Chapter-I

Introduction

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 involved with agriculture. Among the various components of agriculture, poultry, which provides meat and egg as animal protein sources, is one of the most important components, preferred by all kinds of people. The requirement of meat and eggs for human beings is 120 g/day/head and 2 eggs/week/head, in a country where availability of meat and eggs 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 keeping (das et al., 2008). This suggests that emphasis needs to be placed on increasing poultry production to provide required animal protein to human beings as well as to decrease unemployment. Therefore, scientists are trying to obtain maximum production, involving landless or marginal farmers with a minimum land, investment and time. A number of breeding techniques, methods and technology have been applied to achieve this 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, genotypex environment interaction, unsophisticated scientific management, inadequate nutrition and harsh environment, 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). About 89 % of poultry production continues to be under rural scavenging conditions in Bangladesh (Huque, 1996). Besbes (2009) showed that indigenous and local breeds share 90 % of the total population in developing countries. Therefore, some NGO’S, Foreign Aid projects and Governmental organizations have concentrated on adopting a model for using crossbred chickens in scavenging or semi intensive systems to increase family Poultry production (Das et al., 2008). Under extensive or traditional systems of poultry rearing, indigenous chickens performed better 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. 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). Many studies have found 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 Howlider, 1990; Khondoker et al., 1996; Rahman et al., 1998). Study carried out for the production of crossbreds, ‘SONALI’ from RIR and FAYOUMI chickens reported increased egg production (Rahman et al., 1997; Fattah, 1999; das et al., 2008). Rahman et al. (1997) reported 156 eggs/year in ‘SONALI’ crossbred hens. Lower productivity of indigenous chickens seems to be caused, at least in part, by management. A recent report stated that the productivity of Indigenous chickens may be doubled in an improved management system (Chowdhury et al., 2006). In Bangladesh, numerous ranges of crossbreeding research studies have been done but there is no consensus among the findings. Cross-breeding is performed for the purpose of suitable genetic blending to fit under a given environment, breakthrough in genetic limit and to have heterotic effect. Besbes (2009) reported improved body weight, egg production and survivability in crossbred chickens. Although to maintain crossbreeding program is too complex under village condition in most cases the cock has been used to utilize high-yielding breeds to upgrade local chicken (Besbes, 2009). Considering the above facts, the present review will evaluate the potential of using crossbreds for poultry production and the development of a suitable genetic resource for future poultry production in hot-humid climate.

The national survey on livestock and poultry in Bangladesh for the year 1988-89,published in 1994, indicate that the total number of households rearing poultry birds were 10,350,195 and the number of poultry was 96.753 million (DLS projection for 2002 shows chicken 175.12 million and ducks 13.70 million). Of the total poultry population 83 percent were chicken. As compared to the 1983-84 livestock survey, the number of chicken has increased by 26 percent. Farm holdings were 7,213,000 and non-farm holdings were 198,000. Farm holdings were categorized into three sizes viz. Small (500 to 2000 birds), medium (2000 to 5000 birds) and large (above 5000 birds). Of the total number of poultry birds small, medium and large farm holdings had the percentage of 64.0, 24.2 and 6.5 respectively. The population of chicken in Bangladesh has increased at an average rate of 7% p.a. In 1994, the total poultry meat production was estimated at 99,000 mt. (FAO quarterly bulletin of statistics, Vol. 8,1995) and egg production for the same year was estimated at 2,404.4 million tons. It is also notable that the production of poultry meat and eggs increased at an average annual rate of 4.6 percent and 5.5 percent respectively. The poultry industry is set to grow as it affairs to provide quicker return on investment, due to a short rearing period of poultry birds and the feed conversion ratio (2:1) is the highest in any animal production system.

Over the past few years, poultry rearing has developed as commercial undertaking based on imported hybrid stocks. Despite infrastructural inadequacies, a good number of progressive small poultry producers are emerging. Apart from the effort of public and private sectors, certain NGOs like BRAC, Proshika and ASA are also vigorously attempting to spread the practice of poultry farming in the country.

