A STUDY ON HOUSING SYSTEM IN SONALI, FAYOUMI, RIR IN BREEDER SYSTEM

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Intern ID: 03
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Session: 2018-2019

A Partial fulfillment of the requirements for the Degree of Doctor of Veterinary Medicine (D.V.M)

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A STUDY ON HOUSING SYSTEM IN SONALI, FAYOUMI, RIR IN BREEDER SYSTEM

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September,2024

CONTENTS:

Serial No.	Topics	Page No.
01	Abstract	01
02	Introduction	02
03	Justification of The Study	03
04	Materials and methods	03 – 17
05	Result and Discussions	18 – 19
06	Conclusion and recommendation	20
07	References	21-22
08	Acknowledgment	23

List of tables

Table Number	Title of the Table	Page number
1	The lighting schedule	11
2	Light intensity	11

List of Figures

Figure Number	Title of Figure	Page Number
1	Office Building	5
2	Foot bath inside the farm	6
3	Foot bath at the main gate	6
4	DOC housing	7
5	Feed	9
6	Litter material	9
7	Utensil for reducing dust	9
8	Growing stage	9
9	Laying stage	10
10	Feed mill	12
11	Storage of feed and feed ingredient	13
12	Hatchery building	13
13	Incubator	13
14	Inside incubator	13
15	Egg grader	13
16	Second gate	14
17	Unbranched tree	14
18	Disposal pit	15
19	Generator	16
20	Water reserve	17
21	Litter materials	17

Abbreviation

CVASU	Chattogram Veterinary and Animal Sciences University
RIR	Rhode Island Red
DLS	Department of Livestock Services
FAO	Food and Agriculture Organization
DOC	Day-old Chicks
Fig.	Figure

ABSTRACT

Poultry farming is a growing industry in Bangladesh, and maintaining hygienic practices in poultry production can lead to increased income and sustainable development. Effective poultry health management is crucial, especially with the emergence of highly pathogenic diseases worldwide. Standard housing practices are essential for achieving high performance and quality in poultry production in a competitive market. Modern technological innovations can aid in adopting biosecurity measures and environmentally friendly practices within the poultry production system. Developing a modern housing policy with farmer participation could enhance poultry farming across different regions in Bangladesh. Furthermore, the involvement of poultry entrepreneurs in programs that prioritize disease investigation, eradication, and protection of the poultry industry would be highly beneficial. Collaboration with various institutes on research related to poultry product production, processing, and marketing is also necessary. This study analyzed housing practices in a breeder farm selected during an internship program at Regional chicken farm in the Chittagong District. Data was gathered through questionnaires by interviewing the farm duty officer and other staff, and the collected information was analyzed to conclude establishing a sustainable breeder farm.

(Keywords: Sonali chicken, RIR, Fayoumi, housing, litter materials)

CHAPTER I:

INTRODUCTION

Chicken meat and eggs are the best source of quality protein, and are badly needed by the many millions of people who live in poverty.

The Sonali chicken, a crossbreed of Rhode Island Red (RIR) males and Fayoumi females, was developed in 1986. It closely resembles local non-descript chickens in appearance and taste. From 1996 to 2000, Bangladesh's Department of Livestock Services (DLS) introduced the Sonali crossbred chicken to northern regions through various projects, creating jobs for millions of rural women (FAO, 2015). The popularity of Sonali chicken is increasing due to its superior production metrics (average weight of adult males: 2-2.5 kg, adult females: 1.5-2 kg, with a feed conversion ratio of 4.33), greater disease resistance, low mortality, and high profit per hen (Rahman et al., 1997; Huque et al., 1999). They are well-suited for semi-intensive rearing systems in rural areas and can be sold at higher prices than broilers. Consumption of Sonali chicken surged by 45 percent in July 2019 compared to 20 percent in July 2018. Commercial Sonali farming provides employment opportunities for unemployed family members, improves the socio-economic conditions of approximately 76% of beneficiaries, and increases women's employment in rural Bangladesh. Enhancing Sonali production could significantly contribute to the country's overall meat production. (Howlader et al., 2022)

The primary goal in housing and managing poultry parent stock is to create conditions that maximize their performance (Bell and Weaver, 2001). With standard management practices, poultry are quite effective at hatching their chicks naturally. However, achieving high hatchability with artificial incubation requires meticulous control of temperature, humidity, ventilation, egg positioning, and turning. Water loss during incubation is influenced by the egg's shell structure and the humidity of the surrounding air.(Hameed et al., n.d.)

