

# **Study on Genetic Variations in Survivability and Feed Consumption of the Cross Breeds of (Naked Neck and Fayoumi) and (RIR and Naked Neck)**



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**A Production Report Submitted as per approved style and content**

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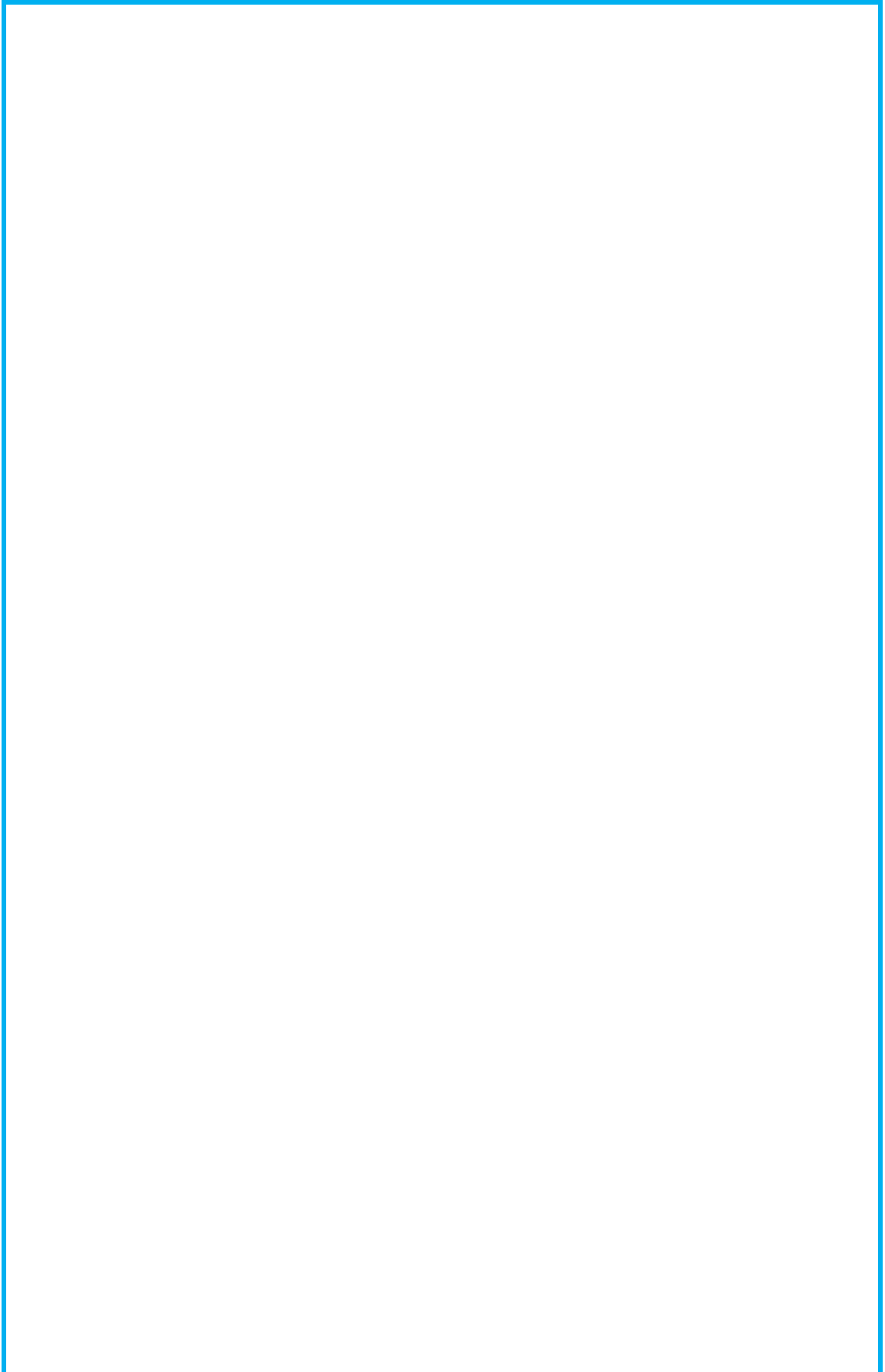
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## LIST OF ABBREVIATIONS

<b>Abbreviations</b>	<b>Elaboration</b>
♂	Male
♀	Female
NF cross	Naked neck♂ × Fayoumi♀
RN cross	RIR♂ × Naked Neck♀
RIR	Rhode Island Red
%	Percentage
n	Number
gm	Gram