The government sponsored a broad policy upgrading program but could never keep pace with the demand of the day. During the recent decade a large number of private commercial farms have been established. The existing government poultry farms have little or no contribution to support the commercial farms in terms of day old chicks (doc),availability of required feed ingredients ,medicines and vaccines .At present all private commercial farms are dependent on import and a few parent stock farms. However, the activities of government poultry farms are confined to maintaining traditional poultry breed (breed purity of these birds are questionable) and extending services mainly for backyard farms keeping scavenging birds. Such services are very limited and cannot keep pace with the demand even of government sponsored poultry programme. Several NGOs like Proshika, BRAC have started their own poultry farms to ensure supply of birds for their own independent and GO-NGO partnership poultry programme.

It has been reported by researchers that the main problem of indigenous chickens in the tropics is that they are poor producer of egg and meat (Alemu, 1995;Gueye, 1998; Tadelle *et al*., 2000). But even if they show low productivity, they are well adapted to the tropics, resistant to poor management, feed shortages and tolerate some of the most common diseases and parasites. On the other hand, improved exotic chickens produce higher number of eggs and more meat than the indigenous chicken breeds, but tropical climate is a great challenge. They are not adapted to adverse environmental conditions, such as high temperature, disease and shortage of feed (Barua *et al*., 1998; Ali *et* *al*., 2000; Islam and Nishibori, 2009). However, the genetic diversity of indigenous and exotic chicken breeds could be utilized by cross breeding schemes. The goal will then be to get a new genotyp or hybrid that is resistant to harsh tropical conditions and at the same time produces a reasonable amount of egg and meat (Barua *et al*., 1998; Iraqi *et al*., 2005; Mekki *et* *al*., 2005). Breeding programs for local chicken breeds are difficult to set-up because of the competition with commercial breeding companies, which often have access to expensive technology and also benefit on economics of scale (Saady *et al*., 2008). There are indigenous chicken breeds in tropical environment with special genetic attributes that have potential use in improvement of local chicken productivity.

One of the best known breeds, the Rhode Island Red (RIR) is a good layer of large brown eggs and as a dual purpose breed also can supply a fair-sized roaster. The hens will rarely go broody and can produce around 260 eggs per year. Developed in Rhode Island in the 1830s, various breeds were used in their makeup, including Malays, Cochins and Brown Leghorns. The single combed variety was admitted to the APA's Standard of Perfection in 1904 and the rose combed birds a year later. The cock will weigh about 8 1/2 pounds and the hens run about one pound lighter.

Fayoumi, the Ancient Egyptian chicken breed has a good disease resistance quality and is a good producer of small eggs.

Size**:** Standard Male: 4.5 Ibs. / Standard Female: 3.5 Ibs.

Comb, Wattles & Earlobes: They have moderately large single combs with six upright points and medium size wattles and earlobes. All are bright red though the earlobes have a white spot.

Color: They have a dark horn to slate blue beak and dark brown eyes with slate shanks and toes. *Male:* The head, neck, back, and saddle are silvery white. The breast, body, and legs are barred in black and silvery white. The tail and wings are black with white highlights. *Female:* The head and neck are silvery white and the rest of the plumage is barred in black and silvery white. Place of Origin: Egypt Special Qualities: They have a good disease resistance and are good egg producers.

Rhode Island Red (RIR), which is successfully maintained under rural as well as farming conditions in different parts of the country and have potentials of a higher economic return as layers and / or broilers (Javed *et al*., 2003). The high egg and meat production genes, present in RIR, can possibly be transferred to Fayoumi, which already has genes for survival under harsh scavenging conditions of countryside, so as to produce a genotyp having higher survival and better economic returns. Fayoumi is an Egyptian breed developed for egg production and known to be adapted to tropical environment (Barua *et al*., 1998). A cross was conduct between RIR and fayoumi to produce SONALI in 1986. The objective of the present study is to evaluate the performance of the F1 cross and their maternal parents. The crosses will also be used as parents for the final synthetic chicken population.

