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Various causes related to Dead-in-shell Embryos of Kamrupa and Dahlem Red bird's egg

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Abstract

The present study was undertaken to study the etiopathology of dead-in-shell embryos of chicken egg collected from the Kamrupa and Dahlem Red bird being maintained at the experimental poultry farm of "All India Co-ordinated Research Project on Poultry Breeding", Guwahati-22 during the period from February, 2014 to March, 2014. In total 2270 numbers of egg were incubated of which 1250 nos. from Kamrupa and 1020 nos. from Dahlem Red bird. Out of which 184 (58.97 %) and 143 (47.35 %) nos. of egg were found dead-in-shell in case of Kamrupa and Dahlem Red bird, respectively. Various abnormalities detected in the dead-in-shell embryos of Kamrupa and Dahlem Red bird were malposition, malformation, dehydration, adhesion, pathological condition. Out of 37 nos. and 33 nos. of dead-in-shell embryos of Kamrupa and Dahlem Red bird, respectively 13 nos. of embryos in each of the breeds showed septicemia. The organism isolated from the embryos of both the variety was *Streptococcus* spp, *Staphylococcus* spp. and *Escherichia coli*.

Keywords: Kamrupa bird, Dead-in shell embryo, infertile, malposition and malformation

Introduction

Poultry rearing is traditionally popular in Assam especially in rural areas (including tribal areas) for meat and egg production (Kalita *et al.* 2011)^[5]. The production of poultry meat and egg has shown an increasing trend with the introduction of improved breeds/strains of poultry. Today, the broiler sector is growing at the rate of 15 per cent per annum as compared to the dairy sector which grows at the rate of 5-6 per cent per annum (Haleem, 2009)^[4]. But the increase is not proportional to the efforts due to various set back like infectious diseases, managerial problems, hatchery problems etc. Due to lower percentage of hatchability for various causes the economic viability of the breeding farms reduces. Dead-in-shell due to various causes is one of the main reason for lower hatchability. In a study Goswami (2009)^[3] recorded 8.96 per cent incidence of dead-in-shell embryos out of 48,831 incubated eggs. Available literature did not reveal much systematic works on the dead-in-shell embryos of chicken in Assam. The dead-in-shell embryos indicate the hygienic and managerial status of the hatcheries and this further leads to early chick mortality. Therefore a systematic study has been planned to evaluate the causes of dead-in-shell embryos of Kamrupa and Dahlem Red bird's egg procured from the flock being maintained in the experimental poultry farm of "All India Co-ordinated Research Project on Poultry Breeding", College of Veterinary Science, Assam Agricultural University, Khanapara.

Materials and Methods

The study was conducted from February, 2014 to March, 2014. In a total of 2270 numbers of egg were incubated which was collected from a flock of Kamrupa bird (A variety developed under AICRP on Poultry Breeding, Directorate of Research (Vety.), AAU, Khanapara, Guwahati-781022), (1250 nos.) and a flock of Dahlem Red bird (1020 nos.) being maintained at the experimental poultry farm of "AICRP on Poultry Breeding", CVSc, AAU, Khanapara, Guwahati-22. The eggs which were failed to pip out, were utilized for further study as stated below:

Pathological study

Gross Examination: The number of infertile and dead-in-shell embryos were find out from the eggs which fail to pip out. All the dead-in-shell embryos were examined for different anomalies as well as pathological conditions through necropsy examination.

Bacteriological Examination: From the dead-in-shell embryos with pathological condition but without any developmental anomalies, suitable materials viz. pieces of liver, lung and yolk sac contents were collected randomly in aseptic condition from such embryos and sent to the Department of Microbiology, CVSc, AAU, Khanapara, for bacteriological isolation.

The data were tabulated and analysed by using the standard statistical methods as described by Snedecor and Cochran (1994)^[9].

