

## 7. POULTRY MANAGEMENT

### Can you recall ?

What do you mean by broilers and layers?



The management practices for commercial layers and broilers are different, but breeder management in both the cases remains the same to a considerable extent as maximizing the chick production is the ultimate object. Poultry management usually refers to the husbandry practices to maximize the efficiency of production by satisfying the basic needs of the birds. However, the success would depend on the judicious implementation of practices combined with personal discretion and experience.

### Do you know ?

Good management means the judicious combination of all the available resources and their proper utilization to earn maximum return on the total cost invested on poultry farm.



### 7.1 Hatchery Management

Hatching is production of baby chicks from fertile eggs. In early days, eggs were hatched by placing them under broody hens but only 10 to 12 eggs can be put under one hen. At present incubators are used for large scale chick production. Incubators can hatch several thousand eggs at a time.

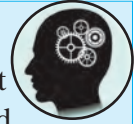
#### 7.1.1 Selection of hatching eggs

1. Select eggs from young flock.
2. Extremely large or very small size or abnormal eggs are avoided
3. Eggs having dirty, poor texture and thin shells should not be selected

4. Eggs stored for long time should not be selected.

### Remember...

Soiled or dirty eggs should not be used for hatching and if used should be first cleaned with a dry cloth or polish paper.



#### 7.1.2 Storage and sanitation of hatching eggs

### Can you think ?

Why eggs are stored with broad end up hatch better?



Embryonic development starts by the time the fertile eggs are laid. The fertile eggs therefore should be collected as frequently as possible, fumigated and stored in a cool place. Temperature for holding fertile eggs before incubation varies from 50-70°F. Better results are obtained with 60°F when eggs are stored for 7 days or less and with 50°F when stored for more days. Relative humidity of storage chamber should be maintained at 70 to 80%.

### Do you know ?

Duration of storage after a week is inversely proportional to per cent hatchability.



#### 7.1.3 Incubation

For better hatch and healthy chicks, the machines should be neat, clean, free from microbial load and should function properly. The practice of cleaning, disinfection and fumigation of eggs before storing and after transfer of eggs to the machine also reduces the incidence and spread of diseases. Incubation period of chicken egg is 21 days.

For successful incubation, optimum and uniform temperature, humidity, gaseous environment and turning of eggs are very essential. The details are given below

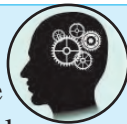
Sr. No.	Particulars	Setter	Hatcher
1	Incubation period	1 to 18 days	19 to 21 days
2	Temperature	99.5 <sup>o</sup> to 100 <sup>o</sup> F	98 <sup>o</sup> F
3	Relative humidity	60%	70 to 80%
4	Turning	8 times / day	--

Abnormal temperature conditions over a long period adversely affect the hatchability by increasing the embryonic mortality, weak and deformed chicks. Due to uncertainty in electric supply, use of a standby generator is advocated. Moisture content of the incubator affects hatchability. The relative humidity should be optimum for better hatchability.

Developing embryos require oxygen for their metabolism. Since ordinary air which contains about 21% of oxygen is sufficient, flow of fresh air into the incubator should be ensured. Eggs are loaded into the incubator with broad end up. Entry to the hatchery complex should be restricted as far as possible.

### Remember...

Fumigation is usually done with formaldehyde gas using 40 ml of 40% commercial formalin and 20 gm of potassium permanganate for each 2.8 cubic meter of space inside the machine.



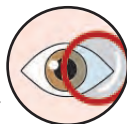
### 7.1.4 Candling of eggs

Viewing through egg by holding it in front of source of light in a dark room is called candling.

The eggs are candled from fifth to seventh days of incubation to remove infertile eggs and on the 18<sup>th</sup> day to remove dead ones.

### Observe and Record...

In most commercial hatcheries, candling is done on 18<sup>th</sup> day of incubation i.e. at the time of transfer of eggs to hatcher.



