POULTRY

INTRODUCTION TO POULTRY :

- The term poultry is applied to the rearing of a wide variety of several species of birds *viz* chickens, turkeys, ducks, geese, guinea fowls, pigeons, pea fowls, quails, pheasants and emus.
- In India it is mainly related to the birds like chickens and ducks.

1. Need for poultry farming and its advantages

1. In comparison with rearing or raising of other livestock poultry requires minimum investment to start with
2. The return is rapid as chickens start laying eggs from 6 months of age and broilers are marketed at the age of 8^{th} to 10^{th} week.
3. Feed consumption is low. Poultry birds consume 1.9 kg feed to convert feed into 1.0 kg of protein.
4. Poultry farming provides a continuous source of income. It requires small space.
5. The biological value and protein efficiency ratios are high for poultry products.
6. Poultry farming offers full time employment as well as part time employment.
7. Poultry buildup litter is a fertiliser containing 3% nitrogen, 2% phosphorus and 2% potash.

2. Poultry development in India :

- The first poultry farm in India was established in **Utter Pradesh** by a Christian mission in 1912. By 1957, it was spread all over India.
- Indiaranks fifth in the world egg production. Andhra Pradesh ranks first among the Indian states in poultry.
- Per capita consumption of egg in India is 20 in a year and is relatively low when compared to Denmark (400), USA (340) and the UK (250).
- Central Poultry Breeding Farms at Mumbai, Bhubaneswar and Hasserghata developed hybrid strains in layers.
- Indian Veterinary Research Institute, **(IVRI),** Izatnagar developed the fast growing broiler strains, National Egg Coordination Committee, **(NECC)** formed in 1981 by the poultry farmers, monitors the market for poultry products in India.
- IVRI produces the poultry vaccines. National Agricultural Bank for Agriculture and Rural Development, **(NABARD)** provides financial assistance for poultry farming.
- **Padmasri Dr. B.V. Rao** is the legendary person who strived for the growth of poultry in India.

3. Classes and breeds of chicken :

- Fowls are classified into three types-meat type, egg type and dual-purpose type.
- These birds are identified as classes and breeds. Class is a group of breeds, which has been evolved in certain geographical area.
- The classes are American, Asiatic, English and Mediterranean. Where as breed is an established group of birds having similar general body shape and other characteristics.

1. American Class :

The breeds are **Rhode Island Red** (meat bird), **Plymouth Rock** (dual-purpose bird), New **Hampshire** (dual-purpose bird) and **Wyandotte** (dual-purpose bird)

2. Asiatic Class :

The breeds are **Brahma** (meat bird) and **Cochin** (meat bird)

3. English Class :

The breeds are **Sussex** (meat bird), Australorp (dual-purpose bird), **Cornish** (meat bird).

4. Mediterranean :

The breeds are **White Leg horn** (efficient egg bird), **Minorca** (egg bird) and **Ancona** (egg bird)

4. Foundation stocks and hybrids :

- Hybrids are produced by crossing the foundation stocks. Hybrids of layer birds are produced by crossing dam (female bird) of White Leg Horn to sire (male bird) of Rhode Island Red.
- **Babcock, Hyline** and **Hisex** are the hybrid layers used in India. Broiler hybrids are produced by crossing dams of Plymouth Rock or New Hampshire to sire of Cornish breed.
- **Vencobb, Ross** and **Hubbard** are the popular hybrid broilers raised in India.

5. Nutritional values of poultry products :

i) Food value of egg:

Each 100 gram of egg contains 173 K cal of energy, 13.3% protein, 11.5 % fat, 173 k.cal energy, 27 mg calcium and 102 mg of phosphorus.

Eggs also contain vitamin A, D and riboflavin.

ii) Food value of meat of chicken (broiler bird):

Each 100 gram of chicken flesh contains 20% protein, 2.5% fat, 109 k.cal. energy, 14 mg calcium and 200 mg phosphorus.

iii) Biological value (B.V): It is defined as the percent of the nitrogen retained by the body maintenance and growth. It is calculated from nitrogen uptake and nitrogen last, as nitrogen is the integral component of proteins.