## ABSTRACT

An experiment was conducted to compare the survivability and feed intake of the cross breeds of (Naked Neck♂ × Fayoumi♀) and (RIR♂ × Naked Neck♀) at grower stage up to 9 weeks of age. Thirty cross breed birds of each group were considered. Commercial layer ration was fed to experimental birds ad libitum. Similar care and management were provided to birds of all treatment groups. Naked neck and Fayoumi cross breeds showed the survivability of 96.15%, 96%, 95.83% and 95.65% in the 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> week of age whereas RIR and Naked Neck cross breed showed that the survivability of the birds were highest 100% at 4<sup>th</sup> week of age and lowest 90.48% at 8<sup>th</sup> weeks of age. At the age of 8<sup>th</sup> week the survivability rate was lowered to 90.48% and then it was therefore recorded as 96%, 100%, 100%, 95.83%, 95.65% and 95.46% in the 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> week of age respectively. Then at the level of 9<sup>th</sup> week survivability rises to 94.74%. Naked neck and Fayoumi cross breeds the highest feed intake 6433.63gms were in 9<sup>th</sup> week of age and lowest 1144gms of feed intake in first week of age. When feed consumption was considered highest average feed intake by the birds was 6433.63gm/week and lowest was 1144gms/week. The intake was increasing in sequence with the increase of week of age correspondingly while considered the feed intake of RIR and Naked Neck, the highest feed intake 3211.90gms were in 8<sup>th</sup> weeks of age and lowest 807.29 gms of feed intake in first week of age respectively. When feed consumption was considered highest average feed intake by the birds was 3211.90gms/week recorded at 8<sup>th</sup> week of age and lowest was 807.29gms/week at 1<sup>st</sup> week of age.

On the basis of results, it was concluded that (Naked Neck♂ × Fayoumi♀) and (RIR♂ × Naked Neck♀) cross-bred chicks could be reared up to 9 weeks respectively to reach target weights with minimum mortality rate with least feed intake respectively to obtain maximum profit.

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**Key words:** Cross breeds, Survivability, Feed intake.

# CHAPTER I

## INTRODUCTION

Poultry constitutes 30% of animal protein sources around the world (IFPRI-International Food Policy Research Institute, 2000). Bangladesh is one of the tropical countries in the world in which agriculture is the backbone of the nation, where population is increasing day by day and about 86% of people are directly or indirectly employed with agriculture (Mohammed A. Islam *et al.*, 2010). One of the most important protein resources in Bangladesh is poultry protein (meat and eggs). The rational requirements for meat and eggs for human beings is 120g/day/head and 2 eggs/week/head in a country where availability of meat and eggs in Bangladesh is 12.6 g/ day/head and 0.46 eggs/week/head, respectively (Huque, 1992). Therefore, this wide gap between demand and supply of animal protein as meat and eggs can be improved easily by poultry rearing (Das *et al.*, 2008). Most of the Bangladeshi consumers still prefer eggs from local native strains. In developing countries, egg production is mainly dependent upon traditional extensive production system using native breeds (Ani I., 1990). About 89% of poultry production is considered to be under rural scavenging conditions in Bangladesh (Huque, 1996). Besbes (2009) showed that indigenous and local poultry breeds share of the total population in developing countries.

Indigenous chicken is low in productivity due to their inherent genetic characteristics, poor husbandry practices, seasonal effects, low level of nutrition, and broodiness (Sarkar and Bell, 2006; Besbes, 2009). But under extensive or traditional systems of poultry rearing, indigenous chickens resulted better output with respect to survivability, fertility and hatchability, although they have poor productivity (Huque and Haque, 1990; Barua *et al.*, 1998b; Islam, 2000, 2006) which does not encourage farmers to extend the present level of their poultry operations. Considering a high level of performance, no doubt is the aim of any enterprise involved in the production of meat and eggs. Genetic variation in poultry for meat and egg production between breeds, strains and lines has been reported (Hocking, P.M. *et al.*, 2003).