Eggs are classified as follows on the basis of candling

**a. Infertile :** Clear and transparent,

**b. Fertile :** Radish brown web like developing embryo on 7<sup>th</sup> day and on 18<sup>th</sup> day egg appear opaque

**c. Dead in germ (0 to 10 days of incubation):** Eggs with slight opacity, brownish, black in colour but no movement translucent

**d. Dead in shell (11 to 21 days) :** Dark shadow of embryo with no movement



**Fig.7.1: Candling of eggs**

### 7.1.5 Sexing of chicks

Sexing of day old chicks is the most common practice with hatcheries dealing with egg type chickens.

There are two methods of sexing of chicks.

- 1. Japanese or Vent method :** It is commonly used method. It involves the identification of rudimentary copulatory organ in the cloaca of male chicks. Since the structure is very small at day old stage, it requires a considerable skill and experience.

### Do you know ?



Vent sexing method is used on commercial basis.

- Sex linked character/auto sexing:** Sexing can also be done with the help of sex linked characters such as rapid and slow feathering, barring and non-barring. For example when a Rhode Island Red male is mated to barred Plymouth Rock female, all the female progeny will be black and male progeny barred.

### 7.2 Rearing of chicks

Management of the farm is necessary, not only when chicks are kept but before bringing them is also very important. All in all out and multiple brooding are the two types of system of poultry farming.

#### Remember...



All in all out system is important because there is no chance of spreading infection from one flock to other flock.

After selling the birds and bringing the new batch of chicks to the farm, following important procedure should be followed for preparation of shed.

- Collect all the litter material from the house and transport to the manure pit located away from the farm.
- Scrap the floor and walls of house to remove all the waste materials present in it.
- Wash the floor, walls and roof of the house with suitable sanitizer solution.
- All metal windows should be blow lamped.
- Clean the area of approximate 1-2 meters around the house.
- The entire house should be white washed.
- Poultry house and all equipments should be cleaned, disinfected and fumigated.

- Brooding / lighting arrangement of the brooder house should be made at least 24 hours before arrival of the chicks.
- Temperature of the chick house should be maintained before the arrival of the chicks.
- Chick should be procured from good hatcheries.

### Chick Management

It is also known as brooding management. The chicks are transferred to a “brooder house” immediately after hatching and reared up to 6 to 8 weeks of age.

### Do you know ?



Chicks cannot maintain their body temperature due to under development of thermoregulatory system.

There are two general systems of brooding.

- Natural brooding
- Artificial brooding

**A. Natural brooding :** Requisites for natural brooding are as follows

- Deshi / broody hen
- Number of chicks: 10 to 15 per hen.
- Coop box / basket with soft clean litter

#### Advantages :

- Reduces lot of responsibilities of owner as hen takes care of chicks.
- Suitable for small number of chicks.

#### Disadvantages :

Not suitable for commercial scale.

#### B. Artificial brooding



Fig. 7.2 : Brooding

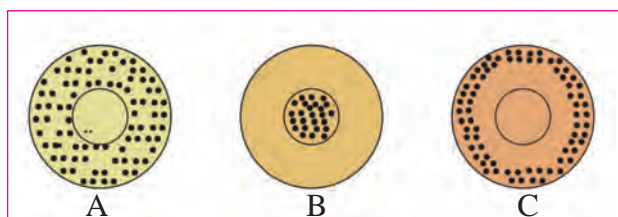
Requisites for artificial brooding are as follows

**1. Optimum temperature :** The optimum temperature for chicks in brooder is 95°F. The effect of optimum, low and high temperature in brooder (Fig. 7.3) is as follows.

**a. Optimum temperature :** Chicks evenly spread out under the brooder.

**b. Low temperature :** Chicks huddling together in center under the brooder.

**c. High temperature :** Chicks are found at the edge / away from the centre.



A: Optimum temperature B: Low temperature  
C: High temperature

**Fig. 7.3 : Distribution of chicks under the brooders at various temperature**

Age-wise temperature requirement in brooder is as follows

Sr. No.	Week	Temperature
1	First	95°F
2	Second	90°F
3	Third	85°F
4	Fourth	80°F

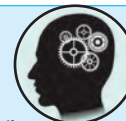
**2. Ventilation :** Brooder house should be well ventilated so as to remove dust, moisture from environment to prevent respiratory diseases.

**3. Sanitation and hygiene :** Brooder house should be thoroughly cleaned, scrubbed and disinfected using half kg chlorinated lime (with 30% available chlorine) in 13-14 litre of water before housing the chicks.