JUSTIFICATION OF THE STUDY

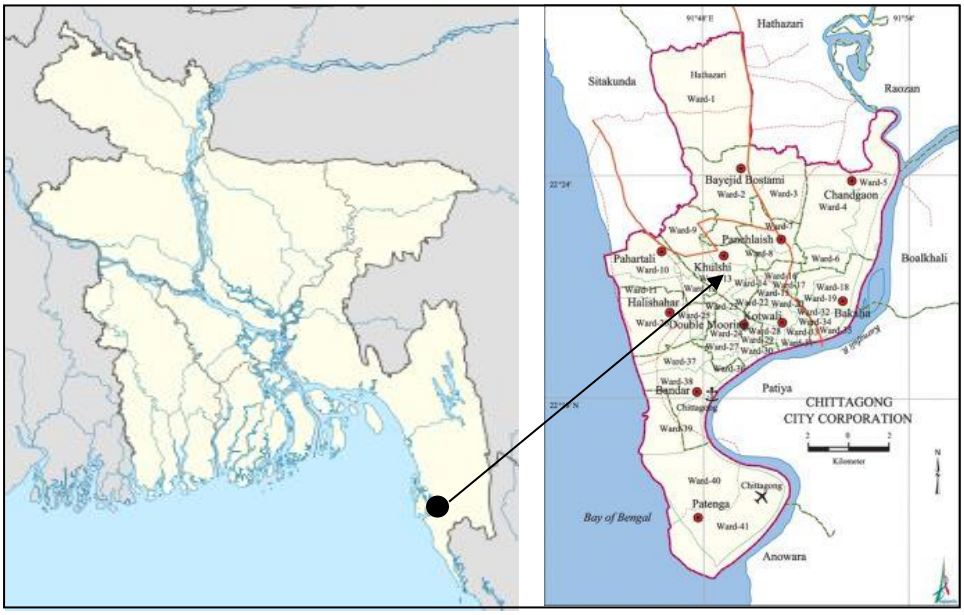
Currently, various livestock projects in Bangladesh are focusing on the production of day-old chicks (DOC) to alleviate poverty. Reports indicate that DOC production achieves an output of 85-87% within the incubation period (Rel. net 2010). In the hatchery I have chosen, all staff are knowledgeable about good management practices and aware of potential risks. They are particularly vigilant about maintaining housing standards that meet global commercial hatchery benchmarks. Proper housing practices are crucial in managing critical moments and are essential for any poultry hatchery. By properly understanding and implementing housing and management practices, producers can achieve maximum hatchability, providing the public with healthy chicks and high-quality protein.

CHAPTER II:

MATERIALS AND METHODS

1.1: Selection of farm and location:

The regional chicken farm was selected during the internship program. It is located in Khulshi in Chattagram district. Chattagram (22.2111°N 92.0417°E)



1.2: Duration of the study:

The duration of the study was 2 February 2024 to 29 May 2024. Regular observation was made during the period to collect necessary data from the selected farms.

1.3: Methods followed in collecting information

At first, a questionnaire was formed containing some basic questions to extract information regarding management and preventive measures undertaken about the objectives set. Emphasis was given to the key considerations of bio-security like the location of the farm, placement of houses, drainage system, garbage disposal, dipping/ food bath, shower system, personal hygienic management, sanitary condition (cleaning, disinfection, fumigation, etc),

vaccination schedule, entry system (humans and vehicles, etc), water and feed supply, rodents control system followed in rearing, etc. The farm was surveyed directly and information was collected by visiting self and also by interviewing the manager and other employee(s).

