STUDY ON PRODUCTIVE PERFORMANCE AND MANAGEMENT OF HISEX BROWN AT ISLAM POULTRY FARM, CHITTAGONG

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ABSTRACT

The study was conducted at Islam poultry farm at Patiya, Chittagong to observe management of housing, feeding, lighting, production performance and disease control practices of 7572 HISEX brown layer birds under cage rearing system for a period of 21st October, 2013 to 17th November, 2013. During the study period the hen day and hen housed egg production percentage, mortality rate, body weight gain and feed intake of observed layer birds of the farm were compared with the standard level. From the standard level the percentage of egg production of HISEX brown are 93%, 93%, 92% and 92% respectively at the age of 38th, 39th, 40th and 41st weeks of age but the observed percentage of Hen day egg production(%HDEP) in the farm were 86.20%, 85.57%, 85.12% and 84.75% and percentage Hen housed egg production(%HHEP) were 86.29%, 85.51%, 85.05%, 84.62% respectively . Again it was found that the mortality rate were 0.026%, 0.052%, 0.066% and 0.066% in that farm during study period respectively at the age of 38th, 39th, 40th and 41st weeks, whether the standard levels are 1.6%, 1.7%, 1.8% and 1.9% which is higher than the result. Amount of feed intake per day is 120 gm which is similar to the standard level. In case of weight gain the standard levels are 1.910 kg, 1.915 kg, 1.920 kg and 1.930 kg per bird respectively at the age of 38th, 39th , 40th and 41st weeks; The weight gain of birds were 1.85 kg, 1.85 kg, 1.90 kg and 1.90 kg of that farm, which are almost same. All the observation and study during experimental period showed that the average Hen day egg production was 85.41% and average Hen housed egg production was 85.37%. from 38th to 41st week of age of the hens. The peak Hen day egg production and Hen housed egg production achieved at 38th week of age which was 86.20% and 86.29% respectively.

Key words: Hisex brown, Management, Production performance.

CHAPTER-1
INTRODUCTION

In Bangladesh, the poultry sector has turned into a promising and dynamic industry with enormous potential for poverty reduction through income and employment generation (Rahman, 2007). It has been recognized as a profitable enterprise and is the most popular income generating activity for the rural poor, particularly women and unemployment youths. Poultry raising has emerged as an integral part of agribusiness in the farming community in Bangladesh (Latif, 2007). In the recent years, poultry farming has become one of the most popular business in agriculture sector of Bangladesh and more specifically, the layer industry in now a developing enterprise alongside other sectors of poultry production. The total growth rate of poultry in Bangladesh is about 6.25% per year (Saleque, 2007). The magnitude of contribution of poultry sector in agriculture GDP is 7.87% and to the country's GDP is 1.5% (BBS, 2005).

Recent livestock in Bangladesh have found on poultry production as a tool in poverty alleviation. Now a days poultry is highly raising industry in Bangladesh. The present poultry population is estimated to about 185.70 million of chicken of which 162.70 million is deshi chickens and remaining are hybrid (Rahman, 2013). It is estimated that there are approximately 163.5 million chickens which contributing partially for the alleviation of poverty and malnutrition of the people. At present situation commercial poultry eggs and meats are accomplishing the greater demand of animal protein as well as the human nutrition in the country. About 0.26 million metric ton of meat and 5210 million table eggs are produced per year (Rahman, 2013). The total egg production of Bangladesh in 2012 were 42562 lac (Anon 2013).

Mass production of chicken eggs has become a highly efficient, competitive enterprise. In a commercial layer farm pullets will begin to laying eggs at 20-22 weeks of age and once laying will eventually peak at 85-93% production. Each hen can be expected to lay about 270 quality eggs by the age of 75 weeks. About 1.8kg feed is needed to productive per dozen eggs(Miah *et al*., 2002).

In Bangladesh more than 135 hatcheries producing 0.49 million DOC per week and about 1 million commercial broiler and layer farm supplying 0.65 million of poultry meat and about

9.9 million table eggs per week (Kabir, 2005). At present more than 75 hatcheries breeding farms in the country and produce millions of broiler and layer DOC. Few years ago the eggs of parent stock and also DOC were imported in Bangladesh. But now a days demand of commercial layer and broiler chicks are fulfilled by our own hatcheries. Some private company also reared Grand parent (GP) stock. All this effort were taken by some private companies, such as Kazi farms, Nourish Poultry and Hatchery, Paragon, Paharica, Usha, BRAC, Biman hatchery etc.

Recently the prospects of rearing exotic hens by the poor in Bangladesh have highlighted (Rahman, 2003). The found projects are important tool for poverty alleviation and social empowerment for the poor, especially for the rural women. Seeing the prospects, various government and non- government organization have come forward helping distress women and unemployed youths across the country in establishing farms so as to make them sell reliant. The nutritional and diseases problem are major constraints in Bangladesh for the development and maintenance of poultry, suitable breed and proper management results in profitable production which are lack in traditional poultry rearing system (Rahman, 2003)

The HISEX brown, brown feathered brown egg layer is a very competitive producer of strong shelled eggs. She has an excellent livability and is ready to stand the challenges of today's egg industry. She produces large quantities of uniform colored brown eggs with a reputation for having an outstanding feed efficiency (Anon, 2013). The favorable genetic characteristics can only achieved when the bird is provided with all its requirements. These include , but are not limited to, good quality feed, good housing and healthcare. The goal of managing the HISEX brown is to attain the greatest number of eggs in the desired weight range at the most efficient cost per dozen or per pound of egg mass. To attain this goal, birds should be fed correctly during both the growing and egg production phase all the known required nutrients for growth and sexual development. The objectives is to be certain that the pullet reaches the target body weight during each week of growth (Anon, 2013).

The HISEX brown is breed to tolerate the challenges of various housing conditions. In general there is a "happy medium'' in regards to how much space a bird needs. The initial investment in housing and equipment is reduced when less space is allocated for each bird. Too little space will reduce performance. Too much space, on the other hand, may result in higher energy costs for warming the building and over consumption of feed may occur, etc. (Anon, 2013).