BV = $\frac{\text{Retained nitrogen}}{\text{Absorbed nitrogen}} \times 100$ where

Retained nitrogen = Nitrogen intake – N_2 lost in faeces & N_2 lost through urine

Absorbed nitrogen = Nitrogen intake – N_2 lost through faeces.

iv) Protein efficiency ratio (PER): It is measure used to evaluate the amount of protein utilized in the growth. It can be estimated based on the weight gained by a growing animal divided protein absorbed.

PER = $\frac{\text{Weight gain}}{\text{intake protein}}$

Food	Biological Value	Protein Efficiency Ratio
Egg	94%	3.9
Milk	84%	3.1
Fish	76%	3.5
Meat	74%	2.3
Rice	68%	2.2
Wheat	65%	1.5

6. Terminology related to the management in poultry:

i) Debeaking: Clipping of 1/3rd of upper beak in poultry birds is called debeaking. 1st debeaking is advised on 10th day and the second debeaking at the age of 13^{tb} or 14th week.

- Debeaking prevents the pecking of birds one another and the wastage of food by birds.
- **ii) Cannibalism (pecking):** Cannibalism results from continued pecking of the exposed cloaca of a bird by the other bird in a flock. It is also called **vent pecking.** The cloaca and portions of the intestine may be eaten. Protein deficiency, high-energy diet, overcrowding, insufficient housing equipment, hereditary factors etc. are some of the reasons for cannibalism. Feather packing and egg pecking are the other bad practices by a bird.

iii) Dubbing: Pruning of combs and wattles in the poultry birds is called dubbing.

iv). Broodiness: The instinct of the female animal to brood the eggs is called broodiness. Hens do not lay the eggs during this period.

- This can be prevented by separating such birds from the flock and injecting the estrogens hormones.

v) Prolapse: Falling down of uterus containing eggs is called prolapse. Some times the entire oviduct can be seen as red mass. Diet containing more fat and less fibre, and the oversize of eggs are responsible for the prolapse.

vi) Culling: The removal of unproductive, cannibalistic and sick birds from the flock is called culling.

vii) Deworming: Treating the sick birds for the expulsion of intestinal parasites is called **deworming.**

- **1st deworming** is necessary at 8th week, second at 16^{tb} to 17th week and for every 8 weeks then onwards.

POULTRY FARMING :

- Poultry farming includes various management practices like hatching, brooding, housing and management practices for layers and broilers,

Management practices for raising layer birds:

- Layers are the birds used exclusively for eggs. The following management practices are required for layers.

i) Management practices in hatching the eggs :

- In 21 days, a fertilized egg develops into a chick through a process of hatching. It may be natural or artificial.
- Natural hatching is a primitive process in which brooding hen hatches the eggs.
- **Incubators** (electrical instrument for maintaining required temperature) are used for temperature maintenance in artificial broading followed in hatcheries.

ii) Management of birds at different ages :

1) Management in Brooding of chicks :

Rearing of 1 day old chicks till 8th week (until they no longer require supplementary heat) is called brooding.

- Brooding is natural and artificial. Desi hens with strong maternal instinct brood the day old chicks till the 8th week.
- **Artificial brooding** is accomplished by temperature - controlled **brooders**. **Basket brooders** are used for small number of chicks and battery brooders are used for large number of chicks.
- Basket brooders have hanging brooding hover, fitted with bulb. Chick guard is used to contain the chicks. 30"xl5"xl5" battery brooder (cage brooder) can accommodate 30 chicks.
- Battery brooders are with adjustable waterers, feeders and thermostatic heat regulators.

- Brooder house should be cleaned properly and should be kept disinfected by suitable disinfectants, A layer of 5 cm thick litter should be made with husk or saw dust. Litter shall be stirred frequently.
- Temperature has to be maintained 95°F during the first week, 90° F second week, 85°F third week, 80°F fourth week to eighth week.
- Temperature can be reduced by adjusting the height of the hover. Chick guard is placed 1.2 m away from the hover edge to contain the chicks. Uniform light and temperature are required.
- If the temperature is too high, the chicks move away from the hover too less, the chicks aggregate below the hover.
- If the temperature is uniform, the chicks distribute evenly.
- The feed given for these chicks is **brooder mash**, or **chick mash**. It contains 21% protein, 2900 to 3000 k.cal energy.
- **1st debeaking** (clipping of upper beak) on 10^{th} day is desirable.
- One day old chicks have to be vaccinated against Mareck's diseases.
- Birds shall be vaccinated against Ranikhet disease and fowl pox at the age of 6^{th} to 8^{th} week.
- **1^{st} deworming is** necessary at the age of 8 weeks