1.4: Analytical techniques:

After the collection of observational information from the Regional chicken farm was compared to the standard breeder farm.

2. Office Building

The office building is a two-storied building facing outside the farm. This is a government organization. The office has an organogram. The office is maintained by officers and office staff. There is a garage and a small space in front of the office and the main gate of the farm is situated beside the office.

Fig. 1: office building.

3.Biosecurity:

The following biosecurity measures were implemented:

1. Personnel entrance was restricted, and everyone had to wear designated attire after showering before entering the shed.
2. The area around the farm was cleaned and disinfected twice daily, in the morning and evening.

3. Foot baths were used at entrances.
4. Fresh feed was supplied to the birds only after quality checks.
5. Water was disinfected, and a disinfectant spray was applied in the house every 15 days.
6. The shed was kept rodent-free.
7. Water tanks were cleaned daily, and nests, drinkers, and feeding equipment were washed regularly.
8. Measures were taken to prevent wild animals from entering the shed.
9. Chicks were vaccinated according to the schedule.

Fig. 2: Foot bath inside the farm

Fig. 3: Foot bath at the main gate

4. Day-old chick house:

Housing for day-old chicks is very important because during this time they are not able to maintain their body temperature. During brooding, they are susceptible to many viruses and bacteria, which can produce many fatal diseases. Maintaining the temperature and humidity is very important. The success of the breeder farm depends on the brooding of day-old chicks.

4.1. Hoover and chick guard:

For brooding one hoover containing 4 halogen bulbs (60-100 watt) was used for 100 birds and the floor space at first week was 9 sq. ft. which gradually increased day by day. The number of electric bulbs depends on the season and environment temperature. The temperature was 34° c and then

decreased to 3-4° c every week. For chick guard was made of plain plastic sheet because it conserves more heat. These sheets are lightweight and flexible. The chick guard is easy to extend. The height of the chick guard was 18 inches and the distance between the hoover and the litter was 25”

4.2. Waterer:

For clean water supply, there are both automatic and manual watering systems. There is a sufficient number of round waterers. the waterers are hanging to prevent the accidental dipping of chicks in the waterer. This watering system helps to keep the litter material dry and clean.

4.3. Feeds and feeder:

There are both round and linear feeders. That ensures enough feed supply to the chicks uniformly. Which helps to maintain flock uniformity.

4.4. Ventilation:

There are a sufficient number of windows for proper ventilation which are secured by wired fence and covered by curtains. This ventilation system ensures proper ventilation and keeps the environment comfortable for the chicks.

4.5. Medical corner:

If some chicks become weak or depressed, they are separated from others for close observation and further medication. Which helps to maintain flock uniformity and reduce the mortality rate.

Fig. 4: DOC housing

5. Housing of grower

The selected farm has a grower shed which is 40 ft wide and 280 ft long. The house was a controlled house, where rice husk was litter. The litter was 1.5” which was changed per week or mixed with new litter which depends on the condition of the litter, the floor space was 2.25 sq. ft/bird.

5.1. Feeder space:

The body weight of 10%bird was taken from each flock once weekly usually at the weekend on an empty stomach. The amount of feed given in the following week is based on the body weight attained compared to the recommended body weight during the growth phase. Then the whole flock divided into 3 groups was overweight, standard, and underweight. The overweight and the standard weight birds were given the recommended feeding and the underweight were given more feed which increased by the recommended plus one-gram extra feed for every 50 gm less weight gain. If the target weight is achieved then the overfeeding stops. For the grower one feeder (40 cm diameter) was used for 20-30 birds. The male birds supplied the same feed as supplied female but separately.

5.2. Drinking water:

Fresh, pure, and clean drinking water is necessary due to 70% of the weight is water. The number of nipple drinkers (1 nipple drinker for 8-10 birds) and the amount of water depend upon the body weight and the environmental condition. The selected farm treated water with chlorine dioxide 0.25mi/litter, H_2O_2-0.03 mi/litter, and $CuSO_4$-0.25 gm/litter and supplied ad libitum in the morning and evening.