Therefore my study was undertaken at **Islam Poultry Farm, Chittagong** with the following objectives:

- ✓ To observe the management practices of HISEX brown layer.
- ✓ To observe and compare the production performance of the birds of 38^{th} to 41^{st} weeks of age of that farm with the standard level.
- ✓ To determine the severity of problems faced by the farmers involved in layer production.

CHAPTER-2
REVIEW OF LITERATURE

Poultry management involves monitoring poultry health; ensuring that the poultry house is maintained with appropriate brooding, rearing, growing and laying conditions; and ensuring that recommended vaccinations are given and appropriate feeding programs are used. In developing countries, it is often difficult to achieve optimum performance from birds, owing to less-than-optimal housing conditions and lack of quality feed, vaccines and trained staff.

2.1 Housing

The system is not new, although there have been numerous changes through the years. As early as the 1930s, chickens were kept in cages. The first held one laying bird; sometime later multiple bird cages were introduced. It is now estimated that about 75% of all commercial layers in the world are kept in cages (North, 1996). Though eggshell quality indicators were affected more by genotype than by housing, the interaction between genotype and housing is not significant for eggshell thickness but it is significant for eggshell weight and strength. Although eggshell thickness is lower in those eggs which are produced in cages, but eggshell strength is higher (Tumova *et al.*, 2011).

Improvements to poultry housing systems in developing countries have focused on providing an environment that satisfies the birds' thermal requirements. Newly hatched birds have a poor ability to control body temperature, and require some form of supplementary heating, particularly in the first few days after hatch. Many developing countries are located in tropical areas where minimal heating is required. Indeed, the emphasis in these countries particularly for meat chickens is on keeping the birds cool **(**Glatz *et al.*, 2013).

The housing and equipment used make it possible to exert considerable control over the climate provided to the birds, but such houses are expensive to build and operate, and require a large turnover of birds to make them viable. Owing to the lower construction and running costs, medium and small-scale commercial housing is popular in developing countries. By far the most prevalent poultry farming system in many developing countries is the small-scale scavenging system, which usually involves only very basic (if any) shelter for housing birds.

Large-scale commercial farms: Commercial houses in developing countries are clear-span structures with litter on the floor for meat birds or cages for laying hens. The commercial chicken meat industry in some developing countries is vertically integrated, with single companies owning feed mills, breeder farms, hatcheries and processing plants. Arrangements typically involve agreements in which the farmer or landowner provides the housing, equipment and labor, while the company provides the chicks, feed, medication, transport and supervision.

For controlled-environment housing of layers, multi-tier cage systems are common. Most large-scale commercial farms use controlled-environment systems to provide the ideal thermal environment for the birds (Glatz and Bolla, 2004). Birds' performance in controlled-environment sheds is generally superior to that in naturally ventilated houses, as the conditions can be maintained in the birds' thermal comfort zone. Achieving the ideal environment for birds depends on appropriate management of the poultry house.

Modern houses are fully automated, with fans linked to sensors to maintain the required environment. Some commercial operators use computerized systems for the remote checking and changing of settings in houses. Forced-air furnaces and radiant heating are the main methods of providing heat to young chicks

Medium-scale commercial: In developing countries, most medium-scale commercial layer and chicken meat houses rely on natural airflow through the shed for ventilation (Daghir, 2001). Where required, meat birds and layers are given radiant heating early in their lives, to maintain body temperature. Laying hens may be kept in commercial wire cages in open sheds, or in sheds with wire sides to exclude wild birds, scavenging poultry and predators.

Small-scale commercial (improved genotype stock and supplementary feeding): Houses of various shapes and dimensions are typically constructed using local building materials consisting of timber or mud bricks and bamboo. These small-scale commercial facilities may have several rooms or compartments where chicks are brooded, pullets are reared and layers are housed in a floor-based system or in cages.

2.1.1 Ventilation management

All poultry houses need some form of ventilation to ensure an adequate supply of oxygen, while removing carbon dioxide, other waste gases and dust. Farmers need to compensate for undesirable climatic conditions by manipulating control systems or modifying the house to ensure that the welfare and environmental needs of the birds are satisfied. Environmental extremes (heat and cold stress, excessive or inadequate ventilation, poor air quality) can be managed if the design of the poultry house is appropriate for the conditions.

Birds require adequate space, sufficient feed to meet their nutritional requirements, and an adequate supply of good-quality water. Use of a stringent quarantine program to prevent disease is an essential element of good management, and farmers must be able to recognize disease and treat it as soon as possible. A suitable vaccination and medication program is essential in commercial operations. In commercial operations, minimum ventilation is often practiced in colder climates, but not generally in tropical ones (Glatz and Bolla, 2004).

In large-scale automated operations, correct air distribution can be achieved using a negative pressure ventilation system. When chicks are very young, or in colder climates, the air from the inlets should be directed towards the roof, to mix with the warm air there and circulate throughout the shed. With older birds and in warmer temperatures, the incoming air is directed down towards the birds, and helps to keep them cool. Evaporative cooling pads can be placed in the air inlets to keep birds cool in hot weather. Tunnel ventilation is the most effective ventilation system for large houses in hot weather.

Tunnel ventilation systems are popular in hot climates. Exhaust fans are placed at one end of the house or in the middle of the shed, and air is drawn through the length of the house, removing heat, moisture and dust. Evaporative cooling pads are located at the air inlets. The energy released during evaporation reduces the air temperature, and the resulting airflow creates a cooling effect, which can reduce the shed temperature by 10 °C or more, depending on humidity. Maximum evaporation is achieved when water pumps are set to provide enough pad moisture to ensure optimum water evaporation. If too much water is added to the pads, it is likely to lead to higher relative humidity and temperatures in the shed(Glatz and Pym, 2013).

