
UNIT 3 POULTRY EQUIPMENTS

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3.0 OBJECTIVES

After studying this unit, you will be able to:

- identify important poultry equipments;
- assess number of equipment required in a broiler and layer farm; and
- explain the use of different equipments in poultry farming.

3.1 INTRODUCTION

A number of equipments are used in our day-to-day work. In the same way, many

types of equipments are required for normal functioning of a poultry farm, for instance, feeders, drinkers, brooders etc. Therefore, it is necessary to know about the equipments which are needed in broiler and layer farms, so that you can calculate their number, how, where and when to use each of them. The knowledge about the equipments also helps you to look for locally available cheaper alternatives so that the business becomes more profitable.

3.2 EQUIPMENTS IN BROILER FARM

Most broilers in the world are reared on deep litter system. Hence, the common equipments required in a broiler farm on deep-litter system such as Brooders, Brooder Guards, Chick Feeders, Broiler Feeders and Drinkers are discussed below:

3.2.1 Brooders

A brooder, in simple words, is an artificial hen (mother) which provides warmth and light for the chicks to eat and drink during the first 3 to 4 weeks of age. You may wish to know whether there are different types of brooders available in the market! Of course, there are many types of brooders available in the market, which are described below:

(i) Canopy Brooder

A “canopy” is an inverted umbrella-like equipment (Fig. 3.1). It is made of Galvanized Iron (GI). However, a bamboo basket of 0.6 to 0.9 m (2 to 3 ft) diameter can also be used. In either case, 3 electric bulb points have to be provided.

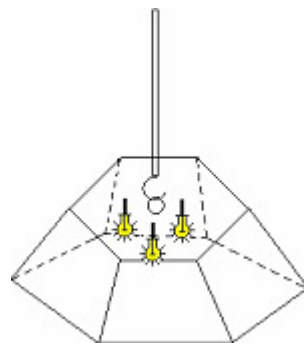


Fig. 3.1: Canopy (Floor) Brooder

(ii) Electrical or Reflector Brooder

Electrical brooder available in market is of rectangular shape with hooks to mount it wherever required (Fig. 3.2). It consists of an electrical heating element (usually 1.25 kW) canopied (capped) with a reflecting surface (Fig. 3.3). It also has a bulb point to fix an electric bulb and a thermostat for regulating temperature. The equipment is expensive but very durable and dependable for brooding.



H Heater B Bulb T Theromostat



Fig. 3.3: Reflector Brooder

Fig. 3.2: Sketch of Reflector Brooder

(iii) Infra-red Bulb Brooder

Infra-red bulbs (red or white colour) are available in the market in two capacities: 150 and 250 Watts. These bulbs heat the chicks when they come in contact with the light (Fig. 3.4). The bulb also illuminates the brooding area.



Fig. 3.4: Infra-red Bulb and Brooder

Now, you are sure to get a doubt; do all the types of brooders needed in a farm? Answer is no. The farmer can choose any of the brooding methods. In any case, it is always better to have one additional equipment (canopy/electrical /infra-red bulb) for emergency.

Your next doubt will be: how many brooders to be purchased?

As a general rule, one brooder is required for every 200 to 250 chicks initially, depending on the local conditions; especially prevailing temperature.

(iv) Battery Brooder

You can refer back to Section 2.4.2 of Unit 2 on housing systems for the description of a battery brooder. You can see that a battery brooder (Fig. 3.5) has reflector brooders in each tier with arrangement for feed, water and movement of birds.



Fig. 3.5: Automatic Battery Brooder

3.2.2 Brooder Guard

A brooder guard, as the name suggests, guards the chicks from straying too far away from the heat source. Brooder guard is necessary because day-old chicks are not aware of feed, water etc. especially during the beginning because, in nature, hen takes care of their needs. Therefore, they have a tendency to look for corners,

which will be usually dark and huddle. This leads to starvation, thirst and finally death.

There are no hard and fast specifications for a brooder guard. Generally, brooder guard is made of many rectangular portions (usually 10 to 12), each measuring about 60 cm × 30 cm (2 ft × 1 ft) chain-linked lengthwise by means of hooks to facilitate their placement (Fig 3.6). It can be made of Galvanized Iron sheets, cardboard, thick carton (cardboard) material or any other material which can stand erect on its length. Hence, brooder guard is like a circular wall of 30 cm height with a brooder at its centre.

The total area to be provided within the brooder guard changes continuously as the chicks grow. Details on this aspect have been discussed in the Unit 2, Block 2 of this course.



Fig. 3.6: Brooder Guard

3.2.3 Feeders

Under natural conditions, broody hen takes chicks along with her and the chicks learn to take feed by observing and copying their mother. But, when we brood artificially under a brooder, feed is given to the birds in equipment called “Feeder”.

Conventionally, long (linear) feeders were being used. However, recently, circular chick feeders made of high-impact plastic are also available. However, there is no rule for selecting any type of feeder. It is left to your choice. However, you will definitely need to know about each type of the feeder before deciding on which one to prefer.

(i) Features of linear feeders

Linear feeders are usually made of Galvanised Iron (GI). However, it can as well be made out of any locally available material like wood, bamboo etc. Provisions for stability and adjustment in height at which the feeder stands have to be made in its design. Birds can stand on either side of the linear feeder; therefore, total feeder space available will be two times the length ($2 \times \text{Length}$).