5.3. Light management:

It is one of the most important points for a breeder farm because birds are very sensitive to light in terms of growth and production. The proper lighting should be maintained from the first week to the last of production. Excessive lighting causes early maturation of the birds resulting in short

peak production, low fertility, and hatchability. The bulb which was 7 feet height above the floor and 1 watt used for a 5 sq. ft. area. The distance from one bulb to another was 11ft.

Fig. 5: Feed

Fig. 6: litter material

Fig. 7: Utensil for reducing dust

Fig. 8: Growing stage

6. Housing during laying stage

6.1. Housing:

The laying house, measuring 40 feet in width and 280 feet in length, received the birds when they were 19 weeks old. These birds were raised on a slate system positioned 2.5 feet above the ground. The structure, a controlled environment, has a height of 7 feet.

6.2. Feeding and feeder:

Each week, the body weight of 10% of the birds from each flock was measured in the morning on an empty stomach. The feeder space for males was 4 inches per bird for circular feeders and 1.5 inches above the slate, while for females, it was 2 inches and 8 inches above the slate. Feed was provided once daily according to the birds' daily requirements, but for females, the daily feed was split into two portions and supplied twice a day. The flock was categorized into three groups: overweight, standard, and underweight. Overweight and standard-weight birds received the recommended feed, while underweight birds were given the recommended feed plus an additional 1 to 1.5 grams per day for one week until they reached the guideline weight.

6.3. Waterer:

A nipple drinker system was used, with one nipple drinker serving 8 to 10 birds.

6.4. Male mixing:

This process begins when the birds reach 12 weeks of age. The chosen farm implemented it for males at 12 weeks old, initially mixing 2% of the males. At 14-16 weeks, 4% of the males were mixed, followed by 6% at 17-19 weeks, and finally 8-10% at 21-23 weeks of age.

6.5. Male and Female ratio:

The ratio of males and females was 1: 10

6.6. Nesting arrangement:

Nesting arrangements were provided when the birds reached 17 weeks of age. Proper nesting arrangements reduce egg breakage and increase production rates.

Fig. 9: Laying stage

7. Lighting:

Table 1: The lighting schedule is given below

Day/week	**Duration of light (hour)**
1st Day	24
2nd Day	22
3rd Day	20
4th Day	18
5th Day	17
6th Day	16
7th Day	15
8th Day	14
9th Day	13
10th Day	12
11th Day	12
12th Day	12
13-140th Day	12
141-147th Day	14
148-154th Day	14
23rd week	15
24th week	16
25th week to end	16

Table 1.2 Light intensity

Age(week)	Light intensity (Lux)
1st to 5th week	40-60 lux
6th to 18th week	10-20 lux
19th to 50th week	20-30 lux

8. Egg collection:

Nesting arrangements were introduced when the birds turned 17 weeks old. Effective nesting setups minimize egg breakage and boost production rates.

9.Feed mill

The farm has its feed mill. They follow the ration according to the age and requirement of the chicken. The main ingredients of the feed are maize, soybean meal, broken rice, di calcium phosphate (DCP) etc.They source the ingredients seasonally, store them properly, and use them throughout the year. Initially, they measure the ingredients according to the ration, crush them to the appropriate size, and mix them uniformly. Then, they provide the feed based on the birds' age, weight, and production level.

Fig. 10: Feed mill

10. Storeroom

The store room is well ventilated, dry and clean. The store room is protected from rodents' other bugs and arthropods. In the storeroom they maintain a register, to ensure the proper storage facilities.

Fig. 11: Storage of feed and feed ingredient

11. Hatchery Building

There are two modern hatchery machines in the hatchery building They maintain an uninterrupted power supply by generator. The person in charge regularly monitors the temperature and humidity of the eggs are standardized and sanitized before entering the hatchery.