Naked neck Chicken (NN), despite its highly unusual appearance, the breed is not particularly known as an exhibition bird, and is a dual-purpose utility chicken. They lay a respectable number of light brown eggs, and are considered desirable for meat production because they need less plucking and they have a meaty body. They are very good foragers and are immune to most diseases. The breed is also reasonably cold hardy despite its lack of feathers. Naked Neck roosters carry a single comb, and the neck and head often become very bright red from increased sun exposure. This breed has approximately half the feathers of other chickens, making it resistant to hot weather and easier to pluck.Recognized color varieties include: black, white, cuckoo, buff, red, and blue in the United Kingdom and Black, White, Buff, and Red in the U.S. (From Wikipedia, the free encyclopedia). Cross-breeding research studies have been performed by different scientists but no final conclusion has been reached. The present study has reviewed update cross-breeding findings and concluded for future using of chicken genotypes in hot-humid climate. However, one report showed that the crossbreed of Fayoumi male and RIR female produced significantly more eggs than the reverse cross (SONALI) with two different diets (Abou-el-Kassem Abd-el-Latif et al 1987). In view of the above conflicting findings, the current study was designed to compare the performance of RIR x Fayoumi and Naked neck x RIR cross-breeds in the term of survivability, feed intake under farm condition of rural Bangladesh.

OBJECTIVES

* To conduct a comparative study between the SONALI and the RIR X NN genotype in term of survivability and feed intake.
* To study a suitable genotype (SONALI) for our environment.
* To determine mortality with the age of mentioned genotype.
* To determine feed intake with the age.
* To examine further prospects of commercial ‘SONALI’ farming in other district all over Bangladesh.

Chapter-II

#### **REVIEW OF LITERATURE**

#### The combination of Fayoumi x RIR had better performance under scav­enging conditions. Egg production, as well as survivability performance of scavenging birds (24.0%) was approximately 40% of those under intensive rearing (60.5%). This difference was attributed to the poor nutritional status under scavenging conditions. In a similar trial, performance of eight exotic breed’s combinations under semi-scavenging conditions in three different locations (Jessor, Manikganj and Rajshahi) was studied (Rahman et al., 1997).

#### The survivability rate is around 80% in backyard rearing system of SONALI (Md.Akhtar-uz-zaman, 2010), here observed 80 percent survivability which is significant but it can be maximized by ensuring high quality management and supervision of the flock.

At rural scavenging condition the mortality rate of FN cross was 78.57%, mortality of Fayoumi (F) is 49.79% and Naked Neck (N) is 8.33%. (M. E. Haque et al, 2003; 3rd International Poultry Show And Seminar).According to Q.M.E. Huque, S.A. Chowdhury, M.E. Haque and B.K. Sil, the mortality rate of Fayoumi (F) is 21.5%.

Mortality rate of Naked Neck (N) is 8.33% and for deshi chicken is 9% upto 500 days of rearing.(A.K.F.H. Bhuiyan M.S.A. Bhuiyan & G.K. Deb Department of Animal Breeding and Genetics, Bangladesh Agricultural University Mymensingh,2202, Bangladesh).The local DESHI (native) chicken are genetically poor performer having a range of live weight of 1.0 to 1.2 kg and laying from 42 to 45 small size eggs (35 to 40g) annually under existing scavenging management (Bulbul 1983; Sazzad 1986; Huque and Haque 1990).