**4. Litter :** Use 5 cm thick layer of suitable litter like saw dust, paddy husk, chaffed straw etc. and stir the litter at frequent interval to prevent formation of cake.

### Remember...

- Never use mouldy material
- Wet litter be replaced by dry litter
- Moisture in litter should not exceed 25%
- Avoid reuse of old litter



**5. Chick guard :** They are placed at about 60 to 90 cm from the edge of the brooder. The distance is adjusted with the age of chicks and normally removed after 4-5 weeks of age.

**6. Floor, feeder and waterer space :** Floor space 0.5 sq.ft. should be provided per chick to start with and increased by 0.5 sq.ft. after 4 weeks until the pullets are about 7 weeks of age. Feeder space required during 0 to 4 weeks and 4 to 7 weeks is 1 and 2 inches, respectively. Whereas watering space required during first 8 weeks is 0.5 inches. Arrange sufficient number of feeder and waterers alternatively in the shed.

**7. Feeding of chicks :** After bringing the chicks, give them crushed maize on the paper for 24 hrs and then offer feed. Chicks should be fed chick crumb/mash up to age of 8 weeks.

**8. Protection from diseases :** Chicks are in stress due to transportation, so provide them water with electrolyte on 1<sup>st</sup> day and from second day onwards give antibiotics along with vitamin supplements (A, D<sub>3</sub>, E and C) for 5 days.

### Do you know ?

The golden rule that “prevention is better than cure” is appropriate to poultry than any other species of livestock.

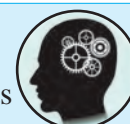


### i. Vaccination

Vaccinate chicks against Marek's, Ranikhet disease, Gumboro disease and fowl pox at appropriate age as per table 7.3.

### Remember...

Quality of water and its cleanliness has an important bearing on the efficiency of the vaccine.



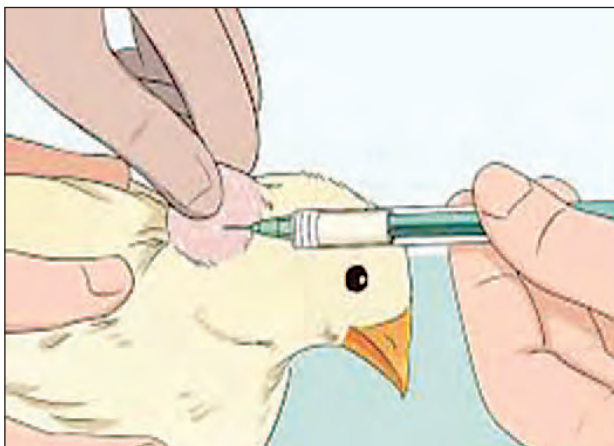
ii. **Removal of sick chicks** : Chicks looking dull, droopy, isolated or sick be removed.

iii. **Disposal of dead chicks** : Always dispose off dead chicks promptly either by burning or burying.

iv. **Visitors** : Prohibit the entrance of visitor to brooder and rearing house because visitors may carry germs along with clothes, feet, shoes, hands etc. Their feet / shoes must be disinfected by dipping in foot bath or spraying of disinfectant solution before they enter the farm.



**Fig. 7.4 : Vaccination eye-drop method**



**Fig. 7.5 : Vaccination by subcutaneous method**

**9. Debeaking** : With the help of debeaker, upper beak is cut one half and lower beak is cut one third. First debeaking also known as touching is done in chicks at the age of 10-11 days and second debeaking at the age of 11 to 12 weeks.

### **Do you know ?**



Debeaking is must to reduce cannibalism and feed wastage in layer bird.



**Fig. 7.6 : Debeaking of chick**



**Fig. 7.7 : Debeaked bird**

### **7.3 Grower/Pullet management**

Grower management includes care of pullets from 8 to 20 weeks age.

The technical standards for pullets during growing stage are as below.

1. Average weight of pullet at 20 weeks should be 1.2 kg.
2. Maximum feed consumption per pullet should be 6.5 to 7 kg.
3. Maximum depletion during growing should be 5% including sexing error and culling.