Therefore, scientists are trying to obtain maximum production, involving landless or marginal farmers with a minimum land, investment and time for poultry rearing. A number of breeding techniques, methods and technology have been applied to achieve this productivity goal. Some poultry industries have imported improved exotic varieties of chickens into Bangladesh which originated in temperate countries where they produce well. In tropical climate like Bangladesh, the production performance of these improved chickens is often below the standard of the breeder company because of their genetic makeup inherent for temperate region, genotype  $\times$  environment interaction, devoid of scientific management, inadequate nutrition level and harsh environmental conditions, as well as high susceptibility to disease and lack of availability of good quality vaccines and therapeutics (Hutt, 1958; Al-Soudi and Al-Azzawi, 1974; Okoye and Aba-Adulugba, 1996; Tadelle *et al.*, 2000; Singh *et al.*, 2004 ). Hot-humid climates are more detrimental factor for chicken production than dry climate (Horst and Petersen, 1981). Indigenous chickens are well adapted to be reared in harsh tropical environments and nutrition compared to the exotic chickens (Barua and Howlider, 1990; Horst, 1991; Ali *et al.*, 1993). They can protect themselves and chicks from predatory animal species (Khan, 1993) and can survive under adverse environmental conditions such as poor housing and feeding, poor management and fluctuating temperature and humidity. They are also resistant to different diseases (Barua and Howlider, 1991; Islam, 2000). Among the varieties of non-descript (not characterized) indigenous chickens, the naked neck and Fayumi (tropically relevant major gene) are available which have been found very promising, as it has a heat dissipation mechanism and is heat tolerant and therefore better adapted to warm climates (Merat, 1986; Horst, 1988; Deeb and Cahaner, 1996; Horst 1996; Islam, 2000). Merat (1982) reported better performance of Naked neck birds at a temperature ranges from 25°C to 30°C and above. Zein-El-Dein *et al.* (1984a) suggested that Naked neck birds showed a slightly stronger advantage in presence of a ration with suboptimal protein level. On the other hand, exotic chickens are affected severely in the harsh tropical environment, showing reduced productivity and survivability and high susceptibility to disease and heat (Bohren *et al.*, 1982; Barua *et al.*, 1998a).



Crossbreeding is one of the tools for exploiting genetic variation. The main purpose of crossing in chicken is to produce superior progeny (hybrid vigor), to improve fitness and fertility traits and to combine different productive characteristics in which the crossed breeds were valuable (Hanafi, M.S. *et al.*, 2001). Moreover, crossing between chicken strains improved the production traits such as feed intake, body weight at sexual maturity, egg number, egg weight and egg mass compared with those for pure strains (Amin, E.M. *et al.*, 2008). Many studies have reported that cross breeding of exotic with indigenous chickens resulted in birds that performed better, even superior to pure exotic chickens, with respect to body weight, egg production, survivability, fertility, hatchability and egg quality (Islam *et al.*, 1981; Barua and Howlader, 1990; Khondoker *et al.*, 1996; Rahman *et al.*, 1998).

Crossbred chickens have improved adaptability to tropical environments and are resistant to disease and heat compared to exotic pure breeds (Islam *et al.*, 1981; Khondoker *et al.*, 1996; Rahman *et al.*, 1997; Barua *et al.*, 1998a; Islam, 2006). Ali *et al.*, (1993) showed that improved productive adaptability of RIR Fayoumi crossbreds compared to pure exotic chickens in Bangladesh. Crossbreds from indigenous naked neck (D. Nana) with exotic chickens are well adapted to harsh hot-humid climate compared to pure exotic chickens (Huque, 1999).

Predators of chickens in the rural area are foxes, a kind of wild cat (*Felis chaus*), mongooses and human thieves. Colibacillosis (both single and mixed infections) had a contributory role in the mortality (28%) of birds also reported that Salmonellosis, Newcastle disease and internal parasites contributes to the next highest (14, 11 and 10%) proportional mortalities (P.K Biswas *et al.*, 2006).

Crossbreeding research studies have been performed by different scientists but no final conclusion has been reached. In this view, the present study has been conducted to measure and compare the survivability and feed intake of the cross breeds of (Naked Neck♂ × Fayoumi♀) and (RIR♂ × Naked Neck♀) at grower stage up to 9 weeks of age.

## CHAPTER II

### MATERIALS AND METHODS

#### 2.1. Description of study area and samples

The present experiment was conducted at Badalgachi Upazilla under Naogaon district of Bangladesh to investigate the comparison in survivability and feed consumption of two different crossbreed chickens derived from crossing from (Naked neck♂ × Fayoumi♀) and (RIR♂ × Naked Neck♀) where RIR (Rhode Island Red) and Fayumi chickens were collected from Government Poultry Breeding farm, Rangpur and indigenous Naked neck were collected from the villages under Naogaon district.



Figure 1: Study area is shown in the map

## **2.2. Experiment Design**

The experiment were conducted using completely randomized design a total of one hundred mature female Fayoumi chicken and ten birds from Naked neck having an age of 20-25 weeks were reared for up to ten weeks. In another rearing system a total of one hundred mature female Naked neck chicken and ten birds from RIR having an age of 20-25 weeks were reared for up to ten weeks. Birds were maintained in floor rearing system where manually egg collection was done in an independent open-side poultry house. There was the provision of removable feeder and drinker for drinking water and 2 square feet floor space/bird. The data for egg weight were recorded on daily basis while the egg quality traits were measured on weekly basis. Then the good quality eggs were collected for further progeny performance study. Then the new progeny from the hatched eggs are the cross breeds resulted from (Naked neck × Fayumi) and (RIR × Naked Neck). The data for survivability were recorded in the resulted cross breed progeny on daily basis while feed intake quantity data were collected on weekly basis up to 9 weeks.

