

# Liveability of Fayoumi and Sonali Chicks in Scavenging Rearing System

O.F. Miazi<sup>1\*</sup>, G. Miah<sup>1</sup>, M.M. Momin<sup>1</sup>, M.M. Hassan<sup>2</sup>, M.M. Uddin<sup>3</sup>, M.E. Hossain<sup>4</sup>, M.S. Mahmud<sup>5</sup> and M.F. Ahsan<sup>6</sup>

<sup>1</sup>Department of Genetics and Animal Breeding,

<sup>2</sup>Department of Physiology, Pharmacology and Biochemistry,

<sup>3</sup>Department of Anatomy and Histology,

<sup>4</sup>Department of General Animal Sciences and Nutrition, Chittagong Veterinary and Animal Sciences University Khulshi, Chittagong-4225, Bangladesh,

<sup>5</sup>Senior Scientific officer, Bangladesh Livestock Research Institute, Savar, Dhaka-1344, Bangladesh and

<sup>6</sup>Department of Zoology, Chittagong University, Chittagong, Bangladesh,

**Corresponding Author:** Dr. Omar Faruk Miazi, Department of Genetics and Animal Breeding, Chittagong Veterinary and Animal Sciences University, Khulshi, Chittagong 4225; E-mail: [f\\_cvasu@yahoo.co.in](mailto:f_cvasu@yahoo.co.in)

**Abstract:** Now the days Fayoumi and Sonali breeds are commonly reared in scavenging rearing system in Bangladesh. The aim of the present study was to determine the liveability 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 reared 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 farmers managed broody hens. Then the chicks were reared under scavenging system. The overall liveability of Fayoumi chick after 8-week was 58.2% and the difference between Chittagong and Noakhali sites was negligible, which did not vary at all ( $\chi^2 = 0$ ,  $df = 1$ ,  $p > 0.05$ ). Whereas the overall liveability of Sonali chick was 49.4% and there was small variation between two sites, but it did not differ significantly ( $\chi^2 = 0.316$ ,  $df = 1$ ,  $p > 0.05$ ). On the other hand, the liveability of Fayoumi chick was higher than that of Sonali, though it did not vary significantly ( $\chi^2 = 1.317$ ,  $df = 1$ ,  $p > 0.05$ ). After 12 weeks the liveability of Fayoumi was 42.3% and Sonali 31.2% that varied between two breeds, but not significantly ( $\chi^2 = 3.43$ ,  $df = 1$ ,  $p > 0.05$ ). The liveability of Fayoumi chicks was higher Chittagong (43.8%), but that was not significantly different from in Noakhali (40.9%) ( $\chi^2 = 0.04$ ,  $df = 1$ ,  $p > 0.05$ ). Liveability for Sonali did not differ significantly between two sites ( $\chi^2 = 11$ ,  $df = 1$ ,  $p > 0.06$ ). Liveability of Fayoumi chicks was better than Sonali under scavenging rearing condition.

**Index Terms:** Liveability, Fayoumi, Sonali, Chittagong and Noakhali.

## I. INTRODUCTION

### 1.1 General

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). Some experiments have been conducted concerning the introduction of exotic breed of hens of high yielding varieties (HYV) and their crosses to determine potentials and limitations in the scavenging and semi-scavenging systems (Rahman *et al.*, 1998). Faruque *et al.*, (1987) also showed that HYV breeds have a higher egg yield than deshi hens under scavenging condition.

### 1.2 Fayoumi

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 and they like it because of its bright color. Fayoumi is hardy, very precisions in early maturing and has excellent flying and escaping capacity (Chsen *et al.*, 1987).

### 1.3 Sonali

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).

#### 1.4 Chick

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.

#### 1.5 Liveability

Liveability means the percentage of live birds for a specified time, which affects the productive and reproductive performance of poultry. Liveability of chicks is a final measure of a bird's reproductive performance (Anisuzzaman, 1988). It is generally well known that chicks from certain mating are known to live well, while from different mating have high mortality. It is a good practice to use only breeders whose progeny live well. The traits liveability, fertility and hatchability are of paramount importance to poultry breeders, because they incur loss in breeding operations. Poor fertility, low hatchability and less liveability significantly affect net returns (Azizul *et al.*, 1980). Therefore, higher fertility of hatching eggs, higher hatchability of fertile eggs and lower mortality of birds should be of direct interest to the poultry breeders as well as the hatchery operations (Banerjee, 1993). Poultry breeders must look into these three traits of significance to overcome the problems of infertility, poor hatchability and low liveability (Ahmed *et al.*, 1982).