Design of a linear feeder is given in Fig. 3.7. Linear chick feeders (Fig. 3.8) will be

60 to 75 cm long, 7.5 cm and 10 cm wide at the base and the top, respectively and 5 cm high with a grill (space 2.5 cm apart) to prevent entry of chicks into the feeder. Linear broiler feeders (Fig. 3.9) will be 90 to 150 cm long, 15 and 25 cm wide at the base and at the top, respectively and 7.5 to 10 cm high, with grill spaced 5 cm apart. All linear feeders will have lips, a folding towards the inside of the feeder throughout the length to prevent spillage of feed during feeding. This is especially important in case of mash-type of feed wherein, the birds scratch the feed in search of grains. Width of the lips can be 8 to 10 mm in case of chick feeders and 20 to 25 mm in case of broiler feeders. A slight angle (10 to 15°) is provided so as make the lips project upwards from the horizontal. In both type of feeders, grill can be easily opened to facilitate filling of feed and angle at the apex of the grill will be about 90° and adjustable stands are fixed to the base at suitable intervals to facilitate raising of the level at which feed is available for the broilers. Obviously, cross-section of a linear feeder will be wedge-shaped (Fig. 3.10).

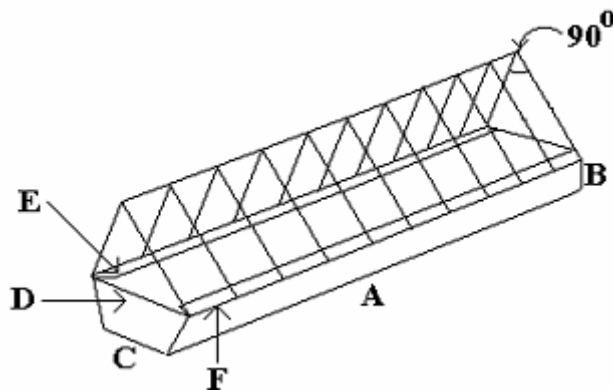


Fig. 3.7: Linear feeder with grill and lips

Dimensions of linear chick feeder:

A = 60 to 75 cm, B = 2.5 cm, C = 7.5 cm, D = 10 cm, E (lips) = 8 to 10 mm and F = 2.5 cm

Dimensions of linear broiler feeder:

A = 90 to 150 cm, B = 7.5 to 10.0 cm, C = 15 cm, D = 25 cm, E (lips) = 20 to 25 mm and F = 5 cm



Fig. 3.8: Linear feeder for chicks



Fig. 3.9: Linear feeders for broilers

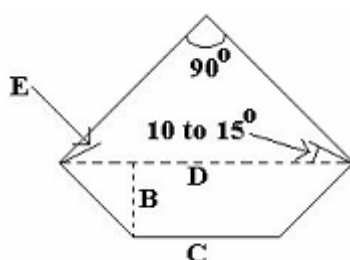


Fig. 3.10: Cross-section of a linear feeder

Where,

B = Height

C = Width at the base

D = Width at the top

E = Lips

(ii) Limitations of linear feeders

You might have noticed that birds like to scratch and search for grains. Hence, they try to enter into the feeder and search for grains; this may result in toppling of the feeder and wastage of feed. In addition, linear feeders need to be filled (to $\frac{1}{2}$ or $\frac{1}{3}$ only) everyday. Adjustment of height at which feed is available is possible but not as easy as in case of circular feeders.

(iii) Features of circular feeders

These are usually made of high-impact plastic. These feeders are suspended from the roof truss or from separate pipeline for the purpose. Therefore, these feeders are also referred to as “hanging feeders” (Fig. 3.11). These feeders are available in different capacities and when completely full, the feed will be sufficient for 4 to 7 days, depending on age and number of birds feeding on them. The height at which the feed is available can be easily adjusted by simple clamp mechanism. Plastic feeders will be brightly coloured (red or blue, generally) and hence, are expected to attract broilers, especially chicks to feed.



Fig. 3.11: A circular (hanging) feeder

In all the cases, the hanging feeders are above the litter floor and never kept on the floor. Your obvious question will be why so? The reason is, hanging feeders will have a base plate and a bell portion; both are so designed that there will be free flow of feed from the bell on to the base plate as and when feed is exhausted through a slit all round. This is primarily facilitated by gravity. Hence, it is necessary that the circular feeders are suspended above the litter floor and never kept on the floor.

In addition, it is mandatory that feed is available at the level of the back of birds to minimize feed spillage; especially when mash-type feed (mixture of ingredients broken to required size) is provided wherein, birds start scratching in search of grains. Therefore, the base plate will be above the litter floor; at the beginning of brooding, about 5 to 6 cm (2 to 2½ inches) which will be increased as the birds grow both in height and weight.

(iv) Type of feeder to be used

There is no rule for selecting any type of feeder. It is left to the choice of the farmer. Circular (hanging) feeders are most commonly used for feeding broilers. However, there is no harm in using linear feeders.

(v) Number of feeders required

The number of feeders required depends upon the type of feeder used (linear or circular) and the age group of the birds.

(a) Linear feeders

Look at the Fig 3.12 carefully. You can clearly notice that there are two sides of the feeder where birds can stand and eat. Therefore, total length of feeder space available is twice the length of the linear feeder.

Having known the total feeders available, what you need to know is the feeding space required by a bird. Assume that broilers require 5 cm per bird of feeder space during the first 4 weeks. If the length of a linear feeder is 75 cm, you can easily

calculate that totally 150 cm (75×2) are available and 30 broilers ($\frac{150}{5}$) up to 4 weeks of age can eat with one linear feeder.

(b) Circular (hanging) feeders

You have to recall your mathematics; total length available around a circle is equal to its circumference. You have also calculated circumference of a circle by using the formula πd or $2\pi r$, where d = diameter and r = radius of the circle. Using the same formula, circumference of the circular feeder is calculated and it is divided by the feeder space required to get the number of birds that can eat around such a feeder.