#### Recent studies indicated that the egg production at smallholder level could be doubled in the existing production system through intervention of cross-breeding in the semi-scavenging poultry model (Rahman et al 1997). The semi-scavenging poultry rearing model has been developed in Bangladesh by the Department of Livestock Services (DLS) and the Bangladesh Rural Advancement Committee (BRAC) for rural smallholder farmers (BRAC 1994). The model comprises small units of genotyp-1ers, mini hatcheries, chick rearing units and the smallholder farmers as end-producers with small flocks of 10 SONALI (RIR x Fayoumi) cross-breed hens (Jensen 1996; Jensen 1997; Saleque and Mustafa 1997). It has been shown that RIR and Fayoumi are successful parent breeds in the government farms. Ambar et al (1999) named the cross between RIR male and Fayoumi female as "SONALI" (golden color in Bengali).  In the semi-scavenging poultry model, the SONALI chicks are reared in confinement during the first 8 weeks of age in the chick rearing unit after which they scavenge part-time for some days in the smallholder farmer's yard and are gradually shifted to the existing scavenging system. SONALI performed best among eight exotic breed combinations with highest egg production (156 eggs/hen/ year), lowest mortality and highest profit per hen (Rahman et al 1997). In another study, the productivity of SONALI was found to be higher and more profitable compared to RIR and Fayoumi under smallholder hill farming condition with feed supplementation (Rahman et al 1998). The government's DLS have been maintaining RIR and Fayoumi breeds in their farms and producing SONALI chicks for rural smallholder farmers. To establish the semi-scavenging poultry model in Bangladesh, DLS have been executing the Participatory Livestock Development Programme (Nazir Ahmed 2000; PLDP 2001) involving leading NGO's like BRAC (Bangladesh Rural Advancement Committee), PROSHIKA and TMSS (Thengamara Mohila Sabuj Sangha).

A Backyard Poultry Development Project was in operation during 1970s (Ahmed and Islam 1985) with the intention of upgrading the Deshi chicken through the production and distribution of breeding cocks and pullets in the rural project villages. This programme was initiated by the Bangladesh Agricultural University (BAU) through the financial assistance of UNICEF in 100 villages. During the project’s life firstly the indigenous Deshi birds were vaccinated farmers motivated to dispose of their Deshi cocks and to rear crossbred chicken. This programme was also supplemented with feeds farmer cooperative formation (Backyard Poultry Raisers Society BPR) regular vaccinations training and marketing channel development. The society members disposed of all their indigenous cocks from the project area. The germplasm introduced was Rhode Island Red (RIR) or White Leghorn (WLH) x RIR or Australorp cocks of 18-20 weeks of age. The aim was to maintain rigidly a 50% exotic and 50% indigenous blood level under village conditions. A total of 5264 cocks 3500 pullets 1500 growing chicks and 74,100 hatching eggs were distributed among the BPRs of the project area. Implementation of said programme in the villages resulted in a significant increase in average egg production per hen per year an increase in average annual egg consumption per person and a lowering of bird mortality (growing and adult) during the project’s life. However it was noticed that after withdrawal of project activity the crossbred birds failed to be sustained in the villages.

Following the BAU Backyard Poultry Development Project the government of Bangladesh took up the Cockerel Exchange Programme in the country for the development of indigenous village chickens. Improved exotic breeds (WLH, RIR and Fayoumi) were mainly being used for the improvement of local chickens via a cross-breeding programmed through the distribution of egg chick and pullets and cockerel exchange activities. In support of this up until the 1990s the Government Central Poultry Farm and its multiplication units maintained exotic pure breeds (WLH RIR New Hampshire Plymouth Rock) and hatched day old pure-bred chicks these being sold to interested farmers and private smallholder entrepreneurs to encourage them to take up commercial chicken farming. However again no positive growth could be shown using exotic pure-breeds in village conditions mainly because of problems arising of adaptability high mortality and significant genotype-environment interaction.

Experiments at the Government Central Poultry Farm Dhaka during the period from 1987 to 1989 encompassed 22 genetic groups of which 5 were pure-breeds (Australorp Barred Plymouth Rock White Leghorn Rhode Island Red Fayoumi and indigenous Deshi) and the remainder was crossbreds (F1) made up of the aforementioned pure breeds (Ambar *et al.* 1999). These studies inferred that Fayoumi may best be used for crossbreeding with WLH or RIR (Fayoumi x WLH - called Rupali and RIR x Fayoumi called SONALI). Further the resultant layers would be suitable for those farmers who wished to farm on small scale egg eries in semi-intensive conditions in Bangladesh. With the Government Central Poultry Farm producing SONALI/Rupali commercial chicken production in semi-intensive conditions in Bangladesh continued until the mid 1990s.

