

## Chapter I

### INTRODUCTION

Birds that have been traditionally kept in the cages and are successfully bred in captivity, thereby altering many of their natural traits and making them almost domesticated. The best example of these are the psittacines or parrots and some passerines like Canary and Munia. Earliest among these is the Budgerigar (*Melopsittacus undulates*) from Australia. Originally, John Gould brought specimens of Budgerigar from Australia to UK in 1840. From that time on it has been bred in captivity and through inbreeding and interbreeding with newly acquired specimens it has landed with several dozen varieties of color forms. The characters of the original species have been altered in the caged birds so much so that many consider it as a 'domesticated' species. However, it is still flourishing well in Australia as a natural species. The Budgerigar is a 17-19 cm small slim parrot whose tail is longer than the body. In nature its colour is bluish black, white and green, with zebra stripes from forehead to upper back, while the wings are mottled. However, the cage birds even have a pure yellow form and many intermediate colour forms. (National Encyclopedia of Bangladesh, 26 September 2018)

Budgerigars are popular pets around the world due to their small size, low cost and ability to mimic human speech. The origin of the budgerigar's name is unclear. The species was first recorded in 1805, and today is the third most popular pet in the world, after the domesticated dog and cat. The budgerigar is closely related to the lorries and the parrots. They are one of the parakeet species, a non-taxonomical term that refers to any of a number of small parrots with long, flat and tapered tails. In both captivity and the wild, budgerigars breed opportunistically and in pairs. (Boles, 1998). Now a days in chittagong, budgerigar become more popular as pet bird and based on this many farms are built up day by day.

Budgies can easily become finger tame while they are young with some diligent training, even if they were not hand fed as babies. Many owners of fully tamed budgies will swear that their budgie thinks it's a human! Even if a budgie is not tamed, they still make enjoyable pets. Their antics and singing will brighten up any room in your home. And budgies who are not finger tame still can become friendly towards you, and even still learn to talk. (Marshall's, 2013)

Budgerigar are the opportunistic breeder. The production performance of budgerigar is very good. A female budgerigar lay four to six eggs at a time. In a year one female give three to four clutches eggs. Female budgerigars can lay eggs without a male partner, but these unfertilised eggs will not hatch. When the female is laying eggs, her cere turns a crusty brown colour. Afemale budgerigar will lay her eggs on alternate days.After the first one, there is usually a two-day gap( Budgerigar – Wikipedia) until the next. She will usually lay between four and eight eggs, which she will incubate (usually starting after laying her second or third) for about 21 days each.Females only leave their nests for very quick defecations, stretches and quick meals once they have begun incubating and are by then almost exclusively fed by their mate (usually at the nest's entrance). Females will not allow a male to enter the nest, unless he forces his way inside. Depending on the clutch size and the beginning of incubation, the age difference between the first and last hatchling can be anywhere from 9 to 16 days.

In this Study, The production performance of budgerigar and the problem that breaks the production performance are broadly found.

Objectives of the study:

- 1) To identify the prospects of budgerigar production in Chittagong.
- 2) To identify the problems of budgerigar production in Chittagong.

## Chapter II

### MATERIALS AND MEHTODS

#### Study site and duration of the experiment

The study area was 10 different farms of Chittagong which are situated at different area of Chittagong ( Noyabazar , Khulshi, GEC, Baddhar hat, Hali shahar, Agrabad , Hathajaree, Asadganj, Chawkbazar, Raozan) .

The study period was from February to June 2018.

#### 2.1.Experimental design

Exploratory research design was followed to conduct the study. The methods-survey, review of secondary data, interview, observation and Focus Group Discussion (FGD) were conducted taking representative sample from all over Chittagong. The questionnaire was carefully designed keeping in mind the objectives. The questionnaire contained both open and closed forms of questions. Most easy, simple and direct questions were asked to obtain information. The questionnaire was pre-tested with three (3) farmers for judging suitability for the farmers. After having feedback from field test, necessary modifications were done and the questionnaire was finalized for data collection.