Crossbreeding generally improves progeny and adult liveability. Cross of two pure breeds in which the viability of chicks is high could not be accepted to give materially higher livability (Stanphone, 1961). On the other hand, two comparatively low breeds may produce considerably higher livability. This is because of bringing together in the crossbreed progeny favorable dominant genes from each of the pure breed parents (Aini, 1990). It has already been established that certain genetic groups differ from others with respects to their ability to withstand unfavorable conditions. The objective of this study was to know about liveability of Fayoumi and Sonali chicks.

## II. 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.

### 2.4 Mathematical calculation and analysis

At first liveability of chicks from day-old to eight weeks and twelve weeks has been determined by using the formula.

$$\text{Liveability} = \frac{\text{No. of live chicks up to specified time}}{\text{Total chicks}} \times 100$$

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.

## III. RESULTS AND DISCUSSION

### Liveability

The overall liveability of Fayoumi chick after 8-week was 58.2% and the difference between Chittagong and Noakhali sites was negligible (Table 3.1), which did not vary at all ( $\chi^2 = 0$ ,  $df = 1$ ,  $p > 0.05$ ). Whereas the overall liveability of Sonali chick was 49.4% and there was small variation between two sites (Table 3.2), but it did not differ significantly ( $\chi^2 = 0.316$ ,  $df = 1$ ,  $p > 0.05$ ). On the other hand, the liveability of Fayoumi chick was higher than that of Sonali (Table 3.1 and 3.2), though it did not vary significantly ( $\chi^2 = 1.317$ ,  $df = 1$ ,  $p > 0.05$ ).

Table: 3.1 Liveability of Fayoumi chicks

Breed	Total eggs	Hatched out chicks	Remaining after 8 weeks	Livability (%) after 8 weeks	Remaining after 12 weeks	Livability (%) after 12 weeks
Fayoumi (Ctg.)	132	112	66	58.9	49	43.8
Fayoumi (Noak.)	132	115	66	57.4	47	40.9
Fayoumi (Combined)	264	227	132	58.2	96	42.3

Table: 3.2 Liveability of Sonali chicks

Breed	Total eggs	Hatched out chicks	Remaining after 8 weeks	Livability (%) after 8 weeks	Remaining after 12 weeks	Livability (%) after 12 weeks
Sonali (Ctg.)	132	119	60	50.4	37	31.1
Sonali (Noak.)	132	112	54	48.2	35	31.3
Sonali (Combined)	264	231	114	49.4	72	31.2

After 12 weeks the liveability of Fayoumi was 42.3% and Sonali 31.2% that varied between two breeds (Table 3.2), but not significantly ( $\chi^2 = 3.43$ ,  $df = 1$ ,  $p > 0.05$ ). The livability of Fayoumi chicks was higher Chittagong (43.8%), but that was not significantly different from in Noakhali (40.9%) ( $\chi^2 = 0.04$ ,  $df = 1$ ,  $p > 0.05$ ). Liveability for Sonali did not differ significantly between two sites ( $\chi^2 = 11$ ,  $df = 1$ ,  $p > 0.06$ , Table 3.2).

The liveability of Sonali chicks in intensive system of rearing was 90.8% and 94.4% in case of semi-intensive system (Islam *et al.*, 2004), which is more than double than the present work of Sonali in scavenging system (31.2%).

The results drawn from the scavenging system of rearing it can be showed that over 50% of chicks are lost before they reach the age of two months. The main causes are the infectious and non-infectious diseases, and predators. Overall mean chick survival rate up to 8 weeks of age was 59.7 % in the scavenging rearing system in Uganda (Mtambo, 1996).

In the present study liveability differed between two breeds possibly because of their differences in genetic makeup. Beside this the livability was high in Fayoumi chicks than that of Sonali for their ability to cope with environment. Fayoumi is being scatteredly reared in the scavenging system in Bangladesh for long time. So its genotype is more adapted in our environment than newly adapted genotype of Sonali.