Another interesting aspect of circular feeders is that for the same length available as circumference, 30% more birds can stand and eat. It is also interesting to know the reason for this. See Fig. 3.12 carefully. It is very easy to recognize in case of linear feeders, no matter how far they stand from the feeders, total space (linear cm) available for feeding is same. In case of hanging feeders, since the shoulder will be about 6 to 8 cm away from the head of the bird, circumference at the shoulder level (R) will be more than at the level of head (r). In other words, feeder space available, in case of hanging feeders, is approximately 30% more than what is calculated as its circumference. Therefore, for the given feeder space available, 30% more birds can feed out of a hanging feeder than that is possible in case of a linear feeder. In practical terms, 30% more birds can stand in a radial fashion around a circular feeder.

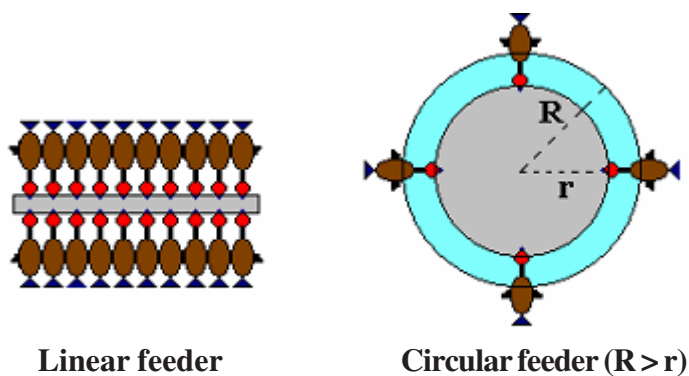


Fig. 3.12: Feeding on linear and circular feeders (top view)

Let us consider an example of 1000 broilers. Feeder space required for a broiler chick (at the beginning) is 5.0 cm (linear space). Therefore, totally 5000 cm is required. Generally, chick feeders will be of 35 cm (350 mm) diameter. Therefore,

each feeder provides $2 \times \frac{22}{7} \times \frac{35}{2}$ or $\frac{22}{7} \times 35 = 110$ cm and due to radial arrangement of birds (30% more space), 143 cm (110×1.3) effective feeder space is available. Consequent on this, each hanging feeder of 35 cm diameter can suffice 28 birds

($\frac{143}{5}$); and for 1000 birds 36 feeders ($\frac{1000}{28}$) are needed. Each such feeder can

hold about 8 kg of feed. For broilers at market, feeder space required is 7.5 cm; therefore, each hanging feeder of 35 cm diameter can be sufficient for 19 birds

$(\frac{143}{7.5})$; and for 1000 birds 54 feeders $(\frac{1000}{19})$ are needed.

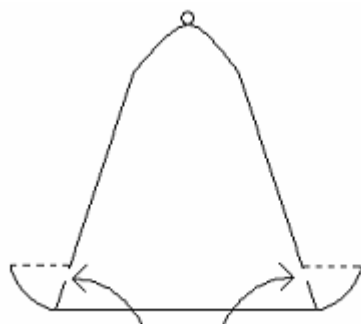
3.2.4 Drinkers

Drinkers, similar to feeders can be either linear or circular. But, linear drinkers are not common. Occasionally, a PVC tube cut into half lengthwise can be kept at an appropriate height so that water is available at the level of back of the birds. Both ends must be closed and water supply should be arranged into the tube at one end. To ensure that water reaches the other end, an inclination of 1 cm in 1 m can be provided. In such linear drinkers, birds can drink on rather sides. Therefore, circular drinkers are most common. These are hung from the truss or roof of the house and connected to an overhead tank, hence referred to as “Hanging drinkers”. Therefore, continuous supply of water is ensured. Hence, the discussion hereafter will be restrict to circular drinkers.

(i) Features of circular drinkers

(a) For first one or two weeks

In case of chicks during first week of brooding, manual drinkers are popularly used (Fig. 3.13). The manual drinkers are also referred to as “fountain drinkers” because water comes out of the holes like that in case of a fountain (Fig. 3.13). The main advantage of manual drinkers is the ease of giving vitamins and other probiotics or medicines or vaccines through water.



Holes made below the level of the base plate



Fig. 3.13: Fountain drinker with position of the holes for water flow

The manual drinker in Fig. 3.13 is 24.5 cm in diameter, 25 cm in height with a capacity of 2½ litres. Therefore, each drinker provides $2 \times \frac{22}{7} \times \frac{24.5}{2}$ or $\frac{22}{7} \times 24.5 = 77$ cm. You can now refer back to circular feeder, where it has been mentioned that 30% more birds can eat around a circular feeder and the same logic applies to circular drinkers also. Hence, 100 cm (77×1.3) effective drinker space is available in this example. Each bell-drinker of 24.5 cm diameter can support 100 chicks $(\frac{100}{1.0})$; and for 1000 chicks 10 drinkers $(\frac{1000}{100})$ are needed.

(b) After one to two weeks of age

Conventionally, water basins made of plastic or wood or GI were being used. However, recently, bell drinkers (Fig. 3.14) made of high-impact plastic are available. As was in case of feeders, there is no rule for selecting any type of drinker. It is left to the choice of the farmer.

Height at which the water is available can be easily adjusted by simple clamp mechanism and rate of flow of water is adjustable by a valve (spring-mounted). Plastic drinkers will be brightly coloured (red or blue, generally) and hence, are expected to attract broilers, especially chicks to water.