## **2.3. Breeding design**

For breeding chickens used in this study were maintained in the ratio of 10 females: 1 male. The chicken were fed ad libitum commercial layer ration. Drinking water was also provided ad libitum.

## **2.4. Data Collection**

The resulted cross breeds were reared up to 9 weeks and data were collected on:

### **2.4.1. Feed Intake in crossbreed chickens**

Feeds were balanced in measuring weight balance and amount of feed provided were recorded every week separately up to 9 weeks that was the growing stage.

#### **2.4.2. Survivability of the crossbreed chickens**

Numbers of dead birds were recorded up to 9 weeks from total numbers of reared birds at the beginning of each week for both cross breeds separately.

#### **2.5. Data Analysis**

All collected data were imported to Microsoft Excell-2007 and transferred to SPSS-16 software for analysis. Descriptive statistics of some parameters were done.

## CHAPTER III

### RESULTS

#### 3.1. Survivability of cross breed chickens

The weekly and overall survivability of the NF cross (Naked neck♂ × Fayoumi♀) and RN cross (♂RIR × Naked Neck♀) are presented in the Table 1.

Age	Survivability (%)	
	NF cross	RN cross
1 <sup>st</sup> week	100%	100%
2 <sup>nd</sup> week	100%	96%
3 <sup>rd</sup> week	86.67%	100%
4 <sup>th</sup> week	96.15%	100%
5 <sup>th</sup> week	96%	95.83%
6 <sup>th</sup> week	95.83%	95.65%
7 <sup>th</sup> week	95.65%	95.46%
8 <sup>th</sup> week	100%	90.48%
9 <sup>th</sup> week	95.45%	94.74%
Average	96.19%	96.46%

**N: Number of birds = 30; NF cross = Crossbred derived from cross between Naked neck and Fayoumi; RN cross = Crossbred derived from cross between RIR and Naked neck.**

The results for Naked neck and Fayoumi cross breeds showed that the survivability of the birds were highest 100% at 8th week of age and lowest 86.67% at 3rd weeks of age. At the age of 3<sup>rd</sup> week the survivability rate was lowered to 86.67% and then it started to rise 96.15%, 96%, 95.83% and 95.65% in the 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> week of age respectively. Then at the level of 8<sup>th</sup> week survivability rises to 100% where as the results obtained from RIR and Naked Neck cross breed showed that the survivability of the birds were highest 100% at 4<sup>th</sup> week of age and lowest 90.48% at 8<sup>th</sup> weeks of age. At the age of 8<sup>th</sup>

week the survivability rate was lowered to 90.48% and then it was therefore recorded as 96%, 100%, 100%, 95.83%, 95.65% and 95.46% in the 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> week of age respectively. Then at the level of 9<sup>th</sup> week survivability rises to 94.74%.

