

# Mortality of Fayoumi and Sonali Chicks in Scavenging Rearing System

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**Abstract:** Fayoumi and Sonali breeds are commonly reared under scavenging system in Bangladesh. Chick mortality has the very important impact on economy of farmers. The aim of the present study was to determine the mortality rate and the causes of mortality of Fayoumi and Sonali chicks. One observational cross-sectional study was done on the Fayoumi and Sonali chicks at Chittagong and Noakhali district from October 2005 to July 2006. A total of 48 farmers (24 from each Upazila) were selected randomly, who rear chicks under scavenging condition and as well as had broody hens. Twelve eggs of each breed were supplied to each farmer. The chicks were hatched out by the broody hens. Then the chicks were reared under scavenging system. The mortality detected for Fayoumi was 57.3%, which was less than that of the Sonali (68.8%) but did not vary significantly ( $\chi^2 = 1.21$ ,  $df = 1$ ,  $p > 0.05$ ). The mortality of Fayoumi chicks at Noakhali site was little higher (59.1%) than that of Chittagong (55.4%), but it did not vary significantly ( $\chi^2 = 0.28$ ,  $df = 1$ ,  $p > 0.05$ ). The mortality of Sonali chicks also did not differ significantly ( $\chi^2 = 0.16$ ,  $df = 1$ ,  $p > 0.05$ ). The mortality was more by diseases than predators. The common predators were crow, wildcat, domestic cat, mongoose and rat in both study sites. The crow predated (Fayoumi; 63.64% and Sonali; 70.83%) more baby chicks than others predators. The highest proportional mortality was caused by Mycoplasmosis + Colibacillosis (36.05 % and 36.94 %) in case of Fayoumi and Sonali followed by the second highest attributed to Mycoplasmosis (26.74%) and (22.52%) respectively. Fayoumi chicks were lower mortality than Sonali under scavenging rearing condition.

**Keywords:** Fayoumi, Sonali, mortality and scavenging.

## 1. INTRODUCTION

Poultry is one of the best tools for poverty reduction throughout the world. Smallholder backyard chicken production is a subsistence activity, providing egg and meat for family consumption and to some extent, cash income (Farooq *et al.*, 2004). Local scavenging chicks are dominant in poultry production in Bangladesh. Smallholder poultry farmers produce 78% eggs and 86% meat under scavenging system (Alam, 1995).

Fayoumi, an ancient breed from the Egyptian City of Fayoumi for egg production, is well known poultry breed in Bangladesh. Now a day, it is a well established poultry breed throughout the world and is also popular breed in India, Pakistan, Sri Lanka and many other countries because of its high profitability with low cost. Farmers can easily rear this breed both in intensive and scavenging systems. The farmers also like Fayoumi because of its bright color. Fayoumi is hardy, very precisions in early maturing and has excellent flying and escaping capacity (Chsen *et al.*, 1987). On the

contrary Sonali breed is a cross breed, which had been produced from the cross of Road Island Red (RIR) cocks and Fayoumi hens. It has specially been advocated in terms of their higher production rate and better adaptability in rural situation (Ahmed, 1997). Pure line of RIR cocks and Fayoumi hens has been used for the production of hatchable eggs to be used by broody hens. Body plumage is yellowish red (locally called Sonali, hence the name of the breed). Legs and ear-combs are yellowish. Sonali females produce about 180 eggs per year (Ali *et al.*, 1981).

Chick is a young chicken from one day to about 5 to 6 weeks of age either male or female (Banerjee, 2001). But in the scavenging system a young chicken up to 12 weeks old is also called chick (Khan, 2003). This is because the growth rate is low and takes more time for productive and reproductive performances than that of the intensive and semi-scavenging reared chicks.

The chicks losses by the diseases or any other causes in poultry stock are of paramount important. It has been established that certain breed, varieties and strains differ from others with respect to their ability to withstand unsuitable environmental condition (Ketelaere *et al.*, 2002). The common diseases are found to be Salmonellosis, Mycoplasmosis, Newcastle disease, Gumboro, Coccidiosis, Colibacillosis, Gangrenous dermatitis, Ascitis and Omphalitis at the time of chicks rearing period (Saleque, 2003). The common predators for the chicks are crows, fox, wildcat, mongoose, kite, rat, domestic cat, etc. (Saleque *et al.*, 1996). The objectives of this study were to calculate the mortality and causes of mortality in Fayoumi and Sonali chicks.