2) Management practices in raising the pullets

- The objective of grower management is to produce a pullet, which will lay eggs from 17^{th} or 20^{th} week.
- The mash given is grower mash containing 17.5% protein 2700 k.cal energy.
- 2^{nd} deworming is necessary for every 8 weeks then onwards, to remove the intestinal parasites.
- 2^{nd} debeaking is advised at the age of 13^{th} or 14^{th} week.
- The booster dose of Raniket disease has to be given at the age of 8-10 weeks.

3) Management in raising the egg laying birds:

- From 17^{th} or 20^{th} week of age, the chicks start laying eggs. One laying nest is required for every four birds.
- **Prelayer mash** containing 16.5% protein, 2.5% calcium and 2500 k.cal energy should be supplied from 17^{th} to 20^{th} week.
- Then onwards layer mash containing 16.5% protein, 3.7 to 3.8% calcium and 2500 k.cal energy is required.
- The poor layers which are unproductive and uneconomical are usually culled. Good and poor layer birds can be identified with the following characters.

Good layers	Poor layer
1. Combs and wattles are full, smooth, thick, waxy and red in colour.	1. These are long, thin, sharp and pointed.
2. The breast bone is long.	2. Breast bone is small.
3. Abdomen is large, soft and free from fat, Pubic bones are widely placed. So abdomen keeps cool.	3. Abdomen is small, hard and with fat. Pubic bones are closely placed. So abdomen keeps warm
4. Skin is thin, soft and oily.	4. Skin is thick, dry and rough.
5. These birds lay eggs also at the time of shedding feathers.	5. They do not lay eggs at the time of shedding feathers.
6. Feathers are warm and soiled.	6. Feathers are clean and perfect.
7. Vent is large, oval and moist.	7. Vent is small, round and dry.
8. These birds shed feathers late and rapid.	8. Shed feathers early and slow.

Housing and housing systems :

- Open sided poultry houses are very popular in India. The poultry house should be well ventilated and free from drafts.
- The distance between two sheds shall be 20m. **Stock house** for growers shall be 50 to 100 m away from the **layer house** to avoid infections.
- The shed has to face east-to-west along its length. This facilitates good sunshine in winter and reduces direct sunlight in summer.

- Housing systems are of two types-battery and deep litter systems.

1. Battery system (cage system) :

- It is the most intensive system of poultry farming. A cage of the size 15"(width) x12" (depth) x 17" (height on the front side) and 15" (height on the rear side) can accommodate only three birds.
- Cage floor is set in a slope, so that the eggs laid roll out of the cage in to the gutter. Below the cage, floor tray is arranged to receive the droppings.
- Both feed and water receptacles are arranged out side the cage. These cages are assembled to one another. These are multi-storeyed, if necessary.

Advantages :

1. Wastage of feed is minimum.
2. A Bird utilises minimum energy.
3. Performance of each bird can be assessed very easily.
4. Culling of unproductive and sick birds is easy.
5. More birds can be accommodated.
6. It is the labour saving practice.

Disadvantages :

1) High initial investment is involved.
2) Birds suffer from cage **fatigue** and **fatty liver syndrome** (enlarged liver).

2. Deep Litter System :

- Birds are kept in large pens. Each pen can accommodate a maximum 250 birds.
- Floor is covered with litter of 8" to 12" thickness and is created by using sawdust or husk or groundnut shells.
- Bird droppings accumulate into the litter. Hence, this litter should be changed periodically. Each bird requires the floor space of 1.8 to 2.0 square feet.
- Proper ventilation is required to keep the litter dry.

Advantages:

1. Coccidiosis and worm infections are less common in deep litter system, as bird droppings are decomposed quickly in the deep litter.
2. Litter maintains constant temperature.

B. Housing equipment :

1. Feeders :

- Circular trough and long feeders are used in deep litter system. Circular feeders are the hanging hoppers, which are suitable for the birds of all ages.
- Long feeders and trough feeders shall have non-Water fountain roosting devices to prevent the roosting of birds. Wire-hinged grill or galvanised sheets with holes are used as non-roosting devises.