## Following care is essential in management of pullet

1. Judicious lighting programme to attain proper sexual maturity at proper age.
2. Separation of cockerels as soon as they are recognized.
3. Provide enough and clean space to avoid overcrowding in the house.
4. Provide fresh, clean, balanced ration and enough clean water.
5. Debeaking should be done at 11 weeks of age.
6. Deworm the pullets before transferring to layer house.
7. Follow proper vaccination programme.
8. **Culling** : Underdeveloped, weak, disabled and sick pullets must be removed during growing period.

### Do you know ?

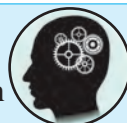
Testing of breeders for salmonellosis is carried out at 16 weeks of age.



9. Transfer pullets to laying house (housing) at 18 weeks of age at one time.

### Remember...

Pullets must be given electrolytes and vitamins in water to overcome stress of handling during transfer to laying house.



### Do you know ?

Management of breeder male is similar to layer management except that male breeders diet contains extra selenium and vitamin E to ensure proper fertility and hatchability.



## 7.4 Layer Management

The flock transferred from grower to

layer house at 18 to 20 weeks of age. Layer is defined as egg laying female chicken up to one year. In breeding flocks male should be placed in the laying quarters 1 to 2 days prior to house the females if they were grown separately.

**7.4.1 Housing :** In India open sided poultry houses are very popular except in very cold areas. California cage system is comfortable and profitable for grower and layer birds.

Appropriate distance should be kept in between two houses to allow proper ventilation and prevent disease transmission. Floor space, feeder space and water space should be provided as per recommendation. One nest is enough for 20-25 layers.

**7.4.2 Lighting :** Lighting should be increased gradually till it reaches 16-17 hours per day and maintained at that level thereafter. One tube light with a reflector hung 2.1 m above the floor would provide the recommended intensity of light for every square meter of floor space. The duration of the light should not be decreased during the laying period. The artificial light hours should be provided both during morning and evening, particularly in summer.

### Can you think ?

Why artificial light should be provided to layer ?



## 7.4.3 Culling of poultry

Removal of non producer and uneconomical birds from the flock is called culling. The culling of the birds is done with following objectives

1. To increase or maintain good efficiency of the flock.
2. To reduce cost on maintenance of flock.
3. To increase the profit from the flock.

Poultry farmer may start with a good stock but invariably there will be some birds, which do not grow well, or hens which do not lay well. Such birds reduce the efficiency of the flock and also increase the cost of maintenance of the flock. Therefore culling of poor layers or non

layers is very important and should be a regular process throughout the year.

The distinguishing features of layers and



**Fig. 7.8 : Good Layer**



**Fig. 7.9 : Poor Layer (Cull bird)**

non layers, good layers and poor layers are given in the Table 7.1 and 7.2 respectively.

**7.4.4 Stress:** Factors such as vaccination, debeaking, improper and restricted feed, medication, climatic change and shifting induce stress on birds. This result in drop in egg production, poor growth and increased susceptibility to disease. Vitamins and

**Table 7.1 : Characteristics for distinguishing layers from non-layers**

Sr. no.	Character	Laying hen	Non laying hen
1	Comb	Large, bright, red, fully expanded	Small, pale with white scale
2	Wattles	Large, prominent	Small, contracted
3	Eyes	Bright, prominent	Dull
4	Vent	Large, oval, moist and bleached	Small, yellow, dry
5	Pubic bones spread	More than 2 fingers	Less than 2 fingers
6	Beak	Faded at the base	Yellow at the base
7	Pelvic bones	Flexible, wide open	Stiff, close together
8	Spread of body capacity	3 to 5 fingers	Less than 2 fingers

**Table 7.2 : Differences between good layers and poor layer**

Sr. no.	Character	Good layer	Poor layer
1	Eye	Bright, prominent	Dull
2	Ear lobes	Bleached	Yellow
3	Shank	Bleached, thin and flat	Yellowish, round, full
4	Beak	Bleached	Yellow
5	Plumage	Dry, old, brittle, soiled	New bright / clean
6	Time of moulting	Late	Early
7	Vent	Bleached, large oval and moist	Yellow, round, small

electrolytes should be given to prevent stress.