Fig. 3.14: Bell drinker

In all the cases, the bell drinkers are above the litter floor and never kept on the floor. You may wonder why such condition? The reason is as follows: The hanging drinkers will have a bell-shape (curved outwards; hence referred to as “Bell drinkers”) forming a lip and water line all round its edge; it is so designed that there will be free flow of water over the bell on to the water line as and when water is exhausted through a slit. This slit is controlled by a spring-mounted valve and suitable ballast (weight to pull the spring) fixed at the bottom of the drinker. Water flow is primarily facilitated by gravity. Hence, it is necessary that the circular drinkers are suspended above the litter floor and never kept on the floor.

In addition, it is compulsory that water is available at the level of the back of birds; again you will be interested to know why for? The reason goes as follows: Birds do not have lips; therefore, they cannot suck water. Instead, they immerse their beak into the water and then lift their head to move water into their mouth by gravity. Therefore, water must be available at the level of the back or even slightly higher than that but never above the level of crop (base of the neck). Such an arrangement also minimizes water spillage also.

(c) Calculation of number of drinkers required

Again, you can refer back to calculation of circular feeders; exactly the same way number of circular drinkers is calculated. Number of bell drinkers = $1.3 \times$

$\left(\frac{\text{Circumference}}{\text{Drinker space}} \right)$ with all measurements made in cm.

Let us consider an example: Number of bell drinkers required for 1000 broilers.

Drinker space required for a broiler chick (at the beginning) is 1.5 cm (linear space). Therefore, totally 1500 cm is required. Generally, chick drinkers will be of 38 cm (380 mm) diameter. Therefore, each drinker provides

$2 \times \frac{22}{7} \times \frac{38}{2}$ or $\frac{22}{7} \times 38 = 119$ cm and due to radial arrangement of birds about 154 cm (119×1.3) effective drinker space is available. Each bell drinker of 38 cm diameter can supply water to about 94 chicks ($\frac{143}{1.5}$); and for 1000 chicks, 11

drinkers ($\frac{1000}{94}$) are needed. Broilers at market age require 2.5 cm of drinker space;

hence, each of the drinkers can be sufficient for 57 birds ($\frac{143}{2.5}$); and for 1000 birds

18 drinkers ($\frac{1000}{57}$) are needed.

Hence, 18 numbers of bell drinkers (38 cm diameter) will be sufficient for 1000 broilers.

Note: Feeder and drinker space for broilers and layers are given separately in Section 3.5.1.

(d) Installation of bell drinkers

Generally, the supplier of the drinkers also installs the drinkers. However, if one is interested to install the equipment by himself, pipeline (at least 2 cm diameter) from an overhead tank of suitable capacity (generally a minimum of 500 litre) is laid inside the house in 3 lines. Each of the lines will have a “T” joint at 2.4 m intervals to suspend a drinker. Between two drinkers, 3 hanging feeders can be fixed over a separate GI pipeline so as to make an equal distance of 0.6 m between any two feeders or a drinker (Fig. 3.15).

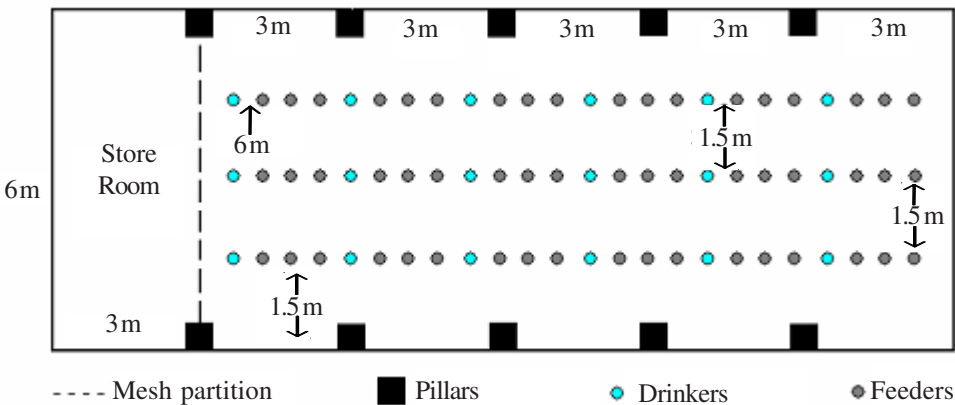


Fig. 3.15: Arrangement of feeders and drinkers

Check Your Progress 1

- Note:** a) Use the space given below for your answers.
b) Check your answers with those given at the end of the unit.
- 1) What are the different types of brooders?

- 2) Explain a reflector brooder with a diagram

- 3) What is a brooder guard? What for it is required?

- 4) What are the different types of feeders and drinkers available in the market?

Activity 1

Visit a nearby broiler farm. Collect information on different equipments used in the farm. Prepare a list of equipments along with their numbers being used in the farm. Note down the type of feeder and drinker used. Also note down the number of birds being reared along with the feeder, drinker and floor space provided to them. Prepare a sketch of the feeder and drinker arrangement in the farm.

3.3 EQUIPMENTS IN LAYER FARM

In this section, equipments required for routine management of layers will be discussed. As you are aware through Unit 1 and 2, layer farm will have brood-grow houses (BGH) and cage layer houses (CLH). Different equipments are required in each of the houses. They are listed below:

3.3.1 In Brood-Grow House

The equipments required are same as those in a broiler house (see Section 3.2 above). However, the requirement of feeder and drinker space are different and therefore, only the number of each of them requires changes.

(i) Brooders

Same as discussed under broilers.

(ii) Brooder Guard

Same as discussed under broilers.