## 2. MATERIALS AND METHODS

### 2.1 General:

The research work was carried out to determine the mortality and causes of mortality of Fayoumi and Sonali chicks, which were reared under scavenging system. The experiment was conducted for a period of 10 months including 4 weeks adaptation period in farmers homestead in the Southern part of Bangladesh, Noakhali district and the Eastern part, Chittagong district between October 2005 and July 2006. Before starting of the experiments the author took a training class about experiment and made lottery for random distribution of the eggs of Fayoumi and (RIR male x Fayoumi female).

Two study areas (Chittagong and Noakhali) were selected for the ecological effect on chicks. In Chittagong District three villages (Bhatiary, Salimpur and Latifpur) under the Sitakundo Upazila and in Noakhali three villages (Karimpur, Sreepur and Maddam Karimpur) under the Sonapur Upazila were selected for the present study.

### 2.2 Farmer selection:

After preliminary selection and training finally 48 farmers were selected, from those (24 from Chittagong and 24 from Noakhali), who had hens under broody condition. The selected farmers were trained up for rearing broody hens, eggs and chicks through supplying a questionnaire and also trained to fill in the form. They were enthusiastic to rear poultry and received training on poultry rearing that helped giving right answer in filling up the data collection questionnaires.

### 2.3 The method of chicks rearing:

The chick rearing method was scavenging which is the oldest of all methods of poultry rearing and has been used for centuries by general farmers. These chicks were scavenged in around the farmers' homesteads and meet a major part of their feed requirements in this way and require little additional feed. The farmers were provide feed to their chicken scattered for 2 to 3 or more times a day schedule and mainly given rice, broken rice, rice polish, wheat, etc. Most part of the feed demands of chicks fulfilled from the scavenging areas. The scavenging areas were farmers' yard and surrounding fields of paddy, wheat, mustered and vegetables from where chicks fed grains, insects and vegetables leaves. So the farmers were more careless about their chicks to supply feed regularly. The farmers were given a night shelter for their chicks of about (4 to 5 feet length, 3 to 4 feet width and 2.5 to 3 feet height). The shelters were made by wood, bamboo, tin, mud, brick, cement, sands etc in Chittagong, but in to the Noakhali the shelters were mainly made by bamboo and tin. The location of the shelter was mainly the side of kitchen houses. This shelter had saved the chicks from predators and environmental conditions. The chicks were reared in a scavenging system with the vaccine applied against the Newcastle disease only. The vaccination schedule was maintained for the first dose at the 7<sup>th</sup> day and then at the day 21<sup>st</sup> for the

booster dose. After 4 month another dose of vaccine for Newcastle disease was administered. This is because; the disease is common and fatal for the chicks and sometimes may cause death of 100% chicks.

The mortality of chicks was determined by using the formula:

$$\text{Mortality} = \frac{\text{No. of dead chicks up to specified time}}{\text{No. of total chicks}} \times 100$$

The mortality of the chicks was like diseases caused and predators caused were also determined separately.

$$\text{Mortality} = \frac{\text{No. of lost chicks by predators for a specified time}}{\text{No. of total chicks}} \times 100$$

$$\text{Mortality} = \frac{\text{No. of dead chicks form diseases for a specified time}}{\text{No. of total chicks}} \times 100$$

Two persons were engaged in each area (Chittagong and Noakhali) to collect data continuously. The collected data were analyzed by using the statistical program of computer, Microsoft word, Microsoft Excel, SPSS and ANOVA.

### 3. RESULTS AND DISCUSSION

#### Mortality:

The average mortality of chicks due to disease and incidence was 57.3% in case of Fayoumi and 68.8% in case of Sonali (Table 3.1). Although the difference of mortality between chicks is quite substantial, but it was not statistically significant ( $\chi^2 = 1.21$ ,  $df = 1$ ,  $p > 0.05$ ). The mortality (Table 3.1) of Fayoumi chicks at Noakhali site was little higher (59.1%) than that of Chittagong (55.4%), but it did not vary significantly ( $\chi^2 = 0.28$ ,  $df = 1$ ,  $p > 0.05$ ). The mortality of Sonali chicks also did not differ significantly ( $\chi^2 = 0.16$ ,  $df = 1$ ,  $p > 0.05$ , Table 3.1).