Fogging systems are sometimes used to reduce the shed temperature. Fogging works best in dry climates, and usually involves several rows of high-pressure nozzles that release a fine mist throughout the house. The cooling effect is significantly increased by airflow from the use of fans within the shed(Glatz and Pym, 2013).

Natural ventilation is common in medium- and small-scale operations and in areas where the climatic conditions are similar to the temperatures required by birds. Ventilation is usually provided by prevailing breezes. Natural ventilation works best in poultry sheds where the long axis runs east to west, to avoid heating of the sidewalls by the sun during the morning and afternoon.

2.2 Effects of nutrition

Managers need to ensure that the diets provided to birds in commercial operations meet the nutrient requirements of each age group and strain of chickens. Smallholder systems in developing countries typically place less emphasis on achieving maximum production, and more on maximizing profitability by using diets comprised mainly of local feed-stuff ingredients, rather than imported feeds. Key management practices by farmers who mix their own feed include ensuring that micro-ingredients are kept cool, moldy ingredients are not used, and storage facilities are weather- and rodent-proof (Glatz , 2013).

2.3 Importance of good hygiene

An essential management task is to maintain clean sheds, surroundings and equipment. A clean shed improves health and limits parasites, dust and microbial contamination, while clean shed surroundings reduce vermin and fly loads. This is important not only for litter and manure management but also for bio-security. Removal of residual feed from feeders is an important practice critical to the health of the flock. Another important management task is to sanitize sheds to minimize the risk of disease to incoming flocks of birds. Maintaining high flock health status is essential, and routine vaccination programs for a number of diseases are typically in place, particularly in larger-scale operations. Some vaccinations are carried out at the hatchery, but it is essential that a proper vaccination schedule be established and that vaccination protocols be complied with(Glatz and Pym, 2013).

2.4 Litter materials and management

Broiler litter is the material used as bedding in poultry houses to absorb fecal waste from birds and to make the floor of the house easy to manage. Common litter materials are wood shavings, chopped straw, sawdust, shredded paper and rice hulls, and a wide range of other materials are used in different regions around the world. Litter should be light, friable, noncompressible, absorbent, quick to dry, of low thermal conductivity and – very important – cheap. After use, the litter comprises poultry manure, the original litter material, feathers and spilled feed. The litter quality in a shed is determined by the type of diet, the temperature and the humidity. The recommended depth for litter is between 10 and 20 cm. Sawdust can result in high dust levels and respiratory problems. Dust particles in the litter capable of causing health problems in the birds are derived from dried feces, feathers, skin and litter; their adverse effects arise because they carry or incorporate bacteria, fungi and gases.

2.5 Management of lighting

Poultry have seasonal and daily biological rhythms, both of which are mediated by light, particularly day length. For day length to exert its controlling effect, there needs to be a dark phase (night) when light levels should be less than 0.5 lux. Day length and light intensity during the breeder bird's life have an important role in development of the reproductive system. The difference in day lengths and light intensities between the rearing and the laying phases is the principal factor responsible for controlling and stimulating ovarian and testicular development (Lewis and Morris, 2006). The response to increases in day length and lighting intensity depends on the body weight profile during rearing, which in turn depend on the nutritional regime. The effects of light are predominantly on the rate of sexual maturation and egg production.

The two types of artificial lighting commonly provided are in-candescent and fluorescent. In candescent globes are cheaper to install, but have lower light efficiency and a shorter life. Fluorescent lights are three to four times as efficient and last about ten times as long, but have variable performance in cold weather. The color of the light rays has an effect on chickens' productivity. For example, green and blue lights improve growth, and lower age at sexual maturity, while red, orange and yellow lights increase age at sexual maturity, and red and orange lights stimulate egg production. Birds are calmer in blue light, so blue lights are recommended for use during depopulation in commercial operations.

Light is critical for the onset and maintenance of egg production. Increasing day length (from winter to summer) during the rearing period stimulates the onset of sexual maturity, whereas shortening day length (from summer to winter) has the opposite effect. Early onset of lay may not be beneficial as it may predispose to reproductive problems. Where artificial lighting is possible, a constant day length (of between 12 to 16 hours per day) during the rearing period has been shown to result in a delayed onset of lay, and is the preferred rearing treatment. Shortening day length or too little light will discourage egg production, and must be avoided once the birds are in lay.

2.5.1 Lighting program and growth

Chickens are sensitive to changes in the duration of illumination, and these will influence the age of sexual maturity. In addition, feed consumption is greatly influenced by the duration of day length. Lighting programs have, therefore, different objectives. During rearing, they allow us to encourage growth and to control the birds' sexual maturity. For this reason, we consider it to be essential to achieve the recommended bodyweight at 5 % lay, in order to obtain an egg weight which conforms with the target from start of lay, and to achieve high overall production.

In addition to the influence of growth, the light program plays a determinant role for 3 essential reasons:

- Progressive growth of the digestive system
- Gradual adaptation to a body clock (above all , anticipation of a dark period).
- Lack of night time energy supply when dark periods are too long.

The observation of the feeding behavior with the water consumption shows a first peak of food intake in the 2 to 3 hours that precede a dark period, and a second peak shortly after lights come on. The crop is used during these peaks of consumption as a storage organ.

The introduction of a dark period from start of the rearing period is important to progressively develop the crop capacity, which plays a role of food reserve. However the amount of food stocked remains insufficient for the nocturnal energy needs.

Pullets subjected to a 10-hour dark period, the amount of food stored in the digestive tract was only 75% of the energy needs for those 10 hours(Buyse,1993).

Thus the feeding behavior of poultry is an attempt to satisfy night time energy needs. It is a reasonable to suppose that the night energy deficit is proportional to the length of the dark period.

2.5.2 Light duration and growth

A rapid decrease in light length is used to slow the growth of broilers and broiler breeders when young. Conversely any increase in light duration will favour growth.