2. Waterers :

- Chickens consume large amount of water. So water shall be supplied to the birds all times.
- Earthen pitcher a Fountains, covered containers (consists of tin or earthen container with saucer, container is turned up side down) and water troughs with non-roosting device are used as waterers in the deep litter system.

II. Broilers and their management :

- **A broiler** or **fryer** is young chicken of either sex below 8^{th} to 10^{th} week age, weighing 1.5 kg and with smooth textured breast.
- These are used for meat perpous. **Roaster** is an older and heavier than the broiler bird.
- Broiler rearing is mainly brooding. Brooding is continued for the first two weeks. Mostly deep litter system of housing is followed in India for broiler rearing.
- Temperature should be reduced gradually from 95°F to 70°F at the rate of 5° F per week. Proper ventilation shall be maintained to provide more oxygen, to remove ammonia and to keep carbon dioxide at low level. Floor space of 1.0 to 1.2 square feet is required per bird.
- Debeaking is not practiced for broilers at present. As feed, **Prestarter mash** containing 22% protein and 3200 k.cal energy is given initially.
- **Starter mash,** containing 20 to 25% protein and 3200 k.cal energy, is provided upto 7^{th} week; **finish mash,** containing 19% protein and 3400 k.cal energy, should be given from 7^{th} week to the 10^{th} week.

POULTRY DISEASES :

- Poultry diseases are transmitted mostly by air, water, feed, droppings, feathers, hatchers and insect vectors or by direct contact. Here, viral, bacterial and fungal diseases are discussed.

I. Viral diseases

1. Ranikhet disease (New Castle disease) :

- It is caused by virus *Paramyxo.* It is highly pathogenic and common at all ages causing mass mortality.
- Symptoms include respiratory (coughing) and nervous (complete or partial paralysis) disorders.

2. Marek's disease :

- Highly infectious disease caused by viruses of **Herpes** group. This disease mostly affects the birds of 2 to 4 month old. Symptoms include enlargement of sciatic nerve, enlargement of glands like spleen etc.

3. Gumboro disease (Infectious Bursitis)

- It is contagious disease affecting 2 to 12 week old chicks.
- Spreads through contaminated feed and water. It is caused by **IBD** virus (Infectious Bursal Disease).
- The symptoms are loss of appetite, white diarrhoea and enlargement of bursa of Fabricius. Vaccination of chicks prevents the disease.

II. Bacterial diseases :

- **1. Fowl Cholera :** It is caused by *Pasteurella avicida.* Symptoms include pin point foci on liver, pin point haemorrhages on pericardium and bluish discoloration of combs. Penicillin and tetracycline are more effective.
- **2. Infectious Coryza (Roup disease) :** It is caused by *Haemophilus gallinarum* affecting all stages. Infection is due to contamination of water and feed.
- Symptoms include nasal and eye discharge with foul smell. Acute respiratory problem and inflamed and swollen eyes. Streptomycin and tetracycline are effective.
- **3. Chronic Respiratory Disease (CRD) :** It is caused *by Mycoplasma gallisepticum. T*ransmission is through eggs, nasal discharge and droppings.
- Symptoms include sneezing, swollen sinuses, respiratory distress, inflarnmative eyes and snoring. Erythromycin and tetracycline are effective.

III. Fungal diseases :

- **1. Aspergillosis (Brooder pneumonia) :** It is caused by *Aspergillus fumigatus.* Transmission is by inhalation of fungal spores. Symptoms include difficult breathing, congested lungs with nodules etc. Affects mostly the brooders. Copper sulphate is effective in controlling the disease. It is given with drinking water..
- **2. Aflotoxicosis :** It is caused by *Aspergillus flavus.* It spreads through contaminated food and water. Symptoms include reduced immunity and susceptibility to infections.
- **3. Thrush (Moniliasis) :** It is caused by *Oidium albicans (Monilia).* It is an intestinal disorder. Symptoms include lesions in the mouth and gut. Nystatin is more effective.
- Other important diseases include the protozoan disease **Coccidiosis** caused by *Eimeria tenella* and the diseases caused by ectoparasites ticks, mites and lice.