#### 2.2. Sampling Technique and Sample Size

A multistage sampling procedure was followed. Purposive sampling procedure was followed to select farms from different area of Chittagong giving focus on concentration of budgerigar's farms. There was no list of budgerigar farmers in the hand of any government and non-government agencies because of its newness in Chittagong, Bangladesh. So keeping in view the objectives of the study, a list of 15 budgerigar farmers was prepared from all over Chittagong via personal communication, Facebook, bikroy.com and other sources. Simple random sampling technique was used to select 10 budgerigar farmers. The sample size of the respondents was determined by using proportion sample formula: the Slovin's formula (Adanza, 2006).The formula is presented below:

$$n = \frac{N}{1 + N(e)^2}$$

Where;

n is the sample size sought;

N is the research population,

e is the level of confidence (taken as 95%).

The sample size (n) for this study calculated using the formula was:

$$n = 15 / 1 + 15(0.05)^2 = 10$$

Therefore, primary data were collected from 10 respondent farmers selected from different area of Chittagong ,Bangladesh.

### **2.3. Data collection**

Direct observation, interview and farm record analysis methods were applied during collecting data for the study. Primary data were collected from budgerigar farmers were on farmers' personal information (age and education level), housing, feeding, breeding, management, disease, marketing, problems and prospects. Some parameters like flock size, number of egg production, weight of egg, male and female ratio etc. were taken. The sources of secondary data were review of literature from official documents, Journals, libraries, research institutes, internet etc. Participatory Rural Appraisal (PRA) tools like Focus Group Discussion (FGD), seasonality analysis of disease and market etc. were also used in relevant cases to collect and verify data. The researcher performed all the interviews to ensure consistency in data quality.

### **2.4. Statistical analysis**

Collected data were compiled, tabulated and analyzed. Qualitative data were converted into quantitative forms by means of suitable score whenever needed and the local units were converted into standard unit scales. Data were analyzed using the Statistical Package for Social Sciences (SPSS) program package (SPSS, 2013).

Simple descriptive statistics such as frequency distributions, percentages, mean and standard error of mean (SEM) were applied to illustrate the results.

### **2.5. Problems encountered during the study**

Travelling to different farms was a big problem. Sometimes paraphrasing of scientific terms took time. Some of the farmers hesitated to answer questions regarding giving information on source of budgerigar, profitability and hatching technique. Sometimes farmers were not available on the scheduled time because of family and social obligations and other business reasons.

### **2.6. Limitations of the study**

There was limitation of transport to meet those farmers who were living in remote areas. Most of the farmers used to not keep record of farming activities properly. So, farmers provided information recalling their memories.

For this reason, in some cases value judgment was applied to have necessary data .

## Chapter III

### Result

#### General farming management status and practices

##### Demography of farmers

To understand demographic and socioeconomic context of existing budgerigar farmers' data on age, education, sex, access to technical support and prior experience of other farming were collected. The average age of the respondent farmers was  $40.5 \pm 1.38$  years. Ownership of 98% budgerigar farms was belonged to the male farmers.

Duration of budgerigar farming of the respondents was  $9.19 \pm 1.56$  years. The study showed that 4.34, 4.35, 26.09, 47.83 and 17.39% farmers obtained educational qualification <SSC, SSC, Bachelor and Masters Degree, respectively .

##### Purpose of budgerigar rearing

Budgerigar rearing is a new farming activity in Chittagong ,Bangladesh. The study showed that 34.78, 19.57 and 45.65% respondent farmers were rearing budgerigar for ornamental, egg and recreation, and pet purposes, respectively.

##### Source of receiving technical support

The farmers seek technical support from different sources. The study showed that 10.88, 10.87, 28.26 and 50.00% farmers took technical support from Department of Livestock Services (DLS), both internet and DLS ,internet and other farmers, and other farmers, respectively

##### Flock structure

The results obtained from the study on flock structure are presented in Table 1. It showed that average flock size of budgerigar was  $50 \pm 4$ . The number of male and female budgerigar ownership were  $25.5 \pm 2.5$  and  $25.5 \pm 2.5$ , respectively. On the other hand average age of male and female budgerigar found was  $14.79 \pm 0.32$  and  $12.64 \pm 0.26$  months, respectively. Average weight found were  $45.30 \pm 2.50$  and  $48.50 \pm 3.50$  kg for male and female budgerigar, respectively.

##### Housing and management

Results on budgerigar housing showed that , 68.33and 31.67% farmers were raising budgerigar in metal cage and wooden cage, respectively. While 51.42% farmers informed that they took extra care during hot period for comfort of budgerigar, 48.58% did not take any extra care. On the other hand, 27.55% farmers took additional care during winter season while 72.45% did not take additional care. During winter and summer the length of

incubation period is about  $20.34 \pm 0.73$  (Table 1). If it is not fertile it stays that colour and you can see through the shell if the egg is held in front of a bright light. It was found that while 16.25% farmers followed lighting procedure for hatching egg, 83.75% had not followed. Most of the farmers did not use scientifically constructed nest box to facilitate laying of eggs by female.