Another trial was commenced in 1993 (Rahman et al. 1996) where different exotic hens were tested in semi-scavenging conditions. One of the breeds combinations was a cross between a commercial hybrid as the female line and an improved breed (Fayoumi RIR or WLH) as the male line. Another breed combination was SONALI. The hypothesis was that the use of commercial hybrids as parent hens would satisfy the multiplication links with respect to high egg production while using another breed as males would satisfy the end users with respect to good scavenging and survival traits. Their study inferred that for the government semi-scavenging smallholder model of chicken production the breeding strategy should be based on the production of SONALI birds. Hot-humid climates are more detrimental than dry climate for chicken production (Horst and Petersen, 1981). Indigenous chickens are well adapted to 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 animals (Khan, 1983) and can thrive 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 type (tropically relevant major gene) is also available which has 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 *et al*., 1996; Islam, 2000). On the other hand, exotic chickens suffer 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). 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) reported improved productive adaptability of RIR x 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).

Cross-breeding research studies have been performed by different scientists but no final conclusion has been reached. The present study has reviewed update cross-breeding findings and concluded for future using of chicken genotypes in hot-humid climate. However, one report showed that the cross-breed of Fayoumi male and RIR female produced significantly more eggs than the reverse cross (SONALI) with two different diets (Abou-el-Kassem Abd-el-Latif et al 1987). In view of the above conflicting findings, the current study was designed to compare the performance of RIR x Fayoumi and Fayoumi x RIR cross-breeds in the term of survivability and feed intake under farm condition of rural Bangladesh.

Chapter-III

#### **MATERIALS AND METHODS**

GEOGRAPHICAL PRESENTATION OF STUDY AREA

#### Bangladesh is located between 20.75°N and 25.75°N in latitude and between 88.30°E and 92.75°E in longitude. The mean annual temperature is about 26°C . Mean monthly temperature ranges between about 18°C in January and 30°C in April-May. Extreme temperatures range between about 4°C and 43°C except on the coast. Ground frost is occasionally experienced in exposed parts of the hill areas but not on the plains. The study was carried out in a Govt. poultry farm, Rangpur.

#### *http://www.fao.org/docrep/008/a0070t/a0070t0l.jpg*

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#### Fig: Geographical location of study area

**Experimental birds and their source:**

The experiment was conducted in a poultry farm of Rangpur district. Secondary Data were collected from the records of this farm mentioning the following managemental procedures and the information required. Two crossbred were produced by the crossing of RIR with Fayoumi and RIR with Naked Neck. The Fayoumi & the Naked neck hens and the RIR cocks were collected from Govt. poultry farm. Mortality was determined by the number of dead birds in the record. Feed intake was measured at the end of each week.

**Initial care, feeding and watering of birds:**

The chicks were supplied with 5% glucose solution on arrival in the experimental shed to overcome transportation stress. For the first three days, broiler starter (CP 23.1%, CF 5.9%, EE 4.4% and Ash 6.1%) of Aftab Feed Mill (Aftab Bahumukhi Farms Limited, Bhagalpur, Bajitpur, Kishoregonj) was supplied on clean newspaper in the form of crumble and then on trays up to one week. After one week, broiler starter feed (CP 24.8%, CF 5.5%, EE 4.3% and Ash 5.9%) of Nourish Poultry and Hatchery Limited was supplied to round feeders throughout the production period. All birds were fed and watered ad-libitum. Multi-vitamin premix (Megavit WS; Novartis Animal Health, Dhaka, Bangladesh) was supplied through drinking water to each group of birds. Moreover, vitamin C was given through drinking water to all birds when the environmental temperature increases. Feed and water were supplied three times per day during the 1st week and then twice daily up to the end of the production period. Brooding and lighting A 100 watt bulb was hung in each experimental pen for brooding the birds.