### 3.2. Feed Intake of cross breed chickens

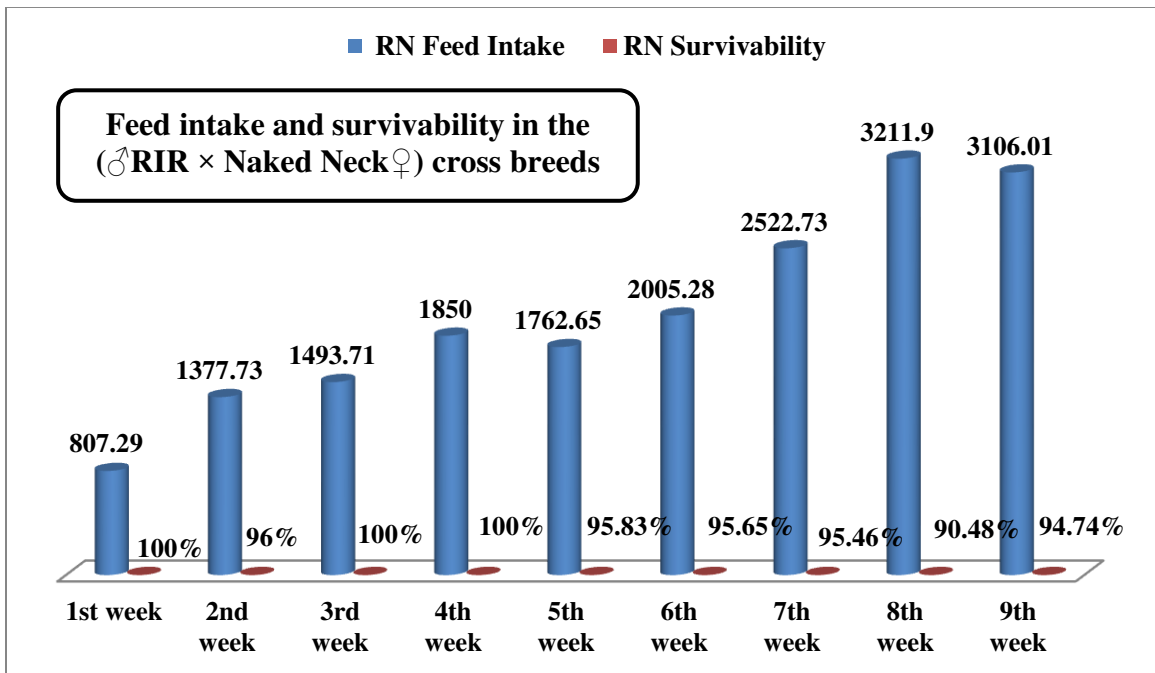
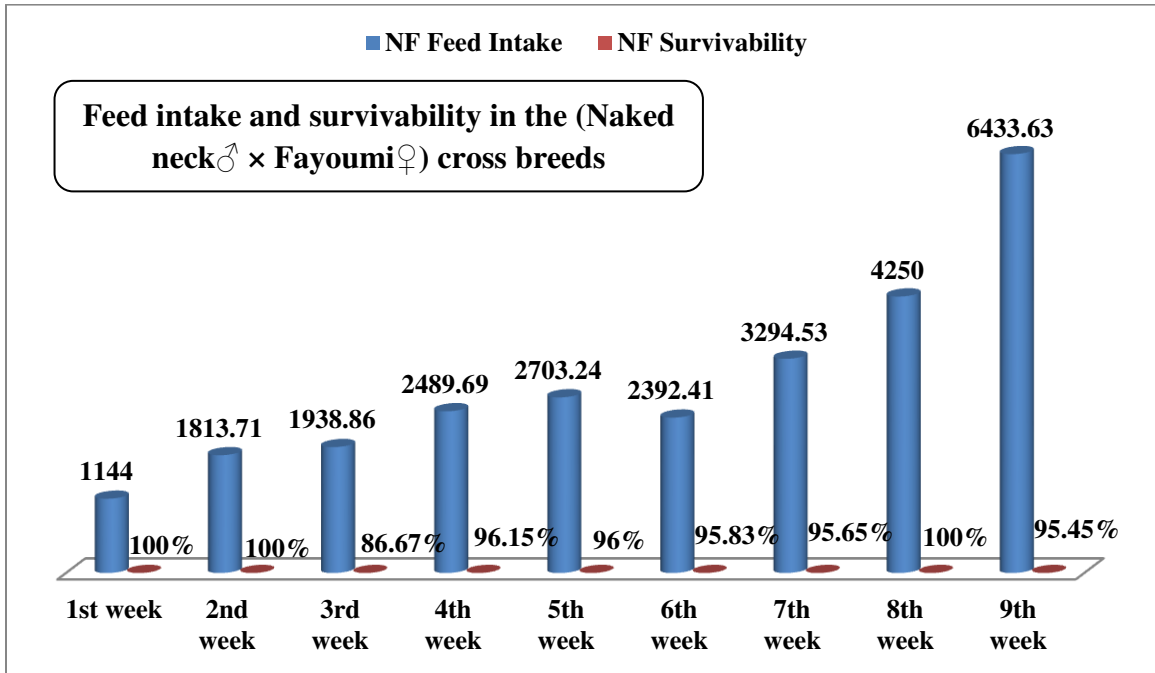
The weekly and overall feed intake of the NF cross (Naked neck ♂ × Fayoumi ♀) and RN cross (♂RIR × Naked Neck ♀) are presented in the Table 2.

Age	Feed Intake (gm/week)	
	NF cross	RN cross
1 <sup>st</sup> week	1144	807.29
2 <sup>nd</sup> week	1813.71	1377.73
3 <sup>rd</sup> week	1938.86	1493.71
4 <sup>th</sup> week	2489.69	1850
5 <sup>th</sup> week	2703.24	1762.65
6 <sup>th</sup> week	2392.41	2005.28
7 <sup>th</sup> week	3294.53	2522.73
8 <sup>th</sup> week	4250	3211.90
9 <sup>th</sup> week	6433.63	3106.01
<b>Average</b>	<b>2940.01</b>	<b>2015.26</b>

**N: Number of birds = 30; NF cross = Crossbred derived from cross between Naked neck and Fayoumi; RN cross = Crossbred derived from cross between RIR and Naked neck.**

In case of feed intake of Naked neck and Fayoumi cross breeds the highest feed intake 6433.63gms were in 9<sup>th</sup> week of age and lowest 1144gms of feed intake in first week of age. When feed consumption was considered highest average feed intake by the birds was 6433.63gm/week and lowest was 1144gms/week. The intake was increasing in sequence with the increase of week of age correspondingly while considered the feed intake of RIR and Naked Neck, the highest feed intake 3211.90gms were in 8<sup>th</sup> weeks of age and lowest

807.29 gms of feed intake in first week of age respectively. When feed consumption was considered highest average feed intake by the birds was 3211.90gms/week recorded at 8<sup>th</sup> week of age and lowest was 807.29gms/week at 1<sup>st</sup> week of age.