### **Feeding**

The study showed that 21.74, 30.43 and 47.83% farmers used formulated, non-formulated, and both formulated and non-formulated feed, respectively for feeding their budgies. None of the interviewed turkey farmers calculated feed efficiency (FE) and wastage of feed.

**Table 1.** Average data on general farming management of budgerigar farming in Chittagong

<b>Parameters Mean± SEM</b>	<b>Parameters</b>
Age of farmers (year)	40.54±1.38
Experience of budgerigar farming (years)	9.19±1.56
Flock size (number)	50±4
Number of male	25.5±2.5
Number of female	25.5±2.5
Age of male bird (month)	14.79±0.32
Age of female bird (month)	12.64±0.26
Length of incubation (days)	20.34±0.73
Price of adult pair (BDT)	1500.2±22.8
Price of one month old chicks pair (BDT)	700.2±1.79

**Table 2.** Average productive and reproductive performance of budgerigar farm in Chittagong

<b>Parameters Mean± SEM</b>	<b>Parameters</b>
Weight of adult Male (g)	45.30±2.50
Weight of adult Female(g)	48.50±3.50
Weight of egg (g)	6.13±0.63
Fertility percent of budgerigar egg (%)	60±3
Hatching percent of budgerigar egg (%)	75.00±1.00
Egg production/female/year (No.)	28±2
Number of clutch in a year (No.)	3±1
Egg production in a clutch (No.)	5±2
Duration of a clutch(month)	3±1
Ratio of male to female ( : )	1: 1

## **Health Management**

The study showed that while 36.96% farmers had encountered diseases like air sac mites, French molt, ectoparasite, diarrhoea, salmonellosis etc., 63.04% had not experienced any disease. Similarly, while 19.57% farmers had used vaccine, 80.43% had not used any vaccine.

## **Marketing**

Results showed that farmers sold a pair of chicks and a pair of adult budgies at the rate of BDT  $1500.2 \pm 22.8$  and  $700.2 \pm 1.79$  respectively (Table 1). Farmers did not keep record for which purpose the customers purchased budgerigar. Usually, customers who intended to farming, purchased budgies in pair i.e. one male and one female.

## **Productive and reproductive performance**

Productive and reproductive performances of budgerigar are presented in Table 2. Average weight of the male and female found  $45.30 \pm 2.50$  and  $48.50 \pm 3.50$  g, respectively. Farmers' experiences revealed that both male and female attained puberty at the same age and it was  $6.22 \pm 0.06$  months. A hen laid on an average  $28.46 \pm 0.78$  eggs per annum and weight of each egg was  $6.13 \pm 0.63$  g.

## **Male-female ratio and farmers experience on fertility**

Male and female ratio maintained by the interviewed farmers was 1:1, in pair. Average fertility of budgerigar egg was experienced by the respondent farmers was  $60.00 \pm 3.00\%$ . In case of low fertility 34.78, 32.61, 17.39, 10.87, and 4.35% farmers identified the main reason as absence of frequent mating, heavy weight of male, disturbance during mating, both absence of frequent mating and disturbance during mating and improper nutrition in diet, respectively

## **Farmers experience of egg hatchability**

Farmers experienced  $25.00 \pm 1.00\%$  hatchability of eggs which indicated lower fertility and not viable from business point of view. With this regard, 50.00, 21.74 and 28.26% farmers opined that the main reason of lower hatchability were low egg fertility, faulty incubation, and both low egg fertility and faulty incubation, respectively.

## **Breeding methods used by budgerigar farmers**

All the interviewed farmers followed natural breeding for reproduction of turkey. None of the farmers used any scientific way as an assisted reproductive technique for budgerigar breeding.



**Clutch size**

Farmers experienced  $3\pm 1$  clutch for female budgerigar in a year. Average egg production in each clutch was  $5\pm 2$ . Duration of each clutch was  $3\pm 1$  month.

**Farmers' perception on problems of budgerigar farming**

As the main problems, low egg fertility, inadequate technical support, low market opportunity and disease were identified by 65.22, 23.91, 6.52 and 4.35% farmers, respectively .