Results and Discussion

A total of 2270 incubated eggs were monitored, where 312 (24.96 %) numbers egg from Kamrupa and 302 (29.60 %) numbers egg from Dahlem Red bird failed to pip out. Out of these 312 numbers of egg in case of Kamrupa bird, a total of 184 (58.97 %) numbers egg were recorded as dead-in-shell embryos and 128 (41.03 %) numbers were found infertile. Whereas, in Dahlem Red bird among the 302 numbers of egg, a total of 143 (47.35 %) numbers egg were recorded as dead-in-shell embryos and 159 (52.64 %) numbers were found infertile. The percentage of dead-in-shell embryos of Kamrupa and Dahlem Red birds were higher on the 21st day (56.92 % and 60.13%, respectively) than on the 18th day (43.08 % and 39.86 %, respectively) of incubation which have been confirmed by candling on 18th day and by breakout open of the eggs on 22nd day. This is in agreement with findings of Tona *et al.* (2001)^[10] and Goswami (2009)^[3]. The higher incidence of mortality on 21st day of incubation might be due to dehydration. Out of 184 numbers of dead-in-shell embryos of Kamrupa bird, 25 (13.59%) cases showed dehydration, 19 (10.33%) cases showed adhesion, 16 (8.70%) cases showed malposition, 8 (4.35 %) cases showed malformation, 37 (20.11%) cases showed pathological condition and 79 (42.93 %) cases showed no definite abnormalities. Similarly, out of 143 numbers of dead-in-shell embryos of Dahlem Red bird, 28 (19.58%) cases showed dehydration, 11 (7.69%) cases showed adhesion, 12 (8.39%) cases showed malposition, 2 (1.39%) cases showed malformation, 33 (23.07%) cases showed pathological condition and 57 (39.86%) cases showed no definite abnormalities.

Various Abnormalities

Malposition: In case of Kamrupa and Dahlem Red bird the different malpositions recorded were- head towards the left side in 3 and 4 numbers of embryos, head towards the small end of the egg in 9 and 6 numbers of embryo (Fig. 1 and 3) and head in between the thigh in 4 and 2 numbers of embryos, respectively. Similar malpositions with varied incidences were also recorded by the earlier workers (Amer, 1962; Rudraprasad *et al.*, 1996; Wilson *et al.*, 2003 and Goswami, 2009)^[2, 8, 12, 3]. Development of malposition might be due to genetic factors, position of eggs in the incubation tray, ambient temperature, age and size of the eggs, breed, individual difference and presumably many other factors as opined by Landaeur (1961)^[6].

Malformation: Malformation was recorded in 8 eggs (4.35 %) in Kamrupa bird and in 2 eggs (1.39 %) in Dahlem Red bird. The different malformations were like crossed beak, short upper beak, twins, abnormal legs and intestinal prolapse. Goswami (2009)^[3] also recorded only 0.15 per cent malformation from his study. Low incidence of malformation might be due to better selection of parent stocks and hatchery management as these play an important role in the incidence

of malformations of embryo (Wannop,1968)^[11].

Dehydration and adhesion: In the study, 25 cases of dehydration and 19 cases of adhesion were recorded in Kamrupa bird and 28 case of dehydration and 11 case of adhesion were recorded in Dahlem Red bird (Fig. 2 and 4) which also recorded by Goswami (2009)^[3] in different numbers.

Bacterial Disease: Among the 37 numbers of dead-in-shell embryos having pathological condition in case of Kamrupa bird, 18 numbers of dead-in-shell embryos were sent for cultural examination from which 13 embryos showed septicemia. Whereas in case of Dahlem Red bird out of 33 nos. of dead-in-shell embryos having pathological condition 20 nos. of dead-in-shell embryos were sent for cultural examination from which 13 embryos showed septicemia. The organisms isolated from such embryos were *Streptococcus* species, *Staphylococcus species* and *Escherichia coli*. Al-Sadi *et al.* (2000)^[1], Raji *et al.* (2007)^[7] and Goswami (2009)^[3] also isolated these organisms from dead-in-shell embryos.

Gross Lesion: The visceral organs viz. heart, liver, lungs, kidneys and intestine showed marked congestion. The yolk content was found discolored and most of the liver showed whitish yellow discoloration. Similar findings were also recorded by Al-Sadi *et al.* (2000)^[1] and Goswami (2009)^[3].

Undiagnosed: Out of 184 numbers of dead-in-shell embryos in case of Kamrupa bird and out of 143 numbers of dead-in-shell embryos in case of Dahlem Red bird, 79 numbers and 58 numbers were undiagnosed, respectively. Such embryos did not show any developmental anomalies as well as pathological condition which might be due to various other causes like viral diseases, inbreeding or the eggs might be from carrier birds of various diseases which needs further investigation. Frequent power failure and voltage fluctuation during incubation period may be considered one of the reasons of this incidence. Goswami (2009)^[3] also recorded a higher percentage of dead-in-shell embryos without any abnormalities.



Fig 1: Head towards the small end of the egg (Kamrupa bird)



Fig 2: Dehydrated dead-in-shell embryos (Kamrupa bird)



Fig 3: Head towards the small end of the egg (Dahlem Red bird)



Fig 4: Dehydrated dead-in-shell embryos (Dahlem Red bird)

Conclusion

Among various causes death due to undiagnosed cause is found to be major cause of dead-in-shell irrespective of breed. Also between Kamrupa and Dahlem Red bird the dead-in-shell embryo found to be higher in Kamrupa bird in compare to Dahlem Red bird.

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