**Table: 3.1 Mortality of Fayoumi and Sonali chicks**

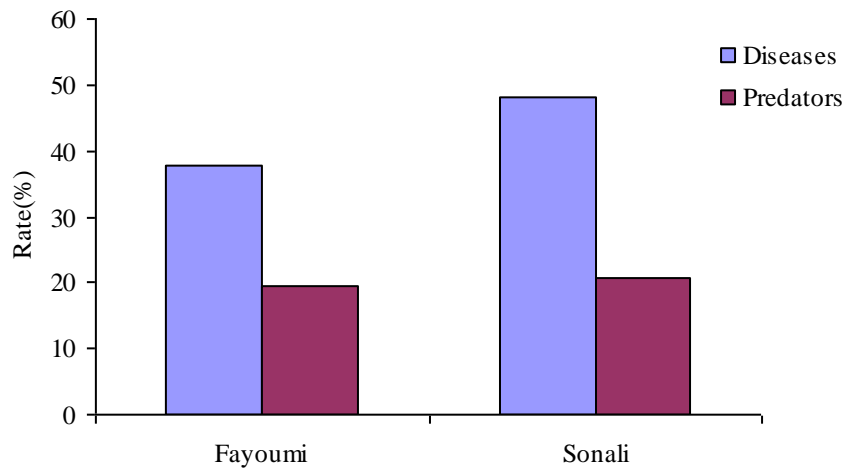
Breed	Total eggs	Hatched out chicks	Total lost	Mortality (%)
Fayoumi(Chittagong)	132	112	62	55.4
Fayoumi(Noakhali)	132	115	68	59.1
Fayoumi(Combined)	264	227	130	57.3
Sonali(Chittagong)	132	119	82	68.9
Sonali (Noakhali)	132	112	77	68.8
Sonali (Combined)	264	231	159	68.8

The mortality rate was found to be more in case of Sonali than the Fayoumi, because the later is scattered reared in the scavenging system in Bangladesh for a long time (Fattah, 1999). So the genotype Fayoumi is more adapted in our environment than that of genotype Sonali. The Sonali breed is also less alert and it cannot easily take feed from the scavenging area, so suffers from nutritional deficiency and more prone to victimized by the predators. For lack of nutrition they also suffer from several diseases.

The crossbred chicks (Sonali) suffered from various diseases such as Pullorum, Salmonellosis, Gumbroo, Ranikhat, Coccidiosis from 2<sup>nd</sup> weeks of age. They were very much susceptible to diseases and their growth might be retarded (Frossido, 1986; Fattah *et al.*, 1999), which support the results of present research.

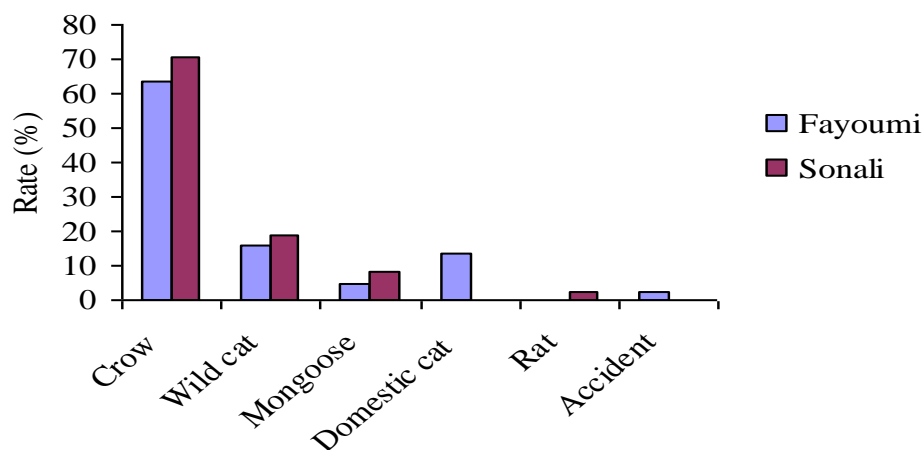
Crossbreeding reduces progeny mortality (Ghostaly *et al.*, 1951; Knox, 1939). Performances of different breed combinations under semi-scavenging conditions for mortality. In semi-scavenging condition, the mortality of Sonali and Deshi was 50% and 29% respectively (Amin *et al.*, 1992). Without interventions the mortality rate of poultry was reported