Fig. 12:Hatchery building

Fig. 13: Incubator

Fig. 14: Inside incubator

Fig. 15:Egg grader

12. 2nd gate

There is a secondary gate for supplying the day-old chicks and other products. This is a part of biosecurity to ensure proper hygiene as it is separate from the house of the chicken.

Fig. 16: second gate

13. Tree plantation

There are many coconut trees. Because it is an unbranched trees, that help to protect the farm from foreign birds that can bring many diseases in the farm.

Fig. 17: Unbranched tree

14. Dead bird disposal

Prompt disposal of dead birds is crucial for disease prevention. Leaving dead birds in pens, feed rooms, or around poultry houses can lead to disease transmission through various vectors such as rats, mice, dogs, cats, flies, beetles, mosquitoes, and other birds. While there is no universally perfect method for disposal, it's essential to choose a method and implement it consistently.

14.1. Disposal Pit:

When faced with the task of disposing of dead birds, consider using a disposal pit as an alternative method. Although less desirable, it offers several advantages:

1. **Labor-Saving:** Unlike digging individual holes or starting fires for each bird, a disposal pit streamlines the process.
2. **Rodent and Dog Resistance:** The tightly covered pit prevents scavengers like dogs and rodents from disturbing the remains.
3. **Odor Control:** Properly sealed pits minimize noticeable odors.
4. **Fire Safety:** Unlike burning carcasses, which can be unpleasant and bothersome to neighbors, a pit poses no fire hazards.
5. **Year-Round Use:** Regardless of the season, a disposal pit remains functional.
6. **Natural Decomposition:** Birds break down fairly rapidly in the pit without the need for chemicals.

Fig. 18: Disposal pit

15. Power backup

A generator is essential in a poultry breeder farm to ensure a continuous power supply, which is critical for maintaining the health and productivity of the birds. Power outages can lead to ventilation system failures, causing rapid temperature increases that can result in high mortality rates, especially in hot climates. Additionally, proper lighting schedules are crucial for the reproductive cycle of breeder birds, and any disruption can negatively impact egg production and fertility rates. Generators also ensure that climate control systems, such as ventilation, heating, and cooling, operate during power cuts, maintaining optimal air quality and temperature. Automated feeders and drinkers rely on continuous power to function, preventing disruptions to the birds' access to food and water. Moreover, sanitation systems, which are vital for maintaining biosecurity, require power for operating equipment like disinfectant sprayers and UV sanitizers.

Fig. 19: Generator

16. Water reserve

Water reserves in a poultry breeder farm are crucial for maintaining the health and productivity of the birds. A reliable and clean water supply is essential for drinking, cleaning, and cooling systems. The quality of water directly impacts poultry health, so it's important to ensure that water sources are free from pathogens, chemicals, and other contaminants. A well-designed water storage system, including tanks, reservoirs, and cisterns, must be properly maintained and cleaned regularly to prevent contamination. Backup water supplies, such as additional storage tanks. Regular monitoring of water quality and quantity, including testing for bacterial contamination, pH levels, and chemical residues, is essential to detect issues early.

Fig. 20: Water reserve

17. Litter management:

Rice husk was used as litter material. Rice husk was utilized as litter material. The litter on the floor serves to absorb moisture from bird droppings, keeping the floor relatively dry and ensuring comfortable conditions for the birds. The litter thickness standard is maintained and varies with the season.

Fig. 21: Litter material

CHAPTER III:

RESULT AND DISCUSSION

At the main gate of Regional chicken farm, there is a foot bath but there is no spray room designed to prevent farm staff and visitors from bringing in organisms, which contraindicate with the standards of a well-maintained breeder farm. However, there must be a manual spray or automatic spray for biosecurity.

The office room of Regional chicken farm is situated outside the main gate. But there should be a facility of CCTV system to monitor the activity on the farm.

The washroom at the entrance of the main shed meets the standards of a well-maintained breeder farm. Separate washrooms for staff in the rearing and laying sheds are also present, which is beneficial as it prevents disease-causing organisms from spreading between sheds.

