followed to curtail parasitism. The farmers especially women should be trained to dose the birds with de-worming medicines. For ecto-parasites dusting or dipping program should be implemented.
3. The available free health services like rendering vaccines by the veterinary dispensaries should be made known to the farmers through extension education, as most of them are ignorant of it.

Department for International Development, UK.
Veterinary College and Research Institute, Namakkal, TN, India.
Scottish Agricultural College and
University of Greenwich, UK.

INCUBATION AND CANDLING OF DESI **(SCAVENGING) EGGS**

Introduction

Indigenous poultry are the descendants of the Red Jungle fowl. They have the best maternal instinct viz. the ability to lay eggs in sequence; sit over the eggs, hatch chicks and brood them for a fixed period of time before commencing the next sequence of egg laying. They are good scavenging and foraging birds, but poor layers with 3 to 4 clutches in a year, giving a total of 45 to 60 eggs per annum.

Broodiness is an instinctive character of desi birds and it is due to the pituitary hormone 'Prolactin'. Broodiness may be evident in birds immediately after laying 10 -15 eggs, when the blood prolactin level is high.

Storage of Eggs prior to incubation:

The eggs of birds have evolved so that they can be stored in a cool temperature for a period of time before they are incubated. The eggs should be cooled to a temperature well below the threshold of embryonic development, what is known as physiological zero, to curtail embryo's growth completely. Under village conditions it is unfeasible to achieve these temperature and hence modified storage technique can be followed for storing eggs.

The procedure for this technique is to store the eggs in a half moon shaped iron pot. The pot is filled with sand which is kept moistened with water after this a piece of jute bag is placed on the sand, the eggs placed on the bag and then covered with a cloth. When the hen stopped layings, all the eggs are placed under the hen, as per existing traditional practice.

This storage method improves hatchability by minimizing water loss from the egg through the shell. During the incubation period, each egg should lose approximately 12% of its fresh weight

as water. Failure to achieve this water loss can, depending on the extent of the deviation from the expected, result in the death of chick. However if the eggshell is cracked, or the shell is abnormally thin, or the environment around the egg is particularly dry during the storage period then the egg is likely to lose an excessive amount of water during storage and consequently, too much water during the incubation period. The most important criterion for this storage technique is to keep the embryo at or below the physiological Zero level.

Selection of Eggs for incubation :

Eggs of poor quality do not hatch well as good quality eggs. Regarding size, extremely small and large eggs should not be incubated. Care should be taken not to incubate together eggs that vary greatly in weight. Similarly eggs with porous, thin, chalky shells and cracked eggs should be avoided. Eggshell thickness is very important to hatchability and hence thick-shelled eggs should be preferred to avoid the risk of breakage during incubation. Dirty eggs should not be incubated, if they are soiled fully or 1/ 3rd to 1/ 4th portion with faecal materials. Whereas the eggs with minimum soiling may be wiped with dry salt paper and used for incubation.

At any cost the eggs should not be washed with water, because after washing the moisture will often condense on the shells, this picks up additional bacterial organism floating in the air and increases shell contamination. Furthermore, such moisture makes eggs hard to handle and they are further soiled.

Factors affecting hatchability:

The environment in which eggs are incubated plays an important role. The factors affecting hatchability are:

1. Temperature
2. Humidity
3. Ventilation
4. Position and Turning of the eggs.

1. Temperature: Chicken eggs will hatch when they are provided with the temperature between 95° F and 105° F (35° C and 40.5° C).

Physiological zero is that temperature below which embryonic growth is arrested, and above which growth is initiated. The Physiological zero level for poultry egg is at about 75° F (23.9° C). Since the desi bird has body temperature of 105° F normally, it provides enough heat to the incubated eggs that helps to develop embryo properly.

When the incubating temperature deviate from the optimum, hatchability declines and the incidence of malformed chicks increases. Normally the broody hen will come out once or twice in a day for feed and water, this may affect the incubating temperature and so hatchability. To avoid this, the broody hen should be provided with adequate feed and water nearby brooding places.

2. Relative Humidity: Relative humidity (amount of air moisture surrounding the egg) determines the rate of evaporation of egg contents that required for an embryo to develop properly and to transform into normal chick. Sixty percentage of RH up to 18 days and 70 % RH from 19 to 21 days of incubation period are required to the eggs for better development of chick. This RH can be obtained from the expiratory air (which is moisturized) of hen during incubation.