## CHAPTER IV

### DISCUSSION

The estimates in the present study determines that Naked Neck and Fayoumi cross breed chickens had a survivability rate of average 96.19% with average feed intake of 2940.01gms of feed per week which shows some dissimilarity according to the reports of Haque *et al.*, (1999) stated that the average feed consumption of Fayoumi and Naked Neck cross breed is about 5712gm/week. Islam *et al.*, (2002b) stated in his study that in case of Indigenous full feathered Naked Neck had been found intake average was 1246gms per week per bird with 16.5% mortality rate where the data regarding Naked Neck showed intake average was 5831gms per week per bird with 20.4% mortality rate. The variation is probably due to the environmental interactions subjected to the chickens during intensive system of rearing in the rural area. Haque *et al.*, (1999) also showed an estimate of survivability the cross breeds 91.7% that is close to the estimates obtained from the present study where the average survivability rate is 96.19% and the lowest survivability rate was 96.67% and higher rate was up to 100%.

RIR and Naked Neck cross breeds shows a particular somewhat different estimate than that of Fayoumi and Naked Neck cross breed chickens in the present study. The study reports chickens had a survivability rate of average 96.46% with average feed intake of 2015.26gms of feed per week. The result can be compared to the study of Barua *et al.*, (1998b) that defines the mortality rate was 10% in an average and the average feed consumption was 7864.7gms per week of age. This also shows large variations with the present study in the highest weekly feed intake that was 3211.90gms per bird in an average where the lowest feed consumption observed 807.29gms per week per bird. Khondoker *et al.*, (1996) suggested RIR had been found intake average was 5927.3gms per week per bird with 37.2% mortality rate where the data regarding Naked Neck showed intake average was 4609gms per week per bird with 44% mortality rate. Khondoker *et al.*, (1996) reported that the intake average was 4988.1gms per week per bird in the cross breeds from RIR and Naked Neck that shows some similarity with the



conducted present study but differs with the mortality reported 25.5% but was found 2% in the present study. Khondoker *et al.*, (1996) suggested RIR had been found intake average was 5927.3gms per week per bird with 37.2% mortality rate where the data regarding Naked Neck showed intake average was 4609gms per week per bird with 44% mortality rate.

The results obtained from the present study can be concluded in such a way where there is no significant different in the mortality in the genotypes of cross breeds obtained from (Naked neck × Fayumi) and (RIR × Naked Neck). When the average feed consumption is estimated resulting cross breeds (Naked neck × Fayoumi) average feed intake 2940.01gms per week per bird is higher than the cross breeds (RIR × Naked Neck) average feed intake 2015.26gms. But the comparison shows up gradation of the pure exotic breeds productive characteristics according to Islam *et al.*, (2002b), Haque *et al.*, (1999) and Khondoker *et al.*, (1996). So the cross breeds are profitable in view of mortality and feed consumption rate.

This large variations may be concluded due to the different environmental interactions prevailed during the study and possibly variations in the intensive management system of rearing. But, the study shows the efficacy of the resulted cross breeds in low mortality and low feed intake in relation with the pure exotic RIR chicken breeds. In interaction between cross breeds of (Naked neck × Fayumi) and (RIR × Naked Neck) also showed that RIR × Naked Neck cross breeds have less feed consumption. So, possibly the rearing cost could be minimized by rearing the following cross breeds in intensive farming.

## **CHAPTER V**

### **LIMITATIONS**

The data were collected from Naogaon district in research work by TMSS rural development based research organization from the rural farmers. Organized data recording system was not followed by the farmers. Some birds died due to the predators in the area. Intensive management was not properly managed by the farmers. The sample size was not big for each farmers and data collected from multiple farmers for multiple data was a difficult task without a well organized recording system.

## **CHAPTER VI**

### **CONCLUSION**

From the present review, it is concluded that crossbreds may be useful for poultry production under semi-intensive or scavenging rearing systems in tropical climates because of their adaptability and resistance to disease. The study reveals that the resulting crossbred birds are more profitable compared with the exotic pure breed also the indigenous bird in respect of survivability and feed consumption.