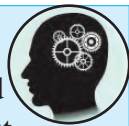
**7.4.5 Medication and vaccination :** The birds should be thoroughly checked daily for any abnormal behaviour and prompt attention should be given to diagnosis and control of the diseases. Routine prophylactic medication should be given in layer flock for control of salmonella and coccidiosis. Vaccination schedule should be followed as per Table No. 7.3

**Table 7.3 : Vaccination schedule for layers**

Sr. No.	Disease	Vaccine	Age (day)	Administration dose / route
1	Marek's disease	HVT vaccine	Day old	0.2 ml s/c (hatchery)
2	Ranikhet disease	F-1/ LaSota / B-1	5-7	1 drop in eye / nostril
3	Gumboro disease	Georgia / Intermediate (live)	14-15	1 drop in eye / nostril
4	Infectious Bronchitis (IB)	IB live massachusetts strain	20-21	1 drop in eye / nostril
5	Gumboro disease	Georgia / Intermediate (live) (booster)	24-25	1 drop in eye / nostril or drinking water
6	Ranikhet disease	LaSota booster	29-30	drinking water
7	Fowl pox	Fowl pox	6 weeks	wing web prick/ intramuscular
8	Ranikhet disease	R <sub>2</sub> B (Mukteshwar)	8 weeks	0.5 ml S/C or I/M
9	Infectious Bronchitis (IB)	IB live Massachusetts	12 weeks	Drinking water
10	Gumboro disease	Gumboro (killed)	16 weeks	0.5 ml S/C
11	Ranikhet disease	Ranikhet (Killed)	18 weeks	1.5ml S/C

**Remember...**

Breeder stock should be routinely tested against salmonellosis and all the positive birds should be destroyed and not used for breeding.



**Hen day production**

$$= \frac{\text{Total no. of eggs laid on that day}}{\text{Actual no. of hen on that day}} \times 100$$

**7.4.6 Hen day production :** A hen day average is obtained by dividing the number of eggs laid during a given period by the average number of

birds on hand during the same period. The hen day average is usually determined on monthly basis.

Hen house egg production

$$= \frac{\text{Total number of egg produced in a year}}{\text{No. of birds housed in the beginning of the year}}$$

**7.4.7 Hen house egg production :** It is obtained

### Internet my friend

Search Breeds/strains of broilers and layers



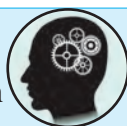
by dividing the total number of eggs produced during a given period by the number of birds housed at the beginning (housing) of the period. The hen-housed egg production is usually obtained on yearly basis. This method indicates income potential from a flock.

## 7.5 Broiler Management

Broiler is defined as young chicken aged about 6 weeks raised only for meat purpose from a hybrid strain.

### Remember...

Broiler grows from a hatch weight of around 35-40 gm to a weight of about 2.0 to 2.2 kg in around six weeks.



Broiler production is rapidly increasing year after year as evidenced by increased production of broilers. Success of broiler production rests primarily on the efficient implementation of scientific management programme followed by sound marketing system.

## 7.5.1 Systems of broiler production

### Do you know ?

All in all out system is profitable for broiler farming.



There are two systems of broiler production

1. **All in all out system :** This is most practical program for broiler rearing in which only one age group of broilers is on the farm at the same time. All the chicks are started on the same day and later sold on the same day, after which there is a

period when no birds are in the premises. The lack of birds breaks any cycle of an infectious disease.

2. **Multiple brooding :** Although it has been more profitable to keep one age group of broilers on the farm, recent advances in isolation and disease control have made it possible to keep chicks of several ages on the same farm.

## 7.5.2 Contract broiler farming

The production of broiler on a contract basis has gained an important foothold in the industry during the past few years as the result of an increased amount of integration. Under such contracts, the producer furnishes the building, equipments, labour and litter material, while the integrator provides chicks, feed, medicine, vaccine along with the necessary supervision.

In this farming the integrator pays the producer a contracted price based on the live weight produced. A contract of this type offers the bonus to producer for decreasing the cost of production and fine for increasing cost of production.

## 7.5.3 Chick quality for broiler production

- i. Chicks should be from healthy parents.
- ii. Uniform size and weight : Average weight of 100 chicks should be between 3.8 to 4.0 kg.
- iii. Chicks should be alert, active and free from deformities.