3. Position and Turning of the eggs: It is necessary that the egg be kept in the proper position during incubation and turned regularly. If the egg is not rotated, the two layers of thick albumen, normally separated by a layer of thin albumen, come in contact and the embryo usually dies. Under natural incubation the hen turns the eggs many times a day (apx 90 times) with the help of its beak and legs.

4. Air requirement: Hatchability also depends on the level of O₂ and CO₂ in the air. It is important to incubate the eggs in a dark, private place rather than usual lighted place, for better hatchability.

Care of brooding hen:

1. The broody hen should be provided with adequate feed and water accessible to the birds.
2. Since ecto parasitic infestation is higher in broody hen, prior to brooding they must be treated for both ecto and endoparasites.
3. The birds should be fed with the feed containing all essential nutrients.

Candling:

Candling is a technique to identify infertile eggs on 7th day of incubation. To improve hatchability a conventional approach is to candle all eggs after a period of 7 days incubation. This technique consists of shining a bright light through the shell and, if the embryo has developed normally (fertile eggs), it appears opaque either in part or totally or shows a small black spot in one corner surrounded by white portion of yolk with blood vessels, while infertile eggs appear transparent and allowing most of the light to pass through the egg. The infertile or spoiled eggs should be removed to reduce the incidence of cross contamination with bacteria between eggs and improve incubation conditions under the bird.

PREDATION IN DESI (SCAVENGING) BIRDS

Predators are one of the significant causes of loss in family poultry especially in young chicks at village level. Predation mostly occurs during the day, when the birds are let outside for scavenging. Since there are no separate houses for desi birds in most of the village households, during night hours also, the birds are staying on the trees nearby and sometime they are predated. Predation induced mortality rates depend upon the presence and prevalence of predators and location of poultry houses. Predation might be higher when poultry living places are placed nearer to the habitats of the predators (e.g. nesting sites for birds, dens for wild cats etc), located at periphery of a village and surrounded by fields.

There are two general categories of predation.

Bird predation:

It includes eagles, falcon and crow. They mainly feed on chicks, but not adults. Crows only feed on chicks, up to about one month of age, whereas eagle takes birds that are up to 1.5 months old.

Mammalian predation:

It includes wild cats, foxes, mongoose, dogs and snake. These predators take both chicks as well as mature birds. Among the various types of mammalian predators, wild cats and mongooses are considerable enemy to the desi birds especially during night hours. Wild cats catch one or two birds in a flock, that are up to one year old, whereas mongoose catch birds aged about 2- 3 months, but almost all of them in a flock is predated.

Mammalian predation is high during the rainy season as the amount of vegetation is more, and thus they may hide well. Conversely, bird predators are more of a threat when there is little or no vegetation cover is available during the summer and drought period. The two possible reasons in drought, such as the birds needed to travel longer distances to find food and availability of more weaklings due to malnutrition, make them more vulnerable to predators.

Predation deaths in Study area:

The results of the survey conducted at Peruganur village during last 3 years showed that an average of 18 to 27 % of the chicks and growers fall to predation. This suggests that the birds should be well protected against predatory.

PREDATION DEATHS IN PERUGANUR, TRICHY DISTRICT DURING STUDY PERIOD.

	Pre intervention			Post intervention		
	Total birds	Total deaths	Predation deaths	Total birds	Total deaths	Predation deaths
C1	665	176	126	908	319	281
C2	514	156	102	587	168	135
C3	266	60	35	331	106	88
Total	1445	392	263	1826	593	504
%		27.13%	18.20%		32.47%	27.60%

Prevention:

1. Improved housing: The birds should be housed in a specially constructed mud, stone or bamboo type house to protect them from mammalian predation, particularly at night hours.
2. To protect from bird type predation, more care should be given to young chicks of up to 1.5 months old by providing secure creep areas fenced with live plantation. Those, which survive up to 1.5 months, have more chances to survive later.

Department for International Development, UK.
Veterinary College and Research Institute, Namakkal, TN, India.
Scottish Agricultural College and
University of Greenwich, UK.