to be 35-85% due to diseases and predators (Scott *et al.*, 1976), which also agrees with the present findings. The mortality rate for two study sites did not vary much because of the environmental condition mainly weather condition is not markedly different from each other.



**Figure: 1 Mortality of Fayoumi and Sonali chicks**

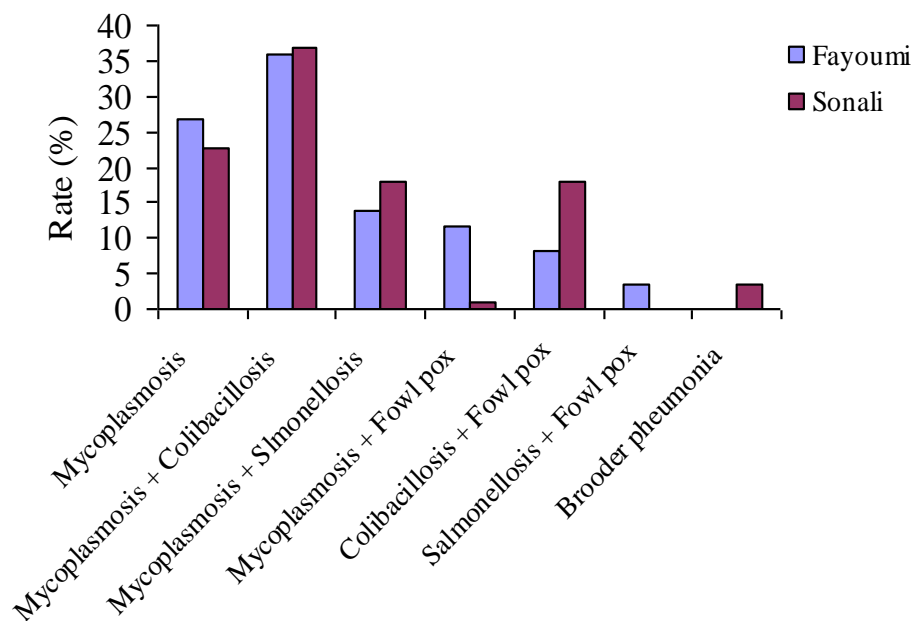
Figure 1 represents a quick comparison of the loss of chicks of both breeds due to diseases and predators. The loss was more by diseases than predators, because the immune system did not develop properly in the chicks, which causes more prone to the diseases and the farmers take more care to their chicks, which resulted less loss due to predators.



**Figure: 2 Fayoumi and Sonali lost by predators**

One of the causes of loss of chicks is predator and loss of chicks due to predators was nearly same in two breeds and sites. The common predators were crow, wildcat, domestic cat, mongoose and rat in both study sites of which crow predated (Fayumi; 63.64% and Sonali; 70.83%) more baby chicks than others (Figure 2). This is because the study was carried out from eggs to early stages of chicks. At the time of early ages the scavenging chicks suffered more from diseases than the loss due to predators. In the early age of chicks farmers take care of chicks against predators, so the loss is less. The mongooses killed 24% of Sonali birds in Noakhali Upazilla (Biswas, 2005) and it was less than 10% in both Chittagong and Noakhali sites in this study (Figure 2).

It is hoped that the result obtained in this study relating to better understanding on the causes of predation would help improving management to enhance life security of birds in the both sites Chittagong and Noakhali and both breeds Fayoumi and Sonali.