Sonali breed is also less alert, so it does not take easily feed from the scavenging area and more prone to be victimized by the predators Nazir, 2003). For lack of nutrition it also suffers from several diseases and nutrition deficiencies. The heritability value for the liveability is very low, 5-10% (Okada *et al.*, 1988). This denotes that the environmental factors like natural feeding, weather

condition and management system affect the liveability. This factor is quite favorable in Chittagong than that of Noakhali study area, so the livability is found to be better in the former area.

The liveability of scavenges chicks is 30% to 40 % of our Deshi chicks (Nawer *et al.*,1999). Liveability of laying birds is more than chicks in every case like scavenging, semi-scavenging and intensive system of poultry rearing. Because the immune system is developed in laying hen and predators do not victimize the mature birds easily. Livability during laying period is 91.19% and 82.43% respectively for Fayoumi and RIR, but for Sonali it is 83.33% (Haque *et al.*, 1994).

Liveability is the potentially of an individual to survive up to its normal life. In chicken, life begins just after fertilization and continues until death. Death losses may occur at any time during lifetime for various diseases (Trail, 1961). Losses from disease in poultry flocks are of paramount importance with respect to the monetary loss resulting from death, retarded growth, less weight gain, decreased egg production etc. There are three methods of disease control available to the poultry men: sanitation, treatment and breeding for development of resistance varieties (Nazir, 2000). Development resistance against a particular disease is the job to be done by the poultry breeders. But in case of scavenging rearing system of chicks, sanitation and treatment schedule are not followed strictly. For this, if a good breed is reared in scavenging rearing management system the livability of the breed will be hampered by the diseases.

Intense inbreeding has an unfavorable effect on chick viability. The viability of laying pullets decreases as the inbreeding increases. Inbreeding beyond 80% causes the pullets to die before the end of the first laying year (Smith, 1996). But in Fayoumi chicks, which are produced by the flock mating system is not an intense inbreeding system. Without this, the genotype of Fayoumi in our country is well adopted in scavenging system for long time. For this reason, the liveability of Fayoumi breed is better than the Sonali, though it is produced by inbreeding system. Crossbreeding generally improves progeny and adult viability (Crawford, 1984). This is because of bringing together in the crossbred progeny favorable dominant genes from each of the pure breed parents. So if we rear this genotype for long time in our environmental condition, the resistance against diseases and adaptation level will become good for the Sonali.

#### IV. CONCLUSION

The study was conducted on the liveability of Fayoumi and Sonali chicks, at the Sitakunda Upazila of Chittagong District and Sonapur Upazila of Noakhali District from October 2005 to July 2006. The research work observed with liveability of scavenging rearing chicks. The livability of Fayoumi chicks (42.3%) was better than Sonali (31.2%) after 12 weeks of age. This is because of the better and longer adaptation of Fayoumi breed than that of Sonali in the Bangladesh. The overall livability of Fayoumi chick after 8-week was 58.2% and the difference between Chittagong and Noakhali sites was negligible. Whereas the overall livability of Sonali chick was 49.4% and there was small variation between two sites. On the other hand, the liveability of Fayoumi chick was higher than that of Sonali. The chicks of both breeds can be reared easily because they can survive through obtaining food from the surrounding environments and so, suitable for rearing for the poor farmers in the rural area.

#### ACKNOWLEDGEMENT

I am utmost delightful to Dr. Md. Farid Ahsan, Professor, Department of Zoology, University of Chittagong, Chittagong for many sorts of help provided during the project tenure. I am also grateful to SLDP2 for financing the research project from Higher Education Research Fellowship. I would like to thank DR. Mohammad Mahmudul Hassan Associate Professor, Department of Physiology, Pharmacology and Bio-chemistry and Gous Miah, Professor, Department of Genetics and Animal Breeding of Chittagong Veterinary and Animal Sciences University for their monitoring, suggestions and inspiration.