The following temperature schedule was maintained for brooding of chicks-

**Table-1: Temperature schedule for brooding.**

|  |  |
| --- | --- |
| **Age (weeks)** | **Temperature (0F)** |
| 1 | 95 |
| 2 | 90 |
| 3 | 85 |
| 4 | 80 |
| 5 | 75 |
| 6 | 70 |

**Vaccination:**

All birds were vaccinated against Ranikhet disease only. Baby Chick Ranikhet Disease Vaccine (BCRDV) was administrated one drop in each eye at 4th and 25th days of chicken.

**Biosecurity measures:**

Adequate hygienic measures and appropriate sanitation programmes were carried out during the experimental period. The experimental area was restricted by making fences and was kept open only to researcher, supervisor and workers related to the experiment by following special care. Before entrance into the experimental shed, special hygienic and sanitary measures were taken to avoid the entrance of diseases and germs from outside. Hands and feet were washed with soap; feet were dipped in a water bath containing disinfectant and clean apron was worn as a part of hygienic measurement. Hygienic management of feeding, watering, vaccination programs and litter management were taken during the experimental period. Disinfectants (Virkon®S; Antec Internatinal, England, U.K.); and bleaching powder) were regularly sprayed on the road and surroundings of the experimental shed to prevent disease outbreak and kerosene was spread carefully to control ant.

Chapter-IV

**RESULTS AND DISCUSSION**

From **Figure 1** it is observed that for SONALI (Genotype-**2)** and Genotype**-1** (RIR and Naked Neck) the no. of birds were 50 and 103 in 1st week. At the end of 13 weeks it was observed that for Genotype-1 and Genotype- 2 the no. of birds were 19 and 19 where as the survivability was higher for Genotype 2 (38%) than that of Genotype 1 (18%). From **Figure 2** it is clear that initially for Genotype 1 feed intake was higher than that of Genotype 2 because initially the no. of bird for Genotype1 and Genotype 2 were 103 and 50 respectively. From age 3 to 8 weeks for Genotype 2 feed intake was higher than that of Genotype 1 because when age in 3 weeks the no. of bird for Genotype 2 was 45 and Genotype 1 was 40; wherever age in 8 weeks the no. of bird for Genotype 2 was 40 and Genotype 1 was 32. After 9 weeks the feed intake for Genotype 2 was a bit higher and the no. of bird for Genotype 2 was 21 and Genotype 1 was 19. At the age of 13 weeks for both Genotypes the no. of bird was 19. Feed intake was different for two Genotype but commonly feed intake increases as age increases up to 8 weeks.

|  |  |
| --- | --- |
|  |  |
| Figure 1: No. of bird for genotype-1 (breed 1) and genotype-2(breed 2) | Figure 2: Feed intake for genotype-1(breed 1) and genotype-2(breed 2) |

**Table-1: Weekly Survivability (%) and feed intake of crossbred**

**Genotype-2(RIR and Fayoumi)**

|  |  |  |
| --- | --- | --- |
| **Age in Weeks** | **Survivability of bird (%)** | **Total Intake(gm)** |
| 1 | 100 | 807.286 |
| 2 | 98.97 | 1435.14 |
| 3 | 100 | 1493.71 |
| 4 | 100 | 1850 |
| 5 | 98.64 | 1839.29 |
| 6 | 97.29 | 2096.43 |
| 7 | 97.29 | 2642.86 |
| 8 | 95.95 | 3550 |
| 9 | 95.95 | 3278.57 |
| 10 | 100 | 1838.5 |
| 11 | 100 | 2310 |
| 12 | 100 | 2290 |
| 13 | 94 | 2170 |
| Average | 98.30 |  |