Table2.1 : Influence of a decreasing light pattern on growth

Age	Light duration (hours/day)	
	Decreasing duration	Standard duration
4-7days	20	20
2nd week	16	16
3rd week	12	15
4th week	8	14.5
5th week	8	14
6th week	8	13.5
7th week	8	13
8th week	8	12.5
Weight at 56th days(gm)	678	731(+8%)

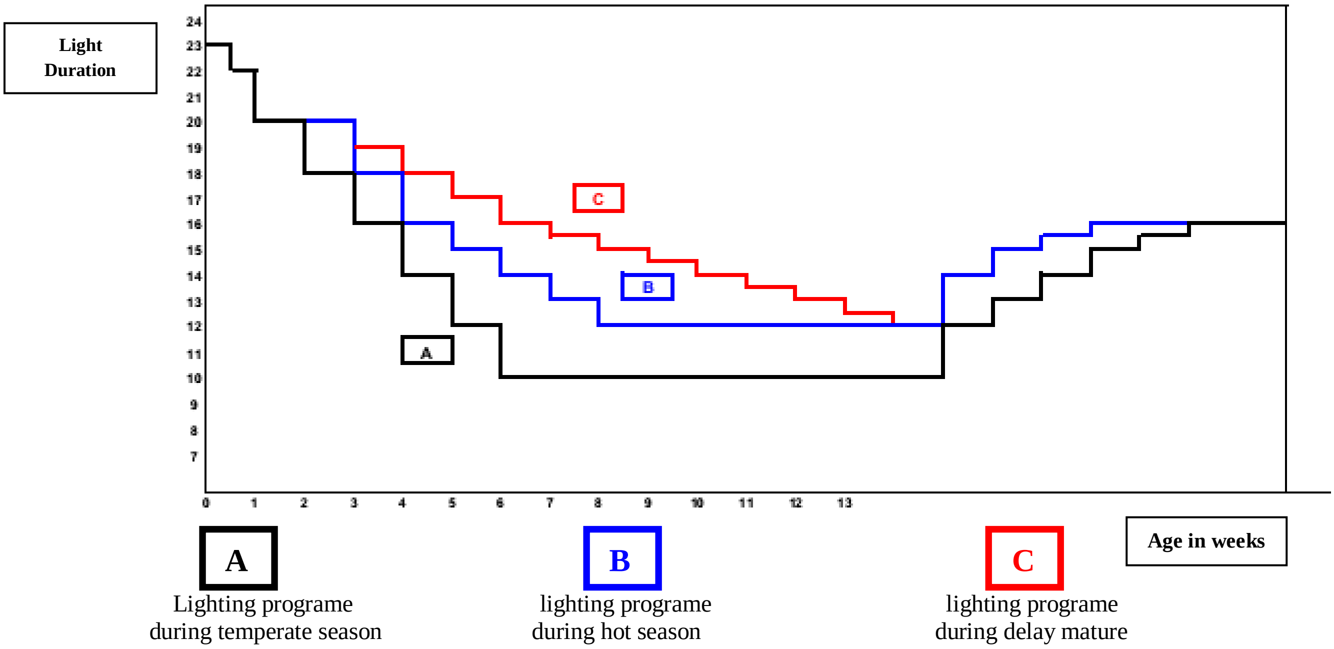
(24th Random Sample Test- Eickelborn)

2.5.3 Lighting program in dark houses

We consider a dark house to be a building in which the light penetrating from outside of all sorts produces an intensity of less than 0.5 lux, at above 20° latitude. In these buildings one should use the program for dark houses. With this level of light intensity coming from outside, there is little interference with the artificial lighting program. The birds react very well to any variation of light duration during the rearing period. Even if it is always important to take into account the performances previously obtained, the sexual maturity is more predictable.

Picture of Egg storage and feeding at Islam Poultry farm

Guide line for lighting programme for rearing in a dark poultry house



2.6 Feeding and Rations

Feeding the laying bird is only a continuation of feeding the growing pullet plus supplying the necessary ingredients in the correct proportions so that the bird may produce an abundant number of eggs. Today , most commercial layers are kept in cages rather than on a litter floor, as was the custom several years ago. This method of management has necessitated some changes in laying feed formulas and in feeding methods.

2.6.1 Basic nutritional requirements of laying hen

Feed is necessary for four reasons:

i. Body maintenance: The amount of feed necessary for body maintain varies with the weight of the bird and the type of environment.
ii. Body growth: A medium size layer (producing brown shelled eggs) should gain from 1.00 to 1.25lb(454 to 570gm)
iii. Feather production: This includes the growing of new feathers to replace those molted or pulled out.
iv. Egg production: The feed requirement for the production of eggs is determined by the number and size of the eggs laid.

2.6.2 Feeding during the rearing period

2.6.2.1 Energy Level

During the first few weeks of life, meat type chickens just like young pullets are incapable of regulating their energy intake according to the energy concentration of the diet. It takes weeks to develop the digestive tract. During the first 8-10 weeks, any increase in the energy level is accompanied by an increase in growth. When given the feed in a crumb form, young pullets are able to increase their feed intake.

Table 2.2: The table below shows the influence of energy level and presentation method on the bodyweight of pullets at 5 weeks of age

Presentation. Dietary Energy Level	Mash Bodyweight at 5 weeks	Crumbs Bodyweight at 5 Weeks
3100 kcal	375 g	412 g
2790 kcal	345 g	405 g

After 10 weeks of age, pullets correctly regulate their energy intake according to the energy level of the diet in both hot and temperate climates. Under consumption during that period is often the result of a poor grit size. The objective is to develop the pullet's ability to eat feed, so that it can increase its consumption by approximately 40% in the first few weeks of lay.

During the period 10 - 17 weeks, it is important to develop the digestive system by using diets with an energy concentration less than or equal to that of the layer's diet.

2.6.2.2 Protein Requirements

The amino acid requirements are to a large extent dependent on the feed conversion ratio and, therefore on age; that is why, when young the requirements expressed in mg of amino-acids per gm of growth.