## CHAPTER VII

### REFERENCES

- Ali, M. I. "Reproduction and growth of Rhode Island Red (RIR), Fayoumi (FO) and RIR× FO chicken in Bangladesh." *Poultry Adviser* 24 (1993): 47-50.
- Amin, E. M. "Effect of crossing between native and a commercial chicken strain on egg production traits. Egypt." *Poultry Science* 28.1 (2008): 27-349.
- Barua, A. "Meat yield of free range naked neck and full feathered Bangladeshi chicken." *Indian Journal of Animal Sciences* 61 (1991): 772-775.
- Barua, A. "Prospects of native chicken in Bangladesh." *Poultry Adviser* 22 (1990): 57-61.
- Barua, A., M. A. R. Howlider, and Y. Yoshimura. "A study on the performance of Fayoumi, Rhode Island Red and Fayoumi x Rhode Island Red chickens under rural condition of Bangladesh." *Asian Australasian Journal of Animal Sciences* 11 (1998): 635-641.
- Barua, A., M. A. R. Howlider, and Y. Yoshimura. "A study on the performance of Fayoumi, Rhode Island Red and Fayoumi x Rhode Island Red chickens under rural condition of Bangladesh." *Asian Australasian Journal of Animal Sciences* 11 (1998): 635-641.
- Barua, Animesh, M. A. R. Howlider, and Yukinori Yoshimura. "Indigenous naked neck fowl of Bangladesh." *World's Poultry Science Journal* 54.3 (1998): 279-286.
- Besbes, B. "Genotype evaluation and breeding of poultry for performance under sub-optimal village conditions." *World's Poultry Science Journal* 65.2 (2009): 260-271.
- Bohren, B. B., J. C. Rogler, and J. R. Carson. "Survival under heat stress of lines selected for fast and slow growth at two temperatures." *Poultry science* 61.9 (1982): 1804-1808.

- Broody, S. 1945. Bioenergetics and growth. Reinhold Publishing Corporation N.Y., U.S.A.
- Das, S. C., Chowdhury, S. D., Khatun, M. A., Nishibori, M., Isobe, N., & Yoshimura, Y. (2008). "Poultry production profile and expected future projection in Bangladesh." *World's Poultry Science Journal*, 64(1), 99-118.
- Deeb, N. "The effect of the Naked neck (Na) gene on broilers stocks differing in growth rate." *Proceedings of the XX World's Poultry Congress, 1996.* 1996.
- Hanafi, M. S., and M. M. Iraqi. "Evaluation of purebreds, heterosis, combining abilities, maternal and sex-linked effects for some productive and reproductive traits in chickens." *Second International Conference on Anim. Prod. Health in Semi-Arid Areas.* 2001.
- Hocking, P. M., Bain, M., Channing, C. E., Fleming, R., & Wilson, S. (2003). "Genetic variation for egg production, egg quality and bone strength in selected and traditional breeds of laying fowl." *British Poultry Science*, 44(3), 365-373.
- Horst, P. "Breeding policies for specific tropical environments using appropriate combination of major genes with improved fowls." *Proceedings of the XX World's Poultry Congress, 1996.* Vol. 1. 1996.
- HORST, P. "Native fowl as a reservoir for genomes and major genes with direct and indirect effects on the adaptability and their potential for tropically oriented breeding plans-a review." *Animal Research and Development* 33 (1991): 63-79.
- Horst, Peter. "The effect of dwarf gene on the adaptability of laying hens to high environmental temperatures." *Animal Research and Development* 13 (1981): 69-74.
- Huque, Q. M. E. "A research report on current status of poultry production and marketing system in Bangladesh." *Bangladesh Livestock Research Institute, Savar, Bangladesh* (1992).

- Huque, Q. M. E. "Improving skill of the small farmers in poultry management." Proceedings of the XX World's Poultry Congress, 1996. Vol. 1. 1996.
- Huque, Q. M. E., and M. E. Haque. "The onset of lay in indigenous hens following hatching of chicks." Poultry Adviser 23.8 (1990): 57-60.
- Huque, Q. M. E., Chowdhury, S. A., Haque, M. E., & Sil, B. K. (1999, March). "Poultry research in Bangladesh: present status and its implication for future research." In Proceedings of a Workshop on Poultry as a Tool in Poverty Eradication and Promotion of Gender Equality (pp. 151-164).
- Hutt, Frederick Bruce. "Genetic resistance to disease in domestic animals." Genetic resistance to disease in domestic animals. (1958).
- IFPRI (International Food Policy Research Institute), 2000.
- Iraqi, M. M., Hanafi, M. S., Khalil, M. H., El-Labban, A. F. M., & Ell-Sisy, M. (2002). "Genetic evaluation of growth traits in a crossbreeding experiment involving two local strains of chickens using multi-trait animal model." Livestock Research for Rural Development, 14(5), 1-9.
- Iraqi, M. M., et al. "Heterotic and genetic components in 4x4 diallel mating experiment for egg production traits in chickens. 4 th World Poult." Conf. 27–30 March 2007, Sharm EL-Sheikh, Egypt. 2007.
- Islam, A. B. M. M., M. M. Hoque, and Q. M. F. Rahim. "Reproductive performance of upgraded indigenous chicken." Poultry adviser (1981).
- Islam, M. A. "Comparative egg production and egg quality of indigenous full feathered and naked neck chicken at hot-humid climate." Bangladesh Journal of Animal Science 35 (2006): 99-105.