**Table-2: Weekly Survivability (%) and feed intake of crossbred**

**Genotype-1(RIR and Naked Neck)**

|  |  |  |
| --- | --- | --- |
| **Age in Weeks** | **Survivability of bird (%)** | **Total Intake(gm)** |
| 1 | 100 | 2246.286 |
| 2 | 100 | 4350.14 |
| 3 | 88 | 5250.71 |
| 4 | 87.5 | 6525 |
| 5 | 91 | 12215 |
| 6 | 95 | 23200 |
| 7 | 93 | 26420.86 |
| 8 | 90.5 | 26550 |
| 9 | 90.95 | 26780.57 |
| 10 | 99 | 27838.5 |
| 11 | 97 | 23100 |
| 12 | 100 | 13290 |
| 13 | 97.6 | 13170 |
| Average | 95 |  |

**To check significant difference of feed intake between two groups:**

A two independent sample mean test was conducted to test whether there is significant difference for feed intake with two genotypes. The mean feed intake for genotyp-2 is 966 gm and genotyp-1 is 1101 gm. There was no significant difference between genotypes (t=0.72, P-value=0.47).

**Association between genotype and survivability:**

To check whether there is an association between genotypes and survivability, an odds ratio was conducted to fulfill objective. The result provided that the probability of survivability of genotype 1 is lower than genotype 2 (OR= 0.34 and CI: 0.16 to 0.73).

**Association between age and feed intake:**

To check whether there is significant difference of feed intake with increasing age, a single mean test was considered for both genotype-2 and genotyp-1. For both genotypes it was shown that there is significant difference of feed intake with increasing age for genotype 2 (t=7.81; P-value<0.01) and genotype 1 (t=7.94; P-value<0.01).

Chapter-V

**CONCLUSION**

The major constraints to the improvement of chicken in our environment were already identified by many scientists. Because of chicken disease, predation, poor housing, poor nutrition and no attention given as well as insufficient capital and a knowledge gap among smallholders also restrict poultry production. Disease and replacement of indigenous chickens by exotic chicken genotypes are major threat in eroding and dilution of the indigenous genetic resources. And, therefore, it is important to design and implement a research programme to collect, conserve and improve the indigenous chickens as well as better genetic combinations with exotic chicken in order to advance poultry production and productivity in our region.

It may be concluded that the SONALI genotype (genotype-2) in the environment of Bangladesh, might be better performer rearing with good management in intensive system, with low input supplies in the terms of survivability and feed intake than genotype-1.

**RECOMMENDATION**

The SONALI (genotype-2) needs further comparison and research with other combination of genotypes in regarding growth, survivability, profitability, cost effectiveness, although it is better performer than genotype-1.

Chapter-VI

**REFERENCES**

Alam J 1995 Livestock resources in Bangladesh-Present status and future potential. pp 12-29.

Ali MI, Wahid MA, Howlider MAR and Yeasmin T. Reproduction and growth of Rhode Island Red (RIR), Fayoumi (FO) and RIR x FO chicken in Bangladesh. Poultry Adviser, 24: 47-50. 1993.

Ambar MAJ, Bhuiyan AKFH, Hoque MA and Amin MR. Ranking of some pure and crossbred chicken using scoring indices. Indian Journal of Poultry Science, 34: 140-146. 1999.

Azharul IM, Ranvig H and Howlider MAR. Comparison of growth rate and meat yield characteristics of cockerels between Fayoumi and Sonali under village conditions in Bangladesh. Livestock Research for rural Development, 17*:http://www.Irrd.org/Irrd17/2/azha17021.htm.* 2005*.*

Azizul, H.D., Reza, A., 1980. A comparative study of the performance of exotic breed and indigenous birds under village condition. Degree Diss., Bangladesh Agricultural University, Mymensingh, Bangladesh.

Bairagi MK, Hamid MA, Islam MA and Howlider MAR. The effect of incorporation of naked neck gene from Bangladeshi indigenous chicken to Rhode Island Red and White Leghorn on growth. Poultry Adviser, 25: 43-46. 1992.