#### 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] Ahmed, N.; Amin, N. P.; Monir, N. I.; Miah, N. and Islam, A. 1982. Livestock related FSR activities of the Bangladesh Rice Research Institute Rice farming Research Division Bangladesh Rice Research Institute, Gazipur. 171 pp.
- [3] Alam, J. 1995. Livestock resources in Bangladesh present status and futures potential. Agricultural University Press Ltd. Pp. 12-29.
- [4] 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.
- [5] Anisuzzaman, M. 1988. A study on growth rate, feed efficiency and livability of Fayoumi chicken under Bangladesh condition. Unpublished M.Sc. thesis, Bangladesh Agricultural University, Mymensingh.
- [6] Azizul, H. D. and Reza, A. 1980. A comparative study of the performance of exotic breed and indigenous birds under village condition. Unpublished M. S. thesis. Department of poultry science, Bangladesh Agricultural University, Mymensingh. 27 pp.
- [7] Banerjee, G. C. 1993. A Text Book of Animal Husbandry. 7<sup>th</sup> Edition. Poultry . Pp 722-793.
- [8] Banerjee, G.C. 2001. A text book of Poultry. 1<sup>st</sup> Edition. Breeding method of Poultry.India. 97pp.

- [9] 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.
- [10] Crawford, R.D. 1984 Assessment and conservation of animal genetic resources in Canada. Canadian Journal of Animal Science. 17: 93-97.
- [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] Faruque, M.O.; Hasnath, M.A.; Mostafa, K.G.; Ikuo, O.; Takashi, A. and Takao, N. 1987. Conservation of livestock genetic resources in Bangladesh-Past, Present and Future. Genetic Studies on Breed Differentiation of Native Domestic Animal in Bangladesh. 2:129-137.
- [13] Huque, Q.M.E. and Ukil, M.A. 1994. Existing poultry production and utilization system in the traditional villages in Bangladesh, Bangladesh journal of Training and development. 7(1): 35-43.
- [14] Islam, M.A.; Ranving, H. and Howlider, M.A.R. 2004. Incubation capacity of broody hens and chick performance. Proceedings of the second annual scientific conference. Chittagong Government Veterinary College held on 25-26 February 2004. Pp 3-19.
- [15] Khan, M.K.I. 2003. Crossing Hilly with RIR and Fayoumi for the Development of Layer Chicken Suitable for Semi-scavenging System with Sonali and Nera as Control. An applied research project. Pp 25-29.
- [16] Khan, M.R. and Roy, P.C. 2003. Credit Policy, Disbursement and its impact on poultry industry in Bangladesh. 3<sup>rd</sup> International Poultry Show and Seminar. February 28-March 2. 2003. 44 pp.
- [17] Mtambo, M.M.A. 1996. Poultry as a Tool in poverty Eradication and Promotion of Gender Equality. Proceedings of a Workshop. Improving the Health and Productivity of the Rural Chickens in Africa: Report of Phase 1 of an Enreca Sponsored Project. 78pp.
- [18] Nawer, M.E. and Abdu, F.H. 1999. Analysis of heterotic gene action and maternal effect in crossbred Fayoumi Chickens. Egyptian- Poultry Science Journal. 19(3): 671-689.
- [19] Nazir, A. 2000. Overview of the project Roles and Responsibilities of Different Organizations and co-ordination Implementation. (4<sup>th</sup> Edition) .Guide for training of trainers : Pp 9-12.
- [20] Nazir, A. 2003. Backyard poultry production system in Bangladesh. Poultry as a tool in poverty eradication and production of gender equality. Proceedings of the workshop, held on March 21-26 Savar, Dhaka. Pp145-149.
- [21] Okada, I.Y.; Maeda, T. H.; Hasnath, M. A.; Faruque, M.O. and Majid, M.A 1988. Gene constitution of indigenous chickens in Bangladesh . Japanese poultry science. 25(1):15-16.
- [22] Smith, A.J. 1996. Poultry. Poultry in context. The Tropical Agriculturist Center for Tropical Veterinary Medicine, University of Edinburgh, Series editor, Rene Coste. Pp1-3.
- [23] Smith, A.J. 1996 Poultry. Integration of poultry production into agricultural systems in the tropics. The Tropical Agriculturist Center for tropical Veterinary Medicine, University of Edinburgh, Series editor, Rene Coste. Pp 179-199.
- [24] Smith, A. J. (1996) Poultry. Breeds and strains of poultry and their improvement. The Tropical Agriculturist Center for tropical Veterinary Medicine University of Edinburgh, Series editor, Rene Coste. Pp 37-41.
- [25] Stanphone, W. 1961. Crossbreds as layers. Animal Breeding Abstract 30. 244pp.
- [26] Trail, J.C.M. 1961. The indigenous poultry of Uganda. Poultry Science. 41:12-17.