- Islam, M. A. "Effect of local and exotic strains of chicken for broiler production at hot-humid climate." Ph. D. Thesis. Institute of Animal Science, Faculty of Agriculture and Horticulture, Humboldt University of Berlin (2000).
- Khondoker, M. A. M. Y. "Performance of upgraded indigenous desi chicken under farm condition." *Bangladesh Journal of Animal Science* 25 (1996): 85-89.
- MALAGO, J. J., M. A. BAITILWAKE (2009). "Egg traits, fertility, hatchability and chicksurvivability of Rhode Island Red, local and crossbred chickens." *Tanzania Veterinary Journal*. 26, 24-36.
- Merat, P. "Potential Usefulness of the Na (Naked Neck) Gene in Poultry Production." *World's Poultry Science Journal* 42.2 (1986): 124-42.
- Merat, P. "Potential usefulness of the Na (naked neck) gene in poultry production." *World's Poultry Science Journal* 42.2 (1986): 124-142.
- Okoye, J. O. A., and E. P. Aba-Adulugba. "Comparative study of the resistance or susceptibility of local Nigerian and exotic chickens to infectious bursal disease." *Avian pathology* 27.2 (1998): 168-173.
- P.K.Biswas, G.M.N. Uddin, H.Barua, K.Roy, D.Biswas, A.Ahad and N.C.Debnath. 2006. "Causes of loss of Sonali chickens on smallholder households in Bangladesh." *Preventive Veterinary Medicine*.76:185-195.
- Rahman, M. M., M. A. Baqui, and M. A. R. Howlider. "Egg production performance of RIR x Fayoumi and Fayoumi x RIR crossbreed chicken under intensive management in Bangladesh." *Livestock Research for rural development* 16.11 (2004): 189-195.
- Rahman, M., Sorensen, P., Jensen, H. A., & Dolberg, F. (1997). "Exotic hens under semi scavenging conditions in Bangladesh." *Livestock Research for Rural Development*, 9(3), 1-11.

- Rahman, Mahfuzar. "Effect of supplementary feeding on production performance of RIR, Fayoumi and their crossbred chicken in rural Bangladesh." *Bangladesh Journal of Livestock Research* 1 (1998): 184-193.
- Sarkar, K., and J. G. Bell. "Potentialities of the indigenous chicken and its role in poverty alleviation and nutrition security for rural households." *INFPD Newsletter* 16.215 (2006): 15-26.
- Singh, D. P., Johri, T. S., Singh, U. B., Narayan, R., Singh, D., & Saran, S. (2004). "Impact of constraints minimization on productivity and popularity of traditional backyard poultry production." In *Proceedings of the XXII world's poultry congress, Istanbul*.
- Tadelle, D., C. Kijora, and K. J. Peters. "Indigenous chicken ecotypes in Ethiopia: growth and feed utilization potentials." *International Journal of Poultry Science* 2.2 (2003): 144-152.



## APPENDIX

Feed intake and survivability in the (Naked neck × Fayoumi) cross breeds

Birds Numbers	Survivability			Feed Intake/week	
	Live	Dead	Average (%)	Total (gm)	Average Intake (gm)
30	30	0	100	34320	1144
30	30	0	100	54411.42	1813.714
30	26	4	86.66666667	58165.72	1938.857333
26	25	1	96.15384615	64732.15	2489.698077
25	24	1	96	67581	2703.24
24	23	1	95.83333333	57417.87	2392.41125
23	22	1	95.65217391	75774.29	3294.534348
23	23	0	100	97750	4250
22	21	1	95.45454545	141540	6433.636364

Feed intake and survivability in the (RIR × Naked Neck) cross breeds

Birds Numbers	Survivability			Feed Intake/week	
	Live	Dead	Average (%)	Total (gm)	Average Intake (gm)
25	25	0	100	20182.15	807.286
25	24	1	96	34443.36	1377.7344
24	24	0	100	35849.04	1493.71
24	24	0	100	44400	1850
24	23	1	95.83333333	42303.67	1762.652917
23	22	1	95.65217391	46121.46	2005.28087
22	21	1	95.45454545	55500.06	2522.73
21	19	2	90.47619048	67450	3211.904762
19	18	1	94.73684211	59014.26	3106.013684

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