All farm staff and workers wear separate clothing, sandals, and masks when entering the farm shed, which is crucial for maintaining biosecurity. The presence of a foot bath at the shed entrance is strictly maintained, reflecting good biosecurity practices.

The farm's water supply comes from safe sources, and chlorination is performed to sanitize the water, which is a standard practice in good breeding farms.

Regular cleaning and disinfection of utensils are conducted, followed by proper drying, which is essential for maintaining good biosecurity practices.

The drainage system is crucial in preventing the spread of organisms, but the farm's system is not sufficiently improved to maintain high biosecurity. There are no effective measures in place to protect against rodents and wild birds, which can easily enter the farm and act as carriers of many organisms.

The distance between the two sheds is adequate to prevent disease spread, and the farm's proximity to the road poses a risk of contamination from vehicles and humans. Additionally, the distance between the farm and nearby dwellings is less than the standard, posing a public health risk.

Proper disposal of dead birds is important to prevent infections among healthy birds. The farm uses the burial method for dead birds, which aligns with standard biosecurity practices.

Vaccination is critical for disease immunity, and the farm follows a proper vaccination schedule.

The second gate is not maintained biosecurity properly. There is no footbath or spray for the vehicle. Which creates a high risk for the farm. The hatchery building is situated beside the second gate.

CHAPTER IV:

CONCLUSION & RECOMMENDATIONS

Conclusion:

Poultry is a significant segment of livestock farming and has become a crucial aspect of agribusiness in Bangladesh.(Islam & Hossen, 2021) It represents one of the most promising sectors for growth in the country, offering quick returns with minimal initial investment.(Uddin et al., 2014)However, poultry diseases are a major factor contributing to losses in poultry farming. (Hameed et al., n.d.)These diseases often strike in endemic proportions, leading to substantial economic damage for poultry farmers. Preventative measures, such as standard housing, are essential for mitigating these losses.(Das et al., 2017) Good housing practices play a vital role in controlling diseases effectively, reducing treatment costs, and enhancing farm profitability.

Recommendation:

Government poultry farm often face a lack of profit and marketing knowledge. To address this, it is essential to train the workers in improved farming techniques and the beneficial effects of biosecurity(Islam, 2021). Such training will enhance poultry productivity and help meet the growing demand for protein in our country.(Islam, 2021) Additionally, a biosecurity campaign should be conducted, focusing on improving drainage systems and controlling rodents and wild birds.(Prank et al., 2024) Further studies are needed to achieve optimal results in these areas.

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ACKNOWLEDGEMENTS

The author wishes to acknowledge the immeasurable grace and profound kindness of Almighty "ALLAH" the supreme authority and supreme ruler of the universe, who empowers the author to complete the work successfully.

The author feels proud in expressing his deep sense of great gratitude and indebtedness to respected teacher and tutor Professor Dr. A.K.M Shaifuddin, Dept. of Physiology, Biochemistry and Pharmacology, Chattogram Veterinary and Animal Sciences University for his trustworthy and scholastic supervision and his suggestion and take proper action to visit the farm and explain the system properly.

He would also like to express his sincere gratitude to the ex-vice-chancellor of Chattogram Veterinary and Animal Sciences University, Professor Dr. A.S.M. Lutful Ahsan, his heartfelt respect to the Dean of the Faculty of Veterinary Medicine at CVASU, Professor Dr. Lutfur Rahman, and also to the Director of External Affairs, Professor Dr. A. K. M. Saifuddin, Department of Physiology, Biochemistry, and Pharmacology at CVASU. The author would like to express his heartfelt appreciation and thanks to all staff of Chittagong Veterinary and Animal Sciences University And Regional Chicken Farm for their kind cooperation during the study period. On a personal note, the author is profoundly grateful to his family for their love, patience, and understanding. Their continuous support has served as a constant source of encouragement and inspiration. Thank you all for your support and encouragement.

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