## 7.5.4 Housing for broilers

Deep litter system of housing is suitable for broilers. Artificial brooding, ventilation, litter management, sanitation and hygiene

### Remember...

Ideal environmental conditions for rearing broilers

- Temperature - 22-30 °C (70-85 °F)
- Relative Humidity – 30-60%
- Ammonia level - less than 25 ppm
- Air flow - 10-30 meter/minute
- Litter moisture- 15-25 %



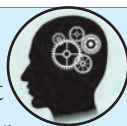
is discussed in detail in chick management. Management is almost same as chicks, except space, feed and water requirement due to faster growth rate. Floor, feeder and waterer space requirement are 0.5 to 1.2 sq.ft., 2-3.5" and 0.5-1" respectively depending upon the age.

### 7.5.5 General broiler management

1. Check electrical equipment and thermometer.
2. Day before chicks arrive, turn brooders to maintain 95°F temperature.
3. Use chick guard of 18" height and place it 24" away from brooder.
4. Keep crush maize in trays.
5. Place waterer between feed trays.
6. Give electrolyte and vitamin A, D<sub>3</sub>, E and K on first day along with crushed maize.

#### Remember...

The mortality should not exceed 5 % for profitable broiler production.



7. After 24 hours, provide and vitamins through water and broiler pre starter up to 1<sup>st</sup> week followed by starter ration up to 21 days and finisher onward up to sale.

#### Do you know ?

Coccidiosis and chronic respiratory diseases are causing major economic loss in broiler farming.



8. Provide fresh, clean and cool drinking water.

### 7.5.6 Disease control and vaccination

1. Keep the litter dry to prevent coccidiosis.
2. Use coccidiostats in feed
3. Always use prophylactic medication against salmonellosis, colibacillosis and chronic respiratory disease.

#### Do you know ?

The recommended feed conversion ratio is 1.6 -1.7 to attain 2.0-2.2 Kg body weight.



4. Follow vaccination schedule strictly.

### 7.5.7 Weight and feed conversion ratio

Broilers are efficient converters of feed into meat. They convert maximum feed into meat within minimum period.

Important parameters to be considered in broiler business are

1. Weekly live weight
2. Weekly feed consumption
3. Cumulative feed consumption
4. Weekly feed conversion ratio
5. Cumulative feed conversion ratio

The feed conversion ratio is calculated as follows

Feed conversion ratio is very important factor in cost of production. The data given in the Table 7.5 represent approximate average

**Table 7.4 : Vaccination schedule for broilers**

Sr. No.	Disease	Vaccine	Age (days)	Administration dose and route
1	Mareks disease	HVT vaccine	Day old	0.2 ml SC (at hatchery)
2	Ranikhet disease	LaSota/F-1/ B-1	5 - 7	1 drop in each eye/ nostril
3	Gumboro disease	Georgia/ intermediate (live)	14 -15	1 drop in each eye/ nostril
4	Gumboro disease	Georgia/ intermediate (live)	24 - 25	1 drop in each eye/ nostril or Drinking water
5	Ranikhet disease	LaSota / F-1 (Booster)	29 - 30	Drinking water

**Table 7.5 : Live weight, feed consumption and FCR of broilers**

Sr. No.	Age of broiler (days)	Live weight (g)	Cumulative feed consumption (g)	Cumulative FCR (pellet feed)
1	7	190	180	0.95
2	14	450	540	1.20
3	21	850	1115	1.31
4	28	1400	1975	1.41
5	35	1980	3050	1.54
6	42	2620	4407	1.68

$$\text{Feed conversion ratio (FCR)} = \frac{\text{Total feed consumption (kg)}}{\text{Gain in weight (kg)}}$$

performance for good flocks. There may be variation due to management, season, feed, strain etc.

**7.6. Management of poultry according to season**

**7.6.1 Summer management :** Intensive rearing of poultry requires immediate and special attention and care during heat stress in summer months. Heat stress can inflict heavy losses by causing almost a total reduction in egg production and weight gain. High yielding birds are highly susceptible to high temperature followed by high humidity.

