

It produces progeny having more vigour and disease resistance than parental species. Progeny is usually sterile.

**INTEXT QUESTIONS 3.1**

Fill in the blanks

1. _____ is the mating of related animals.
2. _____ is the breeding of unrelated animals.
3. _____ and _____ are the inbreeding systems of mating.
4. _____ method is used for improvement of non-descript breeds.
5. _____ mating of animals of two different species.

3.4 ARTIFICIAL INSEMINATION

Artificial insemination (AI) is the technique in which semen with living sperms is collected from the male and deposited into the female genital tract by artificial means rather than by natural mating at proper time and undermost hygienic conditions with the help of instruments. This has been found to result in a normal progeny.

Advantages of Artificial Insemination:

- i) It increases the use of superior / outstanding sires.
- ii) It reduces the number of bulls required for breeding purpose.
- iii) It reduces the chances of spread of venereal diseases like brucellosis, trichomoniasis.
- iv) It saves labour and expenditure on maintaining breeding bull on farm.
- v) It eliminates difficulties in mating of animals having physical disparity due to differences in size and weight.
- vi) It permits crossbreeding to improve the production performance.
- vii) It improves the breeding efficiency.

Limitations of Artificial Insemination:

- i) It requires well trained operators and also needs special instruments.
- ii) It reduces the market value of bulls.
- iii) It is very costly technique.
- iv) It is likely to increase incidence of genetic abnormalities.
- v) It involves very strict hygienic precautions at every step.

**INTEXT QUESTIONS 3.1**

Match the followings:

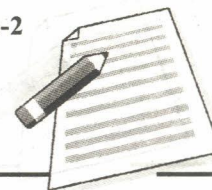
A

1. Male gamete
2. Female gamete

B

- i) Mating of unrelated animals
- ii) offspring

Notes





- | | |
|-------------------|----------------|
| 3. Superior sire | iii) Ovum |
| 4. Progeny | iv) Sperm |
| 5. Cross-breeding | v) Proven bull |

3.5 EMBRYO TRANSFER TECHNOLOGY

Embryo transfer is a specialized technique of breeding. A sexually mature female referred to as the donor is injected with exogenous hormones to produce. More ova, which are fertilized inside her either by natural or artificial service. These are then removed prior to their implantation and transfer to the reproductive tracts of synchronized surrogate mothers of the same species referred to as the recipients. The fertilized ova, thus are developed in the recipient body and resulting offspring derive their genes from the donor and from the male to which donor was bred.

The embryo transfer technique consists of following important steps:

1. Selection and management of donor and recipients.
2. Super ovulation and estrus synchronization of the donor and the recipients.
3. Insemination of the donor.
4. Collection of embryos.
5. Identification and storage of embryos
6. Transfer of embryos.



INTEXT QUESTIONS 3.3

Match the followings:

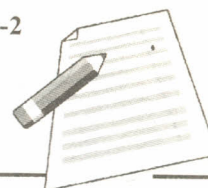
- | A | B |
|----------------------|--|
| i) Mature female | a) Deposition of semen into female reproductive tract. (sperm) |
| ii) Surrogate mother | b) Union of male and female gamete (ova) |
| iii) Insemination | c) Attachment of developing embryo |
| iv) Implantation | d) Recipient |
| v) Fertilization | e) Donor |

3.6 WHAT YOU HAVE LEARNT

Inbreeding and out breeding systems of breeding are useful for improvement of livestock. Cross breeding is useful for producing new breeds while grading up is useful for improvement of non-descript breeds. Artificial Insemination and Embryo transfer techniques are useful tools of breeding in Modern livestock management.

**3.7 TERMINAL QUESTIONS**

1. Write the advantages and disadvantages of Artificial Insemination.
2. Explain in brief the embryo transfer technology.
3. Represent diagrammatically the systems of breeding animals.
4. Write short notes on
 - i) Grading up, ii) Cross-breeding.

Notes**3.8 ANSWERS TO INTEXT QUESTIONS****3.1**

1. Inbreeding
2. Out breeding
3. Close breeding and Line breeding
4. Grading up
5. Species hybridization

3.2

1. Sperm
2. Ovum
3. Proven bull
4. Offspring
5. Mating of unrelated animals.

3.3

1. Donor
2. Recipient
3. Deposition of semen into female reproductive tract.
4. Attachment of developing embryo.
5. Union of male (sperm) and female gamete (ova)

SUGGESTED ACTIVITY

Visit a veterinary dispensary to study Artificial Insemination, embryo transfer technology.



PREGNANCY IN LIVESTOCK

4.1 INTRODUCTION

Pregnancy or gestation is the condition of female when a developing young is present in the uterus. The period of pregnancy, pregnant period or gestation period, is the period from fertilization/conception to parturition. The importance of detection whether a female animal is pregnant or not is directly related to the economy of dairy management. A female may sometimes show a number of signs of which are strongly suggestive for a positive case but on proper diagnosis it may not be found correct. By this way the animal might have passed quite a valuable time of her life.

4.2 OBJECTIVES

After reading this lesson, you will be able to understand:

- Stages of pregnancy.
- Pregnancy diagnosis.
- Economical importance.
- Methods of pregnancy diagnosis.

4.3 STAGES OF PREGNANCY

The gestation period is divided into three parts based on the development stages of conceptus:

I) The period of ovum / zygote

1. It is the period upto 10-12 days after fertilization.
2. The zygote reaches uterus on 3rd – 4th day of fertilization.
3. In uterus, the Zygote remains free for short duration i.e. 8-15 days.
4. The Zygote is nourished by the secretion of uterine gland i.e. uterine milk.