Table 2.3: The table below shows the influence of amino acid content on the weight of pullets at 4 weeks

Ration(in % of the recommendations)	100%	90%
Protein (%)	20	18
Digestible Lysine(%)	1.01	0.91
Digestible Methionine+Cystine(%)	0.76	0.69
Weight at 4 weeks (gm)	335	302

Any delay in growth during the first few weeks will be reflected in a reduced bodyweight at 17 weeks and in later performance. It is, therefore, extremely important to use a starter diet for the first 4 or 5 weeks, which has an amino acid/protein ratio.

Table 2.4: Any amino acid deficiency will result in a reduction in growth rate and an increase in the FCR

Amino Acid content of diets (in % of the recommendations)	100%	90%
Bodyweight at 28 days (g)	335	302
Bodyweight at 118 days (g)	1685	1630
Feed consumption (g)	6951	6904
Feed conversion ratio(FCR)	4.12	4.24

2.6.2.3 Fat in the Layer ration

Fats are primarily used in poultry feeds to supply concentrated sources of energy. Most feed grade fats have more than two times the ME of feed grains. In addition , the utilization of energy in the diet is enchaned when energy derived from fats is substitued for carbohydrate or protein sources of energy. The fatty composition of eggs can also be manipulated by incorporating high levels of corn or sunflower oils in the diet.

2.7 Egg production

Egg production is the major index of performance of commercial layer business because of its accounts for 90% of the income from the enterprise. Egg production is one of the most important economic traits in chicken. Feed restriction during growth (7-22 weeks old) stage body weight reduced significantly, after that body weight increased at sexual maturity as well as egg production also increased(Krishnappa *et al.*,1992) . Hatchability problems in females over 50 weeks of age often associated with poor shell quality(G.Davigowda, 2004). A sort of average loss of embryos during incubation is supposed to be approximately 8-10% resulting in an average has of fertile eggs of 90-92%(Ron Meijerhof, 2004). High embryonic mortality duration late incubation (6.1% between 15-21days) and a greater no. of culled chicks 4.9% (B L Campula *et al.*, 2004). Temperature is the number one determinig factor influences the speed of embryonic development (Jerry Garrison, 2002). Egg stored for 3 days hatched earlier than those stored for 18 days (K.Tona *et al.*, 2002). 18days storage of egg resulted in longer incubation duration, lower quality score and depressed relative growth. Hatchability of fertile eggs was significanlty lower when there was no pre-warming period compared to having a pre-warming of 10-18hours. Th egg production of commercial layer commences about 19weeks of age, rises sharply to a peak at about 26-27 weeks of age and then declines gradually. It is usual practice to replace the layers at the age of 72-76weeks (Rahman, 2003). The maximum a fowl is capable of producing in the first laying year is about 300eggs.

2.7.1 Mortality during egg production

Excessive mortality during the laying period is an expensive management failure. Not only is there a loss of the bird herself, but the profit she would have generated does not materialize. There probably is no such thing as "normal'' mortality;thus there is no method of determination "excessive'' moratality. Studies of large cage laying farms in southern California have been shown that monthly average death losses have been from 0.5 to over 2%. However , individual flocks have been had losses as low as 0.3% per month. Some strains of layers have a lower incidence of mortality than others, so all excessive mortality cannot be the result of poor management.

2.7.2 Production Indices

Commoon to the industry are two methods of measuring daily or weekly egg production. each has its fallacies as an index, but each is a good rule of thumb.

Hen day egg production for one day(HDEP): The following formula is a measure of the egg productivity of the live hens on any given day.

$$\text{HDEP \%} = \frac{\text{No.of egg produced}}{\text{No.of birds available in the flock on that day}} \times 100$$

Example: There are 1,000 hens alive on a certain day and they produce 750 eggs that day. Their hen-day egg production(HDEP) is 75%.

Hen housed egg production for one day(HHEP): The following formula is a measure of the egg productivity in relation to the number of hens (housed) at the beginning of the laying period.

$$\text{HHEP \%} = \frac{\text{No.of egg produced}}{\text{No.of birds housed}} \times 100$$

Example: 1,200 hens were "housed'' at the beginning of the laying year. Today they laid 750eggs. Their hen-housed egg production is 62.5%

Hen day egg production for a long period: This may be calculated by first computing the number of hen days in the period by totaling the number of hens alive on each day of the period. Then calculate the number of eggs laid during the same period. Proceed by using the following formula:

$$\frac{\text{No.of egg produced durinf the period}}{\text{No.of hen} - \text{days in the period}} \times 100 = \%\ \text{hen day egg production for the period.}$$

Hen housed egg production for a long period: First compute the average number of eggs laid per day during the period. Then use the following formula:

$$\frac{\text{average daily nuber of egg produced}}{\text{Number of hens housed}} \times 100 = \%\ \text{hen housed egg production for the period.}$$

2.7.3 Factors affecting egg weighting

Pullets reaching sexual maturity in the spring lay more large eggs than those maturing in the fall as a result of their larger body weights at point-of-lay. This effect produces larger eggs throughout the life of the flock.

- Strains of birds: Egg size is a genetic factor; thus it is possible to develop strains of chickens laying large, medium or small eggs. Egg size is highly correlated with body weight.
- Age at first egg: The older a pullet is when she lays her first egg, the larger her egg during her laying period. In as much as it is possible to delay the onset of egg production, the age association becomes an important economic consideration.
- Environmental temperature: As ambient temperature rise, egg size decreases. At times hot weather will create a major egg size problem.
- Egg size when birds kept in cages: Normally and under similar circumstances, pullets in cages produces eggs that are slightly larger than those laid by pullets kept on a litter floor.
- Laying ration: Certain components of the laying ration will affect egg size. Increases in protein percentage usually are associated with increases in egg size.

- Size of pullets in the flock: The larger the pullet within a given flock, the larger the eggs. As the larger the birds also produce more eggs, body weight becomes important. However , the birds in the flock are never uniform in weight. They go from small to medium to large. But the more uniform the body size, the more uniform the egg size.

CHAPTER-3
MATERIALS AND METHODS

The study was performed at ISLAM poultry farm, Patiya, Chittagong, Bangladesh where HISEX brown layer strain birds are reared in cage housing system. The study was conducted for one month of time from 21st October to 19th November, 2013. The study population was 7572 layer birds.