**Farmers' perception on prospects of budgerigar farming**

According to 41.30, 28.26, 17.35 and 13.09% farmers' opinion main advantages of budgerigar rearing over other psittacine birds were low disease, high market price, low feeding cost and low mortality, respectively

## Chapter IV

### DISCUSSION

Budgerigar farming is a new farming enterprise in Chittagong, Bangladesh. Comparatively young population get involved with this farming and ownership of farming mostly belonged to male farmers. The present results on gender difference in the ownership of budgerigar agrees with the report of Yakubu et al. (2013) who observed a higher numbers of male than female among budgerigar keepers in Nassarawa state, Nigeria. Analysis of education data revealed that 100% farmer respondents received formal education ranges from less than Secondary School Certificate (SSC) to Master's Degree. The results indicate that participation of women in budgerigar farming is lower and budgerigar farmers are educated and most of them have prior experience. So, there is big possibility to flourish budgerigar farming by these farmers in near future.

The study revealed that price of adult budgerigar and chicks were higher in Chittagong, Bangladesh in comparison to international market. The main reasons are that budgerigar subsector is still at the beginning stage in Bangladesh and in most cases budgies were sold as pet birds while some buyer bought also budgies for farming as well as recreation purposes through exhibition. Farmers bought pair chicks, so that they could raise budgies. Selection and price of budgerigar depends on appearance, color, size and weight. Bird Life International (2012). Showed that body size, egg number, hatchability, heat tolerance, body conformation and disease resistance were the traits of utmost importance for selection purpose among budgerigar farmers in Nasarawa state, Nigeria. However, there is absence of structured market for budgerigar in Chittagong, Bangladesh.

Weight of available adult male, female and egg in Bangladesh were comparatively lower than that of developed countries. This might be because of lighter varieties of budgerigar reared by the farmers of Bangladesh. The mating performance found in the present study was higher than the reported by Perrins, Christopher, ed. (2003). for budgerigar raised by local farmers at Northern Australia. However, it was at the higher limit of the continuum (1.67-3.69) reported for native budgerigar breeders in the state of Me-hoecan, Mexico (Pranty 2001).

In fact, several factors like age, temperature, duration of light, mating problems, low nutrient etc., might be the reasons of low fertility of female budgies in Chittagong, Bangladesh. But fertility is a very important measure of reproductive efficiency (Simpson, D.P. 1979). The problem of unfertilized eggs has long been identified as one of the most critical factors limiting the success of breeding programs and ranges from 10.0–98.2% (Dr. Marshall's et al. 2013). Hatchability of eggs was lower because of lower fertility including insufficient knowledge of farmers on budgerigar breeding and egg incubating procedure.

### **Problems of budgerigar farming**

#### **Low fertility, hatchability and use of budgies reproduction technology**

From the present study it was found that none of the farmers used Scientific budgerigar breeding. In fact, adult body weight of male and female are very lower than the reported budgies (Pranty, B. 2001). Lower nutrition, lower mating rate, the lower environment condition than the reported one (Pranty, B. 2001) is also the cause of lower reproduction. egg weight, internal and external quality egg, hatching performance and the quality of chick. It was reported that as female age increases, the weight of egg increases and both shell quality and internal egg quality decrease (Collar, N. J. 1997).. In addition to low egg yield, unsatisfactory egg fertility and hatchability constitute a major problem for budgerigar breeding enterprises (Collar, N. J. 1997)

#### **Inadequate access to technical information and support**

The farmers did not have adequate access to necessary information regarding budgerigar rearing and in case of problems they did not get enough technical support from different government and non-government line agencies. This situation is also prevailed in other developing countries. Mbanasor and Saampson (2004) also reported that there was obvious lack of information on specific requirements for budgies production in Nigeria.

#### **Low marketing facilities**

Market of budgerigar is unlike other poultry species in Chittagong, Bangladesh. There is absence of well-organized market for budgerigar and its products. No structured market value chain has been identified yet in Chittagong, Bangladesh. Farmers buy and sell budgies mainly through personal communication, Internet services (bikroy.com, Facebook etc.) and at

the market of pet birds. Budgerigar selling problems is also identified in other developing countries as stated by Collar et al. (1997) in a study conducted on small holder local budgerigar production in Ogun State Nigeria, found that sale of budgies were more during Christmas and festive period than other periods of the year. Although, many pair of budgerigar selling shops are developed now a days, but the selling rate is very low.