(iii) Chick Feeders

Let us consider a case of 500 layer chicks. Feeder space required for a layer chick (till 4 months) is 6 cm (linear space). Therefore, totally 3000 cm is required. Generally,

chick feeders will be of 35 cm (350 mm) diameter. Therefore, each feeder provides $2 \times \frac{22}{7} \times \frac{35}{2}$ or $\frac{22}{7} \times 35 = 110$ cm and due to radial arrangement of birds 143 cm (110×1.3) effective feeder space is available. Each hanging feeder of 35 cm diameter can be sufficient for about 28 birds ($\frac{143}{6}$); and for 500 birds about 18 feeders ($\frac{500}{28}$) are needed. Each such feeder can hold about 8 kg of feed. For layers, feeder space required is 9 cm; but, they are housed in cages which provide 45.72 cm feeder space for 3 birds which is more than sufficient.

(iv) Grower Feeders

These are similar to hanging feeders for broilers but are of larger diameter.

(v) Drinkers

Let us again consider 500 layer chicks. Drinker space required for a layer chick (till 4 months) is 2.5 cm (linear space). Therefore, totally 1250 cm is required. Generally, chick drinkers will be of 38 cm (380 mm) diameter. Therefore, each drinker provides $2 \times \frac{22}{7} \times \frac{38}{2}$ or $\frac{22}{7} \times 38 = 119$ cm and due to radial arrangement of birds $119 \times 1.3 = 154$ cm effective drinker space is available. Each bell drinkers of 38 cm diameter can be sufficient for about 62 chicks ($\frac{154}{2.5}$); and for 500 chicks about 10 drinkers ($\frac{500}{62}$) are needed. For layers, drinker space required is 2.5 cm; but, they are housed in cages which provide 45.72 cm drinker space for 3 birds or nipple drinker in each cage which is more than sufficient. Hence, 10 number of bell-drinkers (38 cm diameter) will be sufficient for 500 layer chicks.

3.3.2 In Cage Layer House

You know that most of the layers are housed in cages; each cage has facility for the birds to eat and drink. They eat putting their head out through the mesh in front from the linear feeders attached. For drinking, it is not possible to keep the drinkers described under Section 3.2.4. You will ask me why not? The reasons are obvious; birds while moving inside the restricted cage push the drinker and it falls. Moreover, the floor of the cage has a slope for the egg to roll; hence, drinker cannot be kept at all. Obviously, either a drinking channel has to be fixed over the feeding channel (giving sufficient space for the birds to put their head out and eat) or separate arrangement has to be made for providing water. The special arrangement is the nipple in which water comes out when the nipple is hit by the beak of the bird.

(i) Nipple drinkers

When cage system was introduced, water was provided to the birds in watering channels fixed 7.5 to 10.0 cm above the feeding channel. The main problem with this system was daily cleaning of the channel, overflowing of channels occasionally causing problems of humidity, ammonia, fly and smell problems as well as occasional empty channels leading to thirst and reduced performance. To overcome these, nipples were introduced in cages. As the name suggests, these drinkers look like a nipple and water drops come out when they are pressed. They can be used for all

types and classes of birds; but very commonly used in laying cages. These are fixed to the laying cage at 5 cm above the head of the layer so that the hen can easily peck at the nipple. One nipple drinker in each cage housing 3 layers is sufficient and normally, they will be installed by the supplier of the cage itself.



Fig. 3.16: Nipple and Nipple holder



Fig. 3.17: Nipple assembly

(ii) Cages

The most commonly used are 3-bird laying cages.

(iii) Egg filler flats

By now, you are familiar with rectangular trays with depressions to suit eggs in the market place where you buy eggs. They are called “Egg filler flats”. Each of them can hold 30 eggs. It can be made of plastic (Fig. 3.18) or paper pulp (Fig. 3.19). Plastic ones are common because they are durable and easy to clean and disinfect. However, pulp trays reduce breakage of eggs during transportation and are environment-friendly. Eggs are directly collected in such filler flats.

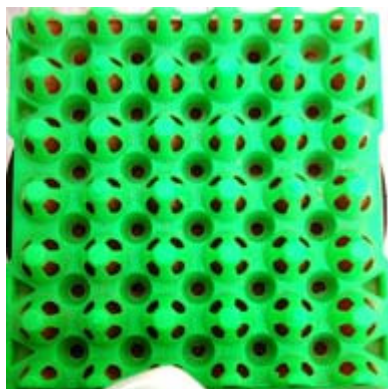


Fig. 3.18: Plastic egg filler flat



Fig. 3.19: Paper pulp filler flats

Let us assume 1000 layers in production. Assuming an average egg production of

300 eggs per annum, $\left(\frac{300 \times 1000}{365} \right) = 822$ eggs are expected every day. It can also

be reasonably assumed that the eggs will be sold within 3 days or totally 2466 (822×3) or say 2500 eggs need to be stored. Adding another 10% for emergency, 2750 eggs may have to be stored at a time. After disposal of eggs, the trays have to be washed and disinfected; therefore, trays to hold one more day's production are needed. In other words, trays to accommodate 3572 eggs ($2750 + 822$) or say 3600 eggs have to be purchased. Since each tray holds 30 eggs, about 120 egg

trays $\left(\frac{3600}{30} \right)$ are required. In other words, one egg tray is required for every 8.33

birds $\left(\frac{1000}{125} \right)$ or say 8 birds.