3.1 Data Collection

Data are collected from register and by asking questions to the farm owner. Production data has taken from their register. Management data has taken from observation and getting information from the précised questionnaire.

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3.2 Housing System

- Tin shed house was constructed with 1 feet high side wall.
- Wire mesh were used from the side wall of the shed.
- Curtain was used to protect the birds from cold.

3.2.1 Brooder House

- Rice husk was used as litter.
- Floor space 0.5 square ft. per chick initially then increased gradually.
- Round waterer of size 5L for 50 chicks.
- Brooder with 3-4 bulbs of 100W for 500 birds.
- Chick guard is 1.5 ft. height and 7ft. diameter for chicks.
- 500 chicks were remain in a space of 250 square ft. for brooding.

3.2.2 Layer House

- Cage housing system.
- Each cage contain 3 birds and the each cage is 7.5 square ft.
- Each bird takes 2.5 square ft. space.
- Each cage contain a linear feeder and a plastic bowl as a waterer for 3 birds.

 

Figure: 1 Cage rearing system of Hisex brown at Islam Poultry Farm

3.3. Bio-security

- Restricted movement of personnel.
- Footbath at the entry of the gate for both stuff and vehicles.
- Spray with antiseptic solution is done routinely around the farm.
- The feeder, hover, water lines are cleaned every morning.
- The poultry droppings is removed and cleaned daily.
- Every morning there was a routine work to remove the dead birds and kept them out side of the shed for post mortem.
- Around 10-12kg lime was spread all over the farm almost twice in a week.
- To prevent the insects, fly, mosquito, spider, and other microbes the farm was sprayed every 14 days interval by using H_2O_2 solution

3.3.1 Fumigation

Fumigation place	ppm + Formalin (gm + ml)	Fumigation time
Layer house	(20 + 40)	20 minutes

3.4 De-worming

De-worming was done at the age of 45 days of the birds and second time de-worming was done at the age of 90 day.

3.5 Debeaking

Debeaking was done at the age of 84 days of birds by using debeaker.

3.6 Vaccination Schedule

Vaccination was done against Gumboro disease, Ranikhet disease, Fowl Cholera, Infectious coryza, coccidiosis, Fowl pox. The vaccination schedule is given below:

Table 3.1: Vaccination schedule of Islam Poultry Farm.

Age	Vaccine
3rd day	IB+ND$_{(live)}$
5th	IBD
7th	IBD+ND$_{(killed)}$
10-13th day	Coccidiosis
14th day	IBD
21th day	ND$_{(live)}$
28th day	ILT
35th day	Bronchitis
42th day	Fowl pox
52th day	Cholera
60th day	Infectious Coryza
70th day	Fowl pox
77th day	Cholera
98th day	ILT
112th day	Infectious Coryza
125th day	IB+ND+EDS

3.7 Lighting

Lighting schedule followed in this farm is given below in table:

Table 3.2: Lighting schedule for HISEX brown of Islam Poultry Farm

Age	Temperature	Day light+ Artificial light
0-3 day	34ºC/95ºF	24hrs
4-7 day	31-34ºC/90ºF	23hrs
2nd week	27-31ºC/85ºF	22hrs
3rd week	23-27ºC/80ºF	21hrs
4th week	20-23ºC/75ºF	20hrs
5th week	20ºC/75ºF	18hrs
6th week	20ºC/75ºF	16hrs
7th week	20ºC/75ºF	14hrs
8th -18th week	20ºC/75ºF	13hrs
19th week	20ºC/75ºF	13.30hrs
20th week	20ºC/75ºF	14hrs
21st week	20ºC/75ºF	14.30hrs
22nd week	20ºC/75ºF	15hrs
23rd week	20ºC/75ºF	15.30hrs
24th week	20ºC/75ºF	16hrs
25th -78th week	20ºC/75ºF	16hrs

3.8 Feeding System

The birds were 38th to 41st weeks of age reared in the ISLAM poultry farm. There is a standard ration which supplied with some deviation of standard level:

Table 3.3: Standard ration for HISEX brown in Islam Poultry Farm.

Age in week	0-4	4-7	8-14	15-17	17-40	40-60	+ 60
CP%	21-22%	19.5%	17.5	15.0	17-18	16-17	15-16
ME(kcal/kg)	2900	2900	2825	2775	2800	2775	2750
Crude Fiber%		3-5	3-6	4-7	3-6	3-6	3-7
Crude fat %		2.5-6	2.5-7.0	2.5-7.0	3-7	3-7	3-7
Linolenic acid		1.2	1.0	1.0	1.2	1.2	1.2

The following rations were approximately maintained in the ISLAM poulry farm for 100 kg of feed, beside these there were some feed additives, toxinbinder, vitamin minerals are also used. But sometimes there may be some changes also occurred in the ration according to physical condition of the birds and also according to environment.

Table 3.4: Ration ingredients & amount followed in Islam Poultry Farm

Age	6-10 weeks	11-17 weeks	17-19 weeks	20-28 weeks	29-45 weeks	Over 46 weeks
Maize	61 kg	57 kg	61 kg	58 kg	58.5 kg	59 kg
Soya	20.5 kg	13 kg	16.5 kg	22.5 kg	22.5 kg	23 kg
Propac	3 kg	2 kg	2 kg	3 kg	2.5 kg	2.5 kg
Readymedicine	2.5 kg	2.5 kg	2.5 kg	3 kg	2.5 kg	2.5 kg
Limestone	1.5 kg	1 kg	2.5 kg	7.5 kg	9 kg	9.5 kg
Energy	0.5kg	0.5 kg	0.5 kg	1 kg	0.5 kg	0.75 kg
Rice polish	11 kg	24 kg	15 kg	5 kg	4.5 kg	4 kg

3.9 Watering

For the prevention of diseases clean water and germ free water were supplied to bird and each 100 birds need one round drinker in case of brooder condition, but when birds were shifted to the cage there was used a plastic bowl for each 3 birds. Beside plane water most of time some additional antibiotics, vitamins, like Protivit, AD3E; livertonic, Vit-E etc. were supplied to the birds by mixing with water.