Bairagi, M.K., Hamid, M.A., Islam, M.A., Howlider, M.A.R., 1992. The effect of incorporation of naked neck gene from Bangladeshi indigenous chickens to Rhode Island Red and White Leghorn on growth.

Barua A and Howlider MAR. Meat yield of free range naked neck and full feathered Bangladeshi chicken. Indian Journal of Animal Sciences, 61: 772-775. 1991.

Barua A and Howlider MAR. Prospects of of native chicken in Bangladesh. Poultry Adviser, 22: 57-61. 1990.

Barua A and Yoshimura Y. Rural poultry keeping in Bangladesh. World’s Poultry Science Journal, 53: 388-394. 1997.

Barua A, Howlider MAR and Yoshimura Y. A study on the performance of Fayoumi, Rhode Island Red and Fayoumi x Rhode Island chickens under Rural condition of Bangladesh. Asian-Australasian Journal of Animal Sciences, 11: 635-641. 1998a.

Barua A, Howlider MAR and Yoshimura Y. Indigenous naked neck fowl of Bangladesh. World’s Poultry Science Journal, 54: 279-286. 1998b.

BBS (Bangladesh Bureau of Statistics) 1995 Statistics Division. Ministry of planning. Government of the Peoples Republic of Bangladesh.

Bennet CD. The influence of shell thickness on hatchability in commercial broiler breeder flocks. Journal of Applied Poultry Research, 1: 61-65. 1992.

Besbes B. Genotype evaluation and breeding of poultry for performance under sub-optimal village conditions. World’s Poultry Science Journal, 65: 260-271. 2009.

Bohren BB, Rogler JC and Carson JR. Survival under heat stress of lines selected for fast and slow growth at two temperatures. Poultry Science, 61: 1804-1808. 1982.

Chicken Mutations Poultry Genetics, Poultry Genetics for Exhibition Genotyp-1ers, Last updated: 13 Nov, 2008.

Chowdhury SD, Ahmed S and Hamid MA. Improve feeding of *Desi* chicken reared in confinement. The Bangladesh Veterinarian, 23: 29-35. 2006.

Comparison of growth rate and meat yield characteristics of cockerels between Fayoumi and Sonali under village conditions in Bangladesh. Available from: http://www.lrrd.org/lrrd17/2/azha17021.htm

Das SC**,** Chowdhury SD, Khatun MA, Nishibori M, Isobe N and Yoshimura Y. Poultry production profile and expected future projection in Bangladesh. World’s Poultry Science Journal, 64: 99-118. 2008.

Deeb N. and Cahaner A. The effect of the Naked neck (Na) gene on broilers stocks differing in growth rate. Proceedings of the XX World’s Poultry Congress, IV, pp.11. 1996.

Howlider, 1999.Livestock Research for Rural Development 16 (8) 2004.

Permin and Pedersen 2000 Network for Smallholder Poultry Development (NSDP), Dyrlaegevej 2, 1870 Frederiksberg, Denmark. Email: Poultry@ kvl.dk.

Poultry Adviser 25:43-46. Bekele, F., Ådnøy, T., Gjøen, H.M., Kathle, J., Girma, A., 2010.

Production performance of dual purpose crosses of two indigenous with two exotic chicken genotyp-1s in subtropical environment. Int. J. Poultry Sci. 9:702-710.

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Rahman M M 1995 HYV crossbred under semi scavenging conditions. Paper presented at a seminar organized by the Bangladesh Smallholder Livestock Project at the officers' Training Institute Savar, July 12 and 13.

S. Gallal, J. Boyazoglu and K. Hammond. January 2000*.* Developing *and* breeding Strategies for Low Input Animal*.* ProductionEnvironment*.* Ponapa, 1982, Eggs in child nutrition, poultry advisor 51-53.

University Press Ltd. Global Plan, 1992, Sustainable Agricultural and Natural Resources Management. Volume 1.