### **Poor housing**

Farmers did not know the scientifically accepted nest box for budgerigar rearing. They gave space on the basis of assumption. Moreover, they were not aware of about using of suitable litter materials and their management. Many farmers did not take special care during extreme hot and cold situation which ultimately hampered the production performance of birds.

### **Non availability of manufactured feeds and feeding standard**

Feeds for budgies are not manufactured by any feed mill in Bangladesh. So farmers fed their budgies by their homemade feed as well as a mixture of homemade and broiler/layer feed. They did not know the scientific requirement of energy, protein and other nutrients for different categories of budgerigar. Similar things was happened in Nigeria as reported that budgerigar production in Nigeria has largely remained at the smallholder level due to high cost of feed, inconsistency in feeding program, as well as lack of knowledge of the adequate levels of nutrient requirement("Budgie Research"2003) .

### **Inadequate capacity building facilities**

There is absence of opportunity for capacity building of budgerigar farmers in terms of receiving training, getting information, participating in workshop and seminar. As most of the concern stakeholders are not aware enough about budgerigar farming in Chittagong, Bangladesh, farmers are not getting required knowledge and skill. Therefore they are using traditional procedure for rearing budgerigar. But egg weight, fertility, hatchability and late embryonic mortality varied greatly between traditional and modern breeding management system ( "Talk Budgies — Breeding" 2013).

## **Prospects of budgerigar farming**

### **Adapted to the climate of Bangladesh**

Budgerigar is a unique bird which is suitable for rearing in hot humid climatic condition like in Chittagong, Bangladesh. But due to unknown reasons it has not been explored in Bangladesh and other developing countries. In fact, budgies are adaptable to wide range of climatic conditions and can be raised successfully almost anywhere in the world if they are well fed and protected against diseases and predators. It has an aesthetic value due to their beauty (Simpson, D.P. 1979). For this reason budgerigar is becoming popular gradually in developing countries like in Bangladesh.

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### **Low disease prevalence**

Budgerigar is more disease resistant in comparison to other psittacine birds.

Mortality rate of budgerigar is very low in comparison to other pet birds. (Delbridge, Arthur 1991). reported that budgies are resistant to Marek's and Infectious bronchitis and commonly encountered with other diseases like mycoplasmosis, fowl pox, fowl cholera, erysipelas and hemorrhagic enteritis.

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### **Low feeding cost**

In fact, feed cost represents two thirds of the total costs in a pet bird rearing system and consequently it would be valuable to identify animals that eat less but perform at the same level as their contemporaries. Budgies are good foragers and it could reduce feeding cost.

Budgerigar can obtain added nutrients from forage because they are better able to digest fiber due to larger microbial population in their digestive tracts ("Talk Budgies FAQ" 2013). On the other hand, Soliven (1984) reported that according to opinion of farmers of the Philippines, budgerigar rearing is profitable as long as the chicks are properly fed and taken care of, and cost of production is cheap as almost 50% of the feed they eat is green vegetables and field grasses as supplement to commercial feeds.

### **Higher market demand**

At present budgerigar market is limited to some particular customers as an ornamental bird as well as for recreation purposes; and its price is higher than other pet birds. So there is huge opportunity to expand budgerigar market in Chittagong, Bangladesh as well as in abroad.

### **Alternative source of income**

While the other pet rearing is so much costly and difficult, the budgerigar rearing is so much easy and it is too much beautiful, for that reasons the people are attracted to rear this bird. So ,besides other poultry farming the budgerigar farming may become a good source of alternative income like other developed countries.( S M Pearn, A T Bennett, and I C Cuthill ,2001).

### **Availability of educated farmers**

Most of the surveyed farmers are comparatively educated and they were self-starter. So there is huge possibility to develop budgerigar entrepreneurs in Chittagong, Bangladesh. They will be able to receive technical knowledge on selection, brooding, breeding, feeding, housing etc. on budgerigar rearing easily.

## **Chapter V**

### **CONCLUSION**

In fact, budgerigar production is still at primitive stage in Bangladesh which is characterized by poor housing, feeding, breeding and health care practices as well as inadequate availability of scientific information, technical services, credit facilities, training and marketing opportunities. So, to improve the budgerigar production, vigorous public extension service, training for farmers, opening of different avenues for research on budgerigar and identifying marketing strategies, are immediately needed in Chittagong and all over the Bangladesh.

## Chapter VI

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