3.10 Calculation Method of egg production

Egg production percentage was calculated by using the following formula (North, 1996)

Hen housed egg production for one day(HHEP): The following formula is a measure of the egg productivity in relation to the number of hens (housed) at the beginning of the laying period.

$$\text{HHEP \%} = \frac{\text{No.of egg produced}}{\text{No.of birds housed}} \times 100$$

Hen day egg production for one day(HDEP): The following formula is a measure of the egg productivity of the live hens on any given day.

$$\text{HDEP \%} = \frac{\text{No.of egg produced}}{\text{No.of birds available in the flock on that day}} \times 100$$

CHAPTER –4
RESULTS & DISCUSSION

The present study was undertaken to observe the management practices and compare the production performances of the birds in ISLAM poultry farm, Patiya, Chittagong, during the period October-November, 2013. Comparison of, mortality rate, feed intake, body weight gain at the age of 38th to 41st weeks of HISEX brown between observed in the farm and the standard.

Table: 4.1 Comparison between observation and standard level

Age In week	Total birds (average)	Dead birds per week	Standard			Observation			
			Feed intake per hen per day (gm)	Body Wt. Kg per hen per week	Mortality Rate(%)	Feed intake per hen per day (gm)	Body wt gain kg per hen per week (kg)	Mortality rate per week(%)	Total eggs produced per week
38	7572	2	120	1.910	1.6	120	1.85	0.026	45688
39	7570	4	120	1.915	1.7	120	1.85	0.052	45329
40	7566	5	120	1.920	1.8	120	1.90	0.066	45084
41	7561	5	120	1.930	1.8	120	1.90	0.066	44852

(Source of standard level: Anon. 2013. c)

In this study it was seen that the highest production was achieved at the 38th week of age, after that the production become lower as the age rises, it is similar to the egg production of commercial layer commences about 19th week of age, rises sharply to a peak at about 26th to 27th weeks of age and than declines gradually (Rahman, 2003).

Again it was found that the mortality rate were 0.026%, 0.052%, 0.066% and 0.066% in that farm according to the observation respectively at the age of 38th, 39th, 40thand 41st weeks; whether the standard levels are 1.6%, 1.7%, 1.8% and 1.9% which are higher than the observed result. So that it is very good for the farm that the mortality rate is very lower than the normal standard.

Average amount of feed intake per day per bird was 120 gm which was also similar to the standard level.

In case of weight gain the standard levels are 1.910 kg, 1.915 kg, 1.920 kg and 1.930 kg per bird respectively at the age of 38^{th}, 39^{th}, 40^{th} and 41^{st} weeks and the observation were 1.85 kg, 1.85 kg, 1.90 kg and 1.90 kg respectively in the farm. Weight gain was almost same to the standard level that means the production performance and the weight gain were good in that farm because of good management system and no wastage of feed. It is as like as better performance of egg type layers with increase in flock size. This may be due to better management by owners of larger flocks and avoidance of unnecessary wastage of feed (Nair and Ghadoliya, 2000; Kumar and Mahalati, 1998).

The result of current study is shown under the following subheading.

4.1 1st week of observation

Time period: From 21/10/2013 to 19/11/2013

Age of the birds: 38 weeks

Total no of birds were: 7572

Table: 4.2 Egg production percentage(Hen day egg production, Hen housed egg production), and mortality rate in 1st week observation at the age of 38th week.

Date	Days in a week	Total No. of birds	No. of dead birds	Total egg produce Per day	% HDEP	%HHEP
1/1/13	1st day	7572	0	6412	84.68	84.68
2/1/13	2nd day	7572	0	6522	86.13	86.13
3/1/13	3rd day	7572	0	6588	87.00	87.70
4/1/13	4th day	7572	1	6584	86.95	86.95
5/1/13	5th day	7571	1	6514	86.03	86.02
6/1/13	6th day	7570	0	6528	86.22	86.21
7/1/13	7th day	7570	0	6540	86.39	86.37
		Average = 7572	0.026%	Total production in a week = 45688	Average = 86.20	Average = 86.29

This table showed that the number of total dead birds were 2 and the mortality rate of the 1st week was 0.026%. . This table also denoted that the average percentage of Hen day egg production 86.20% and Hen housed egg production 86.29% at 38th week of age;1st week of observation, whereas the standard production percentage 93% at the age of 38th week (Anon, 2013)

4.2 2nd week of observation

Time period: From 08/01/2013 to 14/01/2013

Age of the birds: 39 weeks

Total no of birds were: 7570

Table: 4.3 Egg production percentage(Hen day egg production, Hen housed egg production), and mortality rate in 2nd week observation at the age of 39th week

Date	Days in a week	Total No. of birds	No. of dead birds	Total egg Production Per day	%HDEP	%HHEP
28/10/13	1st day	7570	2	6512	86.02	86.00
29/10/13	2nd day	7568	0	6520	86.15	86.10
30/10/13	3rd day	7568	0	6482	85.65	85.60
31/10/13	4th day	7567	1	6465	85.43	85.38
01/11/13	5th day	7566	0	6432	85.01	84.94
02/11/13	6th day	7566	0	6452	85.27	85.21
03/11/13	7th day	7566	0	6466	85.46	85.39
		Average = 7570	0.052%	Total egg production = 45329	Average = 85.57	Average = 85.51

This table represented that the numbers of total dead birds were 3 and the mortality rate of the 2nd week was 0.052%. This table also denoted that the average percentage of Hen day egg production 85.57%% and Hen housed egg production 85.51% at 39th week of age; 2nd week of observation and the standard production percentage 93% at this age(Anon,2013).