**Figure: 3 Fayoumi and Sonali lost by diseases**

During the observations there were 86 Fayoumi and 111 Sonali chicks reported to die from disease and chicks were collected for postmortem. Overall, birds were found to suffer from combination of diseases. The highest proportional mortality was caused by Mycoplasmosis + Colibacillosis (36.05 %) in case of Fayoumi and Mycoplasmosis + Colibacillosis (36.94 %) in case of Sonali followed by the second highest attributed to Mycoplasmosis (26.74%) and (22.52%) respectively. The common diseases were Salmonellosis, Fowl pox, Brooder pneumonia and combined of or synergistic effects of two pathogens (Biswas *et al.*, 2004).

Colibacillosis with its single and mixed infections or involved with cachexia caused the highest proportional mortality in Sonali birds in the SLDP-2 (it includes Feni, Noakhali, Rangpur, Dinajpur and Patuakhali) areas, of which the Noakhali was more affected than others (Barua *et al.*, 1998).

According to Giasuddin *et al.*, (2003) the overall highest prevalence of Colibacillosis was 26.7% in Noakhali area. Colibacillosis and Infectious bronchitis, and Colibacillosis and Mycoplasmosis caused higher mortality of Sonali (Nir *et al.*, 1990; Mack *et al.*, 1990). Barua (1990) recorded the highest mortality due to synergistic and/or additive effects of three diseases (Colibacillosis, Infectious bronchitis and Mycoplasmosis). The present result reveals that Salmonellosis and Mycoplasmosis jointly caused 13.95 % and 18.02 % for Fayoumi and Sonali mortality, and Salmonellosis and Fowl pox resulted jointly caused 3.49 % and 0 % for Fayoumi and Sonali mortality in the present study (see Figure 3). The major loss of chicks is due to diseases and predators (see Figure 3).

#### 4. CONCLUSION

The study was conducted on the mortality and the causes of mortality of Fayoumi chicks compared to Sonali, at the Sitakunda Upazila of Chittagong District and Sonapur Upazila of Noakhali District from October 2005 to July 2006. The research work observed with mortality and the causes of mortality of scavenging rearing chicks. Mortality was less in case of Fayoumi (57.3%) than that of Sonali (68.9%) This is because of the better and longer adaptation of Fayoumi breed than that of Sonali in the Bangladesh. The loss was more by diseases than predators, because the immune system did not develop properly in the chicks. The farmers take more care to their chicks that are why less loss due to predators. The common predators were crow, wildcat, domestic cat, mongoose and rat in both study sites. The common diseases are Mycoplasmosis, Colibacillosis, Salmonellosis, Fowl pox, Brooder pneumonia and combined of or synergistic effects of two pathogens.