(iv) Nests

Nests are not required when the layers are grown in cages or CLH. However, if layers are grown on deep litter, nests at the rate of 30 per 100 layers have to be provided. Nests should have an inclined roof (Fig. 3.20). You may ask a question why roof of the nests must be sloping. The reason is very simple; layers have a tendency to jump/fly (Perch) and sit on the nests. If allowed, they may lay eggs on the top of the nests also! Therefore, nests must have an inclined roof, popularly referred to as anti-perching roof. You can identify all the above features of nests in Fig 3.21.



Fig. 3.20: Nests with inclined roof (Anti-perching roof)

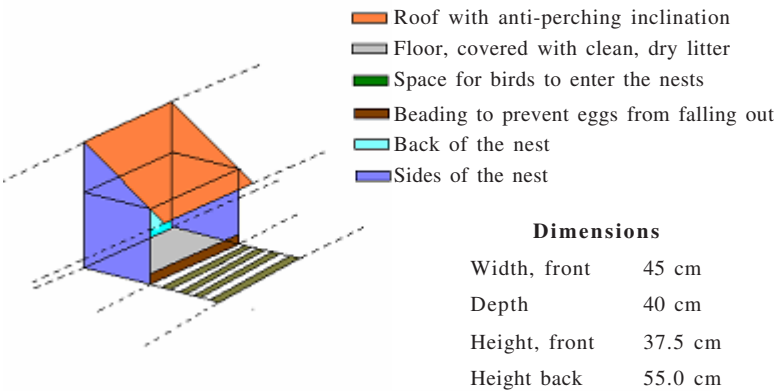


Fig. 3.21: Nests for layers

(v) Candler

This equipment produces a beam of light which is used to get an idea about the internal quality of eggs without breaking (Fig. 3.22).



Fig. 3.22: Candler

Check Your Progress 2

- Note:** a) Use the space given below for your answers.
- b) Check your answers with those given at the end of the unit.

- 1) What are the advantages of nipple drinkers?

.....

- 2) Define egg filler flat.

.....

- 3) What is a candler?

.....

Activity 2

Visit a nearby layer farm. Prepare a list of equipments along with their numbers being used in the farm. Note down the type of feeder and drinker used. Also note down the number of birds being reared along with the feeder, drinker and floor space provided to them. Prepare a sketch of the feeder and drinker arrangement in the farm.

3.4 OTHER GENERAL EQUIPMENTS

In poultry farm, there are some more equipments required for day-to-day functioning of the farm and they are as follows:

3.4.1 Beak-trimmer (Debeaker)

You will be explained about beak-trimming along with management of layers. Most commonly used equipment is the electrical beak trimmer (Fig. 3.23). The equipment is usually mounted on to a stand of convenient height (0.60 to 0.75 m) with a peddle connected to the top of the unit with a chain, so that upon pressing the pedal with the foot of the operator, the hot blade slides down cutting the beak placed over a small platform in the equipment. The equipment is also provided with a thermostat to regulate temperature.



Fig. 3.23: Electrical beak-trimmer

3.4.2 Blow-lamp (Flaming Gun)

Blow-lamp is very useful equipment and it generally works on kerosene or gas (Fig. 3.24). It is used to flame metal frames to get rid of external parasites and their eggs or larvae etc. from the building. It can also be used on equipment made of GI. In either case, after cleaning and disinfection, blow-lamp can be used on the area.



Fig. 3.24: Blow lamp

3.4.3 Catching Mesh and Catching Hook

Catching mesh consists of several pieces of meshwork ($2.5\text{ cm} \times 2.5\text{ cm}$ or $7.5\text{ cm} \times 7.5\text{ cm}$) measuring $60\text{ cm} \times 60\text{ cm}$ beaded on all sides to protect from sharp edges (Fig. 3.25). These pieces (about 8 to 10 in number) are linked through rings, so that they can be folded and spread whenever needed. When birds need to be caught (for vaccination or sale etc.), they are moved to a corner of the shed, and the catching mesh is spread leaving as much space as possible all round so that the birds cannot escape.



Fig. 3.25: Unit of catching mesh

(**Note:** Many such units linked to make a catching mesh)

Catching hook is a hook with a long handle which can be used to catch the birds by the leg.

3.4.4 Crates

Crates are box-like structures made of meshwork used for transportation of birds (Fig. 3.26). Recently, impact resistant plastic is used for crates so that it will be light in weight, durable, easy to handle, clean and disinfect. There is possibility of injury to the birds while loading birds into the crates, transportation and unloading. The base of the crates will be of meshwork $2.5\text{ cm} \times 2.5\text{ cm}$ so that the birds can be comfortable while on it. All sides will be of meshwork $7.5\text{ cm} \times 7.5\text{ cm}$ so that good ventilation is possible. An opening ($30\text{ cm} \times 30\text{ cm}$) with a lid is provided on the top to help loading and unloading. A crate of dimensions $90\text{ cm} \times 45\text{ cm}$ and of height 30 cm can easily accommodate 10 to 15 broilers depending on body weight.



Fig. 3.26: Crate

3.4.5 Refrigerator

A refrigerator (at least 130 litre volume) is compulsory in any poultry farm. It is necessary to store vaccines and other medicines and also to manufacture ice cubes for carrying diluted vaccine ready for use.

3.4.6 Shovel and Raking Tool

Shovel (Fig. 3.27) used in agricultural operations is used in poultry farms for removal of manure. Raking tool (Fig. 3.28) helps in mixing the litter so that cake formation of the litter is prevented. If raking is not done regularly, droppings (faeces) from the bird will mix with the litter material resulting in cake formation. Hence, raking is done with a raking tool in order to keep the litter dry.