4.3 3rd Week of observation

Time period: From 15/01/2013 to 21/01/2013

Age of the birds: 40 weeks

Total no of birds were: 7566

Table: 4.4 Egg production percentage(Hen day egg production, Hen housed egg production), and mortality rate in 3rd week observation at the age of 40th week

Date	Days in a week	Total No. of birds	No. of dead birds	Total egg Production Per day	% EDEP	% EHEP
04/11/13	1st day	7566	0	6498	85.88	85.82
05/11/13	2nd day	7566	1	6458	85.36	85.28
06/11/13	3rd day	7565	2	6438	85.10	85.02
07/11/13	4th day	7563	0	6408	84.72	84.63
08/11/13	5th day	7563	1	6414	84..81	84.71
09/11/13	6th day	7562	1	6428	85.00	84.89
10/11/13	7th day	7561	0	6440	85.17	85.05
		Average = 7566	0.066%	Total egg production = 45084	Average = 85.15	Average = 85.05

This table revealed that the numbers of total dead birds were 5 and the mortality rate of the 3rd week was 0.066%. This table also denoted that the average percentage of Hen day egg production 85.15% and Hen housed egg production 85.05% at 40th week of age;3rd week of observation and standard percentage of production is 92% at 40th week (Anon, 2013).

4.4 4th Week of observation

Time period: From 22/01/2013 to 28/01/2013

Age of the birds: 41 weeks

Total no of birds were: 7561

Table: 4.5 Egg production percentage(Hen day egg production, Hen housed egg production), and mortality rate in 4th week observation at the age of 41st week

Date	Days in a week	Total No. of birds	No. of dead birds	Total egg Production Per day	% HDEP	% HHEP
11/11/13	1st day	7561	0	6422	84.93	84.81
12/11/13	2nd day	7561	1	6416	84.85	84.73
13/11/13	3rd day	7560	1	6410	84.78	84.65
14/11/13	4th day	7560	2	6394	84.57	84.44
15/11/13	5th day	7558	0	6380	84.41	84.25
16/11/13	6th day	7558	1	6428	85.04	84.89
17/11/13	7th day	7557	0	6402	84.71	84.54
		Average = 7561	0.066%	Total egg production in a week = 44852	Average = 84.75%	Average = 84.62%

This table represented that the number of total dead birds were 5 and the mortality rate of the 4th week was 0.066%. This table also denoted that the average percentage of Hen day egg production 84.75% and Hen housed egg production 84.62% at 41st week of age;4th week of observation, whereas the standard production 92% at this age(Anon, 2013).

CHAPTER-5
CONCLUSION

Although the studied farm follows the rules of layer farming method, the egg production did not reached to the peak production compared to standard level but mortality was lowest during rearing of chicks and laying period. From this study it may be concluded that the egg production can be increased up to the standard level with good management practices. It can be also assured that the farm will be more profitable for getting standard level production. Moreover farm bio-security is very poor and it maintain minimum bio-security . There are many rodent and wild bird can easily enter into the shed, which create a risk for the layers. As the farm situated near the locality & surrounding wall not well made, so there is a risk of production fall due to surrounding activities. At the end my placement period it was suggested to farm owner to upgrade the bio-security system specially suggested to made a concrete surrounding wall .

CHAPTER-6
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APPENDIX

Questionnaire for Data Collection

Name of the Farm:……………………………………………………………………………………

Owner Name:…………………………………………………………………………………......

Address: Union…………………… Thana……………………….. Dist:……………….

Contact No:……………………………………

A. Farm information

1. Type of farm: Layer/Broiler ……………………………………………………..
2. Total No of birds:…………………………………………………………………
3. Rearing system: Floor /Cage………………………………………………………
4. Starting age of rearing ……………………………………………………………
5. Breed/ Strain:……………………………………………………………………
6. Total area of farm:………………………………………………………………….
7. Duration of rearing ………………………………………………………………..

B. Housing management

1. Total Number of shed:………. brooder house…….. grower cum finisher house ………..
2. Area of each shed:……………………………………………………………………….
3. Space per bird:…………………………………………………………………………
4. No. of pan/bird……………………… Light/bird……………………………………..
5. About preparation of house for birds:
   ……………………………………………………………………………………
   ……………………………………………………………………………………
   ……………………………………………………………………………………
   …………………………………………………………………………………..

C. Feeding management

1. Feed type: pellet/ Grain…………………………………………………………………
2. Amount of feed/bird …………………………………………………………………….
3. Feeding schedule………………………………………………………………………………
…………………………………………………………………………………………….
4. Water source:………………………………………………………………………………
5. Amount of feed at different level: (per bird)
Starter…………………….Grower………………………….finisher …………………
6. Frequency of water supply: □ Adlibitum □ Routine ……………………………….

D. Lighting schedule

1. Lighting at different level: Starter……………… Grower……………Finisher……………
2. Total no of light/shed……………………………………………………………………….
3. Duration of light: □ Natural …………………... □ Artificial………………………….

E. Production information

1.No. of egg per batch:…………………………………………………………………………
2. Laying Time: □ Morning……………… □ Afternoon…………... □ Evening……………
3. Market price/egg:……………………………………………………………………………

F. Disease management

1. Common diseases at farm:
   I. ……………………………………..
   II. ……………………………………..
   III. ……………………………………..
   IV. ………………………………………
   V. ………………………………………
2. About Vaccination schedule at farm:
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
3. Management of disease condition: □ Self management □ Quack □ Veterinary doctor
4. Feature of Veterinary doctor calling: □ Actively □ occasional
□ In critical situation □Not at all.

G. General management

1. Common chemicals used at foot bath or, for surface disinfection or any shorts of sterilization:
   I. ………………………………………….
   II. ………………………………………….

III. ………………………………………….
IV. …………………………………………..
V. ………………………………………….

2. Egg collection schedule: …………………………………………………………………………
3. Litter material: …………………………………………………………………………………..
4. Frequency of changing litter material:…………………………………………………………..

Name of the interviewee: .... **Name of the interviewer**..........................

Date: ………….. Date: …………………………………….

Signature.. Signature …………………………………

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