FEEDING OF DESI (SCAVENGING) CHICKENS

Desi chickens are allowed to scavenge and consume whatever they can find to meet their nutrient requirements. The requirements are strongly influenced by numerous factors that include age, productive state, state of health of the bird and the environment. In young birds protein deposition is a high priority for the bird and thus in the early stages of growth the young bird requires relatively high concentrations of protein (and thus amino acids) in the diet. At this stage of growth it is more beneficial for the bird to eat dietary constituents that are relatively high in available protein such as legume seeds and insects. However the consumption of insects, if they are parasitic or damaging to the bird, may cause some problems. They may encourage re-cycling of parasites. Although cereal seeds and by-products provide some protein they mainly supply energy and this will tend to cause fat to be deposited. As the birds grow older their total daily nutrient intake must increase and the protein intake can be reduced relative to energy. Throughout growth and production adequate supplies of vitamins and minerals must be supplied. If birds start to lay then their requirement for calcium, phosphorus and protein will increase. If insufficient supplies are available then eggs of poor quality (reduced shell quality, poor hatchability and poor health of chicks) will be produced. Simultaneously the layer will become depleted in nutrients and may suffer ill-health. If birds become ill or have an increased number of parasites within the gastro-intestinal tract then nutritional requirements will increase, either to meet the competing demands of the parasites or microbes in the GIT or to allow the repair of the GIT. Furthermore if the bird develops an immune response then its requirements for nutrients increase.

Some seeds contain proteinaceous compounds such as phytohaemagglutinins (lectins) and protease inhibitors that interact with the proteins and glycoproteins within the GIT. Lectins can damage the GIT and allow bacteria and other undesirable materials to pass through the wall thus causing problems and the animal to require more nutrients.

These can be proteins of the epithelial tissue and also enzymes within the GIT. Such interactions of protease inhibitors will reduce the functional ability of the enzymes produced by the bird, which will then attempt to increase production and also may allow ingested nutrients to pass through the GIT and be excreted. Increased production of enzymes adds an increased demand for nutrients especially those that are high in sulphur containing amino acids thus the supply needs to be increased to maintain health and performance.

Seeds with a high content of non-starch polysaccharides, which are indigestible, can increase the microbial burden within the GIT and thus reduce nutrient intake. In some cases seeds that contain terpenoid compounds, tannins and saponins can be beneficial, provided the intakes are not too high, because they can reduce the parasite and microbial loads within the GIT, thereby improving the health of the bird and nutrient utilisation.

Backyard poultry, reared in rural households, are dependant on free scavenging on wastes of households and residual farm produce for their feeding. They meet requirements through waste and broken grains, earthworms and insects, kitchen leftovers, green vegetables, tender leaves and anything edible available in the surrounding areas.

During rainy season the birds are overwhelmed with the greens, insects etc and hence the growth and egg production are comparatively better in those periods. But this condition does not exist through out the year. Shortage of feeds is the one of the main constraint to rural poultry development. Malnutrition in birds occurs due to non-availability of feeds. The feed related problems are of greater importance in landless laborers than landholders. This can be avoided through adopting following feeding practices in desi bird rearing.

1. The birds can be fed with protein containing termites along with grains feeding. Termite production can be encouraged.

2. Rice bran can be mixed up with little quantity of either water or porridge and used as a feed for desi birds. Bran is available in nearby mills.
3. Tamarind seed can be powdered and given to adult birds. As it contains 10 % protein and 80 % carbohydrates, this will improve the growth of the birds during lean season.
4. As papaya is not consumed in some of the places, the immature, fallen papaya can be used for feeding.

Apart from the scavenging feeds, supplementary balanced diet containing optimum level of vitamin, calcium and phosphorus should be given to prevent nutritional deficiency diseases in birds. The dietary level of calcium determines the quality of shell. Leathery eggs are occasionally encountered in desi birds due to calcium deficiency. For prevention, shell grits may be mixed with grains and fed to birds, during laying periods.

Termite Feeding:

Termites can be used as a source of protein rich feed for desi bird. It contains protein - 36 %, fat - 44.4 % and carbohydrates - 560 calorie / 100gms. For producing termites artificially, a mud pot is taken, filled layer by layer with dried dung material and one or two pieces of gunny bag / dried coconut leaves one by one. Water is sprinkled with every addition of material, finally straw is added and over this water is sprinkled. Then the pot is kept overnight in inverted position on dampened area. Termites could be observed in the pot by next morning or a day after that.

Conclusion:

It may be concluded that supplementary feeding of rural