Fig. 3.27: Shovel



Fig. 3.28: Equipment for raking litter

3.4.7 Sprayers

Sprayers are used for disinfection of building, birds, men, material and surrounding areas, as and when required. Several types of sprayers are available in the market. But, sprayers which are hand-operated (Fig. 3.29) and can be carried on the back while in use is most ideal for a poultry farm. The desired disinfectant or sanitizer can be mixed and loaded on to the tank and sprayed as required.



Fig. 3.29: Sprayer

3.4.8 Sprinklers

Sprinklers are particularly important in hot weather areas. Commercial irrigation sprinklers (Fig. 3.30) can be used to cool not only the surroundings of the farm buildings but also the roof of the farm. However, under hot-humid conditions, sprinklers are used only to cool the roof during afternoon hours only.



Fig. 3.30: Sprinkler

3.4.9 Vaccinating Syringe

Unlike broilers, laying-type birds have to be given several vaccinations and some of them by injections. Therefore, automatic vaccinating equipment (Fig. 3.31) which loads a set volume of vaccine into the syringe is required to carry-out vaccination within a reasonable time.



Fig. 3.31: Automatic syringe

Note: Although it is ideal that needle is changed for every bird, it is not commercially practicable.

3.4.10 Vaccine Flask

This flask is similar to a thermos flask but, will have a wide mouth to help handle the ice cubes and vaccines easily. Its volume can be 1 to 2 litre.

3.4.11 Weighing Balance

A balance is a necessary requirement for weighing feed, birds at market etc. Now-a-days, balance with a digital display to the nearest gram is available at reasonable rates. If a farmer wishes to sell broilers on retail, a 5 kg or 1 kg balance is sufficient (Fig. 3.32). If birds are sold wholesale, a spring balance with a sensitivity of 100 or 25 g is desirable.



Fig. 3.32: Weighing Balance

3.4.12 Other Optional Equipments

In addition to the equipment described above, other equipment can also be purchased. However, these are not compulsory ones, but, they may be required under certain circumstances.

(a) Room heaters

In locations where extreme cold weather is expected, room heaters may have to be kept available so that they can be put on, especially during the night.

(b) Curtains

Under cold weather conditions, it may be necessary that the opening in the side walls may have to be closed. This is particularly necessary during the first 2 to 3 weeks of age when the chicks cannot regulate their body temperature efficiently. For such emergencies, curtains suiting the dimensions of the side walls have to be kept ready. Arrangement to close them and open in part or full by rolling down as the day progresses is also necessary (Fig. 3.33). Curtains will have to be cleaned, disinfected, folded properly and kept ready for the next use.



Fig. 3.33: Curtain

(c) Foggers

If very hot weather is expected, foggers to spray fine mist of water directly on to the face of the birds are needed. While fogging the birds, only face need to be made wet because only in that region, water can evaporate and provide cooling effect. Feathers are water-proof and hence, attempt to wet the feathers should not be made.

Check Your Progress 3

Note: a) Use the space given below for your answers.

b) Check your answers with those given at the end of the unit.

1) Describe the importance of blow lamp.

.....

2) Describe crate for poultry.

.....

3) What is the importance of fogger?

.....

Activity 3

Visit a nearby poultry farm (broiler or layer). Prepare a list of other equipments used in the farm along with their numbers and the purpose for which they are used.

.....

.....

3.5 FEEDER AND DRINKER SPACE REQUIREMENTS

Space required for eating and drinking differs depending on size of the bird. Bigger the bird, higher the feeder and drinker space required. Since different species of poultry differ in size, their requirements also differ with that of chicken.

3.5.1 Broilers and Layers

The feeder and drinker space requirements of broilers and layers are presented in Table 3.1.

Table 3.1: Feeder and Drinker Space Requirements of Broilers and Layers

Feeder Space			Drinker Space		
Age	Broilers	Layers	Age	Broilers	Layers
0-1 week	1.5	1.5	0-1 week	1.75	1.5
1-2 weeks	5.0	2.5	1-4 weeks	1.75	1.5
2-4 weeks	5.0	2.5	4-8 weeks	2.0	1.5
4-8 weeks	7.5	3.75	>8 weeks		2.0
>8 weeks		6.25	Adult		2.5
Adult		10.0			

Adapted from Wilson *et. al.* 1997

3.5.2 Other Species of Poultry

The feeder and drinker space requirements of other poultry species is presented in Table 3.2

Table 3.2: Feeder and Drinker Space Requirements of Other Poultry Species

Age	Turkey (large)	Duck	Geese	Age	Japanese Quail*
Feeder space (in linear cm/bird)					
0-1 week	3.0	5.0	5.0	0-2 weeks	2.0
1-2 weeks	6.25	5.0	6.25		
2-4 weeks	7.5	6.25	7.5	3-5 weeks	3.5
4-8 weeks	10.0	6.25	10.0	6-8 weeks	5.0
>8 weeks	12.5	7.5	12.5	> 8 weeks	7.0
Adult	15.0	12.5	15.0		
Drinker space (in linear cm/bird)					
0-1 week	2.5	1.75	1.75	Age	
1-4 weeks	2.5	1.75	2.5	0-2 weeks	1.0
4-8 weeks	2.5	1.75	2.5	3-5 weeks	2.0
>8 weeks	3.0	2.0	3.0	6-8 weeks	2.5
Adult	3.5	2.5	3.5	> 8 weeks	4.0

Adapted from Wilson *et. al.* 1997; * **Source:** Sreenivasaiah, 1998

3.6 LET US SUM UP

Several equipments are required in any poultry farm; for example, brooders to give warmth to chicks, brooder guard, feeders, drinkers, refrigerator, vaccinating

equipment, weighing balance, crates etc. In addition to these, in a layer farm, beak-trimmer (Debeaker), egg filler flats, cages and nipple drinkers are necessary. The number of equipments required can be calculated by knowing the number and type of birds in the poultry farm and their respective feeder and drinker space requirement, as the case may be. Feeder or drinker space available from a linear type of feeder or drinker is calculated considering length available on both sides of the equipment. In case of circular (hanging) feeder or drinker, more birds can stand at a time radially and therefore, after calculating number of birds that can stand around the feeder or drinker, 30% is added. As a rule of thumb, feeder space required is about the width at shoulders and drinker space required is about the width of the head of the bird.