Effect of high environment temperature

**A. Rising temperature decreases**

1. Feed intake
2. Egg production
3. Weight gain
4. Thyroid size and activity
5. Blood calcium level

**B. Rising temperature increase**

1. Panting
2. Mortality
3. Feed conversion ratio
4. Water consumption
5. Respiration rate
6. Body temperature

**7. Stress**

**Following programme can be used at high temperature to make the birds more comfortable**

1. Adequate floor space and no over-crowding
2. Give cool fresh water.
3. Increase the waterer space.
4. Give fresh food during the morning and evening cool hours.
5. Avoid feeding in between 12 AM to 4 PM
6. Insulate the ceiling.
7. Increase ventilation by providing fans.
8. Use foggers.
9. Sprinkle the roof -run sprinklers intermittently.
10. Wet the area outside and around the house.
11. Use vitamin supplement A D3 E K, Vit C and electrolyte powder.
12. Increase protein level and decrease energy content in the feed to maintain protein intake.



**Fig. 7.10 : Panting of birds in heat stress**



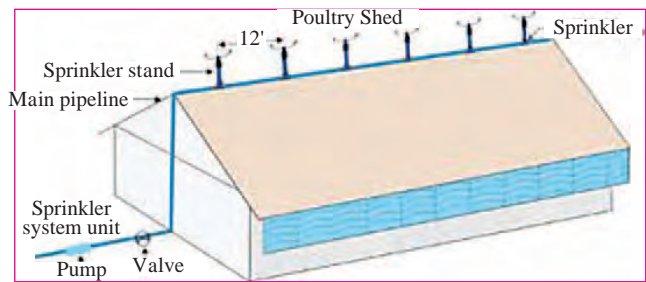
**Fig. 7.11 : Fogger system**

13. Painting the roof with white colour or thatching roof to reflect the heat to reduce the temperature.

### 7.6.2 Monsoon management

Management during rainy season is equally important as in summer season. Extreme humidity coupled with draft or rain predisposes to several diseases specially respiratory diseases causing severe stress on the bird leading to lowered egg production, weight gain and mortality. Therefore, it is important that birds should be made comfortable by adopting following management practices.

1. Check up the leakages in the roofs and repair.



**Fig. 7.12 : Sprinkler system (Sketch)**

2. Depth of the litter be increased.
3. Litter should be stirred well thrice a week or alternate days.
4. In order to keep the litter dry, sprinkle 2-3 Kg of dry lime per 100Sq.ft. floor area.
5. Control flies by spraying dry lime, Sumithion or Malathion spray on the droppings once in a week.
6. Deworming should be done once in two months.
7. Avoid mould formation inside the feed bag during monsoon by keeping the feed neat, clean and feed bags on a dry high level platform.
8. It is better to get litter material and store it prior to monsoon.

## Exercises

### Q. 1. Fill in the blanks

1. Eggs should be turned at least ---- times per day to get maximum hatchability
2. Fumigation is usually done with formaldehyde gas using -----
3. Incubation period of chicken egg is ---- days
4. Candling is done on ----- day of incubation in commercial hatchery.
5. Optimum temperature and relative humidity in setter is -----and -----, respectively
6. In deep litter system moisture in litter should not exceed ----- %
7. Layer bird should be provided ---- hours light per day for better egg production.
8. Optimum temperature and relative humidity in hatcher is ----- and -----, respectively.

9. Hatching egg should be stored at ---  
----- °F temperature and ----- %  
relative humidity for better results.
10. In first week optimum temperature in  
brooding should be ----- °F.

**Q. 2. Answer the following questions in brief.**

1. How to select hatching eggs?
2. Write short note on candling?
3. Enlist the technical standards for  
pullets during rearing stage.
4. Write types of brooding with  
advantages and disadvantages of  
natural brooding.
5. Write brief note on systems of broiler  
production.
6. Give vaccination schedule for broilers.

7. Give table showing age wise  
temperature requirement of chick  
during brooding.
8. How to calculate hen house egg  
production?
9. Why culling is necessary in layers  
management?
10. Write short note on contract broiler  
farming.

**Q. 3. Answer the following questions in detail.**

1. Write in detail the chick management.
2. Describe in detail broiler management.
3. Explain in detail layer management.
4. Write in detail the vaccination  
schedule for layers.
5. Discuss in detail about summer  
management.