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**REFERENCES**

- [1] Ahmed, Z. 1997. Semi-scavenging poultry model production chin. Impact of smallholder livestock Development project in some selected Areas of Bangladesh. *Livestock Research for rural Development*. 9(4): 23.
- [2] Alam, J. 1995. *Livestock resources in Bangladesh present status and futures potential*. Agricultural University Press Ltd. Pp. 12-29.
- [3] Ali. M. A., Ahmed, S. and Hamid, M.A. 1981. Studies of the production characteristics of some broiler type of birds under local condition. *Bangladesh Journal of Agricultural Science*. 8(1): 77-81.
- [4] Amin, M. R.; Haque, M .M. ; Islam Q.M.S. and Khan, M. M. R. 1992. The performances of crossbred and indigenous chicken under scavenging system. *Bangladesh Journal of Animal Science*. 21 (1-2): 77-81.
- [5] Banerjee, G. C. 2001. *A Text Book of Animal Husbandry*. 7<sup>th</sup> Edition. Poultry. Pp 722-793.
- [6] Barua, A. and Howlider, M.A.R 1990. Prospect of native chicken in Bangladesh. Conservation and Improvement of native poultry and ducks. Research Achievements and Activities Bangladesh Livestock Research Institute (BLRI-Report1999), Saver, Dhaka. April. 58: 17-20.
- [7] Barua, A.; Howlider, M .A.R. and Yeashmin Y, 1998. A study on the performance of Fayoumi, Rhode Islad Red and Fayoumi x Rhode Island Red chickens under rural condition of Bangladesh. *Asian Australasian Journal of Animal Science*.11 (6):635-641.
- [8] Biswas,P.K.; Biswas, D.; Barua, H. and Roy, K.2004. A longitudinal study to identify the cause of the mortality of Sonali birds and broody hen chicks of key beneficiaries in the SLDP2 area. Proceedings of the second annual scientific conference. Chittagong Government Veterinary College. Held on 25-26 February 2004. Pp 81-89.
- [9] Biswas, P.K.2005. A Longitudinal study to identify the causes of the mortality of ‘Sonali’ birds (♀Fayoumi X ♂RIR) reared under semi-scavenging system in the SLDP-2 areas. Proceedings of the third annual scientific conference. Held on14-15 March ,2005. Chittagong Veterinary and Animal Sciences University, Chittagong. Pp 41-62.
- [10] Chsen, N.and Gupta, S. 1987. A comparative study of the performance of White Leghorn, Rhode Island Red, Native naked neck and native feathered birds. Unpublished M.S.thesis, Department of poultry science, Bangladesh Agricultural University, Mymensingh. 22 pp.
- [11] Farooq, M .; Gul, N. Chand, N.; Durrani, F. R. and Khurshed, A. 2004. Production performance of backyard chicken under the care of women Charsadda, Pakistan. <http://www.Utafoundation.Org/lrrd141faro141.htm> 4/7/2006.
- [12] Fattah,K.A.. 1999. The Danish human resource base in agricultural research for development. Poultry as a tool in poverty eradication and promotion of gender equality. Proceedings of a workshop. Held on March 22-26. 21 pp.
- [13] Fattah, K.A. and Swan, S.E.J. 1999. “The poultry development strategy of the Participatory Livestock Development Project (PLDP) in Bangladesh”, In *Poultry as a Tool in Poverty Eradication and Promotion of Gender Equality*, .Proceedings of Danish development workers course, Tune, Denmark, Held on March 25-29, 1999. Pp 38-55.
- [14] Forssido, T. 1986. Studying on the meat production potential of some strains of chicken in Ethiopia. A unpublished Ph.D. thesis, Justus Loebing Universitat, Gieben, Germany.

- [15] Ghostaly, F. and Nordskog, A.W.1951. Hybrid vigor in strain crossing and breed crossing. Executive summaries of research report, Annual Research Review Workshop. Held on 11-12 May, New York. 2003. Pp 6-8.
- [16] Giasuddin, M.; Alam, J.; Islam, M.R. and Rahman, M.M 2003. Epidemiological investigation of infectious bursal disease in Bangladesh 3<sup>rd</sup> international poultry show and seminar held on February 28-March 2, Dhaka, 2003. Pp 99-105.
- [17] Khan, M.K.I. 2003. Crossing Hilly with RIR and Fayoumi for the Deveopment of Layer Chicken Suitable for Semi-scavenging System with Sonali and Nera as Control. An applied research project. Pp 25-29.
- [18] Knox, C.W. 1939. Crossbreeding in the domestic fowl. Proceedings of Seventh Worlds Poultry Congress Green Land. 1938. Pp 58-61.
- [19] Kumar, J.; Aggarwal, C.K and Acharya, R.M. 1976. Collecting and evaluation of native germ plasm part 11. Efficiency of fowl conservation, egg production, and egg size in Deshi Rhode Island Red and their crosses. Animal Breeding Abstract. 40: 581 pp.
- [20] Mack, O.; Nath, M.O. and Donald, D. Bell, J. 1990. Commercial chicken production manual, Fourth Edition, Chapman and Hall 115 Fifth Avenue, New York, NY .10003 pp.
- [21] Saleque, M.A. and Mustafa, S. 1996.Landless women and poultry: The BRAC model in Bangladesh. 89pp.
- [22] Saleque, M.A.2003. Pattern of Poultry Disease in Breeding Farm and Small Poultry Units in Bangladesh. 3<sup>rd</sup> International Poultry Show and Seminar, held on February 28-March 2. 2003. 38 pp.
- [23] Scott, M.L.; Nesheim, M.C. and Young, R. J.1976. Nutrition of the chicken( 2nd Edtion). M.L Scott Associate Ithaca New York. 236pp.