3.7 GLOSSARY

Ballast	: Weight attached at the bottom of the drinkers.
Bell Drinker	: Equipment in shape of a bell to offer water to the birds.
Blow-lamp	: Small hand-operated equipment running on kerosene (or gas) to blow the cleaned areas with flame to get rid of external parasites and their eggs/larvae.
Brooder	: Equipment used to provide warmth to the chicks.
Canopy	: Umbrella-like.
Crate	: Box-like equipment made of metal or plastic meshwork which is used to hold and carry birds.
Debeaker	: Equipment used to trim the beaks of birds; works on electricity.
Fogger	: Fogger produces a fine mist of water; can be used on birds during hot weather.
Linear	: Straight or long.

3.8 SUGGESTED FURTHER READING

Ensminger, M.B. 1993. *Poultry Science*, 3rd Edition. International Book Distributing Co., Lucknow, India.

North, M.O. and Bell, D.D. 1990. *Commercial Chicken Production Manual*. AVI Publication, Van Nostrand Reinhold, New York, USA.

Sreenivasaiah, P.V. 2006. *Scientific Poultry Production*, 3rd Edition. International Book Distributing Company, Lucknow, India.

3.9 REFERENCES

Sreenivasaiah, P.V. and Venugopal, S. 2008. *Small-Scale Broiler Production*. International Book Distributing Company, Lucknow, India.

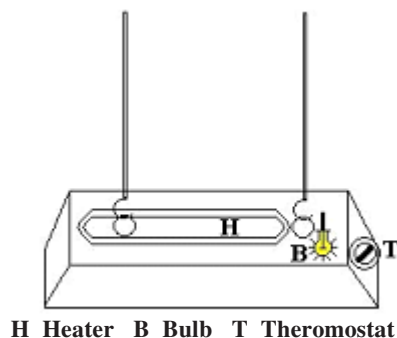
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3.10 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

- 1) Different types of brooders are:
 - a) Canopy brooder
 - b) Reflector brooder
 - c) Infra-red bulb brooder
- 2) Reflector brooder is rectangular in shape with hooks to mount it wherever required. It consists of an electrical heating element (usually 1.25 kW) canopied (capped) with a reflecting surface. It also has a bulb point to fix an electric bulb and a thermostat for regulating temperature.



- 3) A brooder guard, guards the chicks from straying too far away from the heat source. Brooder guard is necessary because day-old chicks are not aware of feed, water etc. especially during the beginning because, in Nature, the hen takes care of their needs. Therefore, they have a tendency to look for corners, which will be usually dark, and huddle. This leads to starvation, thirst and finally death.
- 4) Linear and circular feeders; fountain and bell drinkers are available in the market.

Check Your Progress 2

- 1) As the name suggests, these drinkers look like a nipple and water drops come out when they are pressed. They can be used for all types and classes of birds; but very commonly used in laying cages. These are fixed to the laying cage at 5 cm above the head of the layer so that the hen can easily peck at the nipple. One nipple drinker in each cage housing 3 layers is sufficient and ordinarily, they will be installed by the supplier of the cage itself. The nipples are very much important when the daily cleaning of the channel, overflowing of channels occasionally (causing problems of humidity, ammonia, fly and smell problems) and occasional empty channels (leading to thirst and reduced performance) become problematic.
- 2) Any rectangular trays with depressions to suit eggs in the market place where you buy eggs are called "Egg filler flats". Each of them can hold 30 eggs. It can be made of plastic or paper pulp. Plastic ones are common because they are durable and easy to clean and disinfect. However, pulp trays reduce breakage of eggs during transportation and are environment-friendly. Eggs are directly collected in such filler flats.
- 3) Candler is used to get an idea about the internal quality of eggs without breaking. This equipment produces a beam of light.

- 1) Blow-lamp is very useful equipment and it generally works on kerosene (or gas). It is used to flame metal frames to rid the building from external parasites and/or their eggs/larvae etc. It can also be used on equipment made of GI. In either case, after cleaning and disinfection, blow-lamp can be used on the area.
- 2) Crates are box-like structures made of meshwork used for transportation of birds. Recently, impact resistant plastic is used for crates so that it will be light in weight, durable, easy to handle, clean and disinfect. The possibility of injury to the birds while loading birds into the crates, transportation and unloading. The base of the crates will be of meshwork 2.5 cm × 2.5 cm so that the birds can be comfortable while on it. All sides will be of meshwork 7.5 cm × 7.5 cm so that good ventilation is possible. An opening (30 cm × 30 cm) with a lid is provided on the top to help loading and unloading. A crate of dimensions 90 cm × 45 cm and of height 30 cm can easily accommodate 10 to 15 broilers depending on body weight.
- 3) The foggers are used to spray fine mist of water directly on to the face of the birds are needed, when the hot weather is expected. While fogging the birds, only face need be made wet because only in that region, water can evaporate and provide cooling effect; feathers are water-proof and hence, attempt to wet the feathers should not be made.