*Notes***II) The period of embryo**

1. It extends from 13th to 45th day of pregnancy in cow.
2. It is characterized by formation of germ layers viz. endoderm, mesoderm and ectoderm which gives rise to different body parts / organs.
3. The digestive system, lungs, liver and circulatory system develops.
4. The heart starts beating by 21st to 22nd day.
5. The nervous, musculo-skeletal and urogenital system begins to develop.
6. The placenta usually formed in 20-30 days.

III) The period of foetus

1. It extends from 46th day of pregnancy to the parturition.
2. It shows progressive increase in size and weight of foetus.
3. There is development of bones and cartilages in different body parts.
4. The different body system progressively develops to the fully functional form.
5. There is growth of placenta and accumulation of fluids.
6. Hairs appear around the muzzle and eyes at 150 days and hair coat covers the body at about 230 days.

**INTEXT QUESTIONS 4.1****Fill in the blanks:**

- 1) The period of ovum / zygote after fertilization is _____ days.
- 2) The period of embryo is characterized by formation of germ layers _____, _____ and _____.
- 3) The placenta is usually formed in _____ days in pregnancy.
- 4) The gestation period is divided into _____ parts in pregnancy.

4.4 PREGNANCY DIAGNOSIS**Economic importance of pregnancy diagnosis**

It is of great importance to know whether or not a female animal has become pregnant after a service. Pregnancy diagnosis assists in herd management by identifying non-pregnant animals, which can be served again or culled with minimum necessary delay. Such procedure will improve the breeding efficiency and greatly contribute towards the economy of the enterprise. Over and above this, routine pregnancy examination on herd or flock basis is a valid tool for detecting infertility and problems connected with it, at an early stage when it is likely to be amenable to treatment. Pregnancy diagnosis is helpful in proper care and feeding of pregnant animals. Pregnancy diagnosis is also very useful in selling, buying, registration and insurance of animals.



Methods of pregnancy diagnosis.

These include clinical, chemical, Microscopical, Radiography and immunological diagnosis.

Clinical examination of pregnancy – A majority of cattle owner and veterinarians depend upon this method of examination. The main limitation of this examination is that it cannot be used for very early pregnancy diagnosis in large animal and is not suitable for small animals.

The following are the most important symptoms used in diagnosing pregnancy in animals.

- 1) **General sign**- These are manifested by alternation in temperament, character, and aptitude, cessation of heat and tendency to fatten.
- 2) **Physical sign** – The volume of the abdomen increases as the stage of gestation advances and the mammary gland start developing of about 30-60 days before the date of parturition in heifers and about 15 days in pluriparous animals.
- 3) **Milk test** – The milk of the pregnant animals becomes sour, sinks in water and has a high specific gravity.
- 4) **Urine** – The salt contents of urine are diminished.
- 5) **Auscultation** – The pregnancy can be diagnosed by hearing the sounds of the foetal heart with the help of a stethoscope.
- 6) **Rectal palpation** – This is a universal method adopted for pregnancy diagnosis in large animal. A pregnancy of even 40 days can be diagnosed by experienced veterinarians.

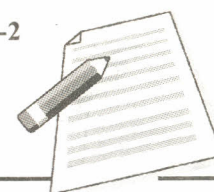
Chemical Tests

There are many chemical tests. Details of some importance are as under:

- 1) **Sodium hydroxide test** – Take 10 percent sodium hydroxide solution and put some mucus in it and heat it to boiling point. It will turn orange if the animal is pregnant.
- 2) **Barium chloride test** – Take 1 percent barium chloride solution and add urine in equal parts. If there is no precipitation, it indicates pregnancy.
- 3) **Copper sulphate test** – Take a saturated solution of copper sulphate and add mucus to it. If mucus turns to a rubber – like paste, it indicated pregnancy.
- 4) **Copper sulphate and milk test** – Take 10ml of 3 percent CuSO_4 solution and add 1ml of milk to be tested. If there is coagulation, it indicated pregnancy.
- 5) **Glucose fructose estimations in mucus** – Higher percentage of fructose in mucus. (110 + 20mg percent) is indication of pregnancy. In non-pregnant animals, the fructose content of mucus is 35+30mg percent

Microscopic examination of vaginal mucus

The presence of more number of large, nucleated, spherical cells in vaginal mucus smear are indicative of pregnancy.



Immunological Method

The presence of hormones in the pregnant animals can be used as a tool for determining the early pregnancy in animal.

Progesterone estimation – It is 80 to 90 percent accurate. It can be done in both milk & serum plasma by Radio Immuno Assay technique. The pregnancy can be done as early as 18-23rd day. The levels higher than 4 ng /ml of milk and 1 ng/ml of plasma are indicative of pregnancy.

Radiography Methods

There are three methods of which the last two are important:-

- 1) **X-Ray** – This is possible only after bone formation. But it can be harmful to the foetus and also to the operator.
- 2) **Ultra-sonography** – It is quick, reliable and safe method for pregnancy diagnoses base on feeling of the foetal heart sound.
- 3) **Scanning** – This technique can be useful in pregnancy diagnosis of sheep, bitches, cattle and more. In this, the sound waves are projected in the form of images on a screen. A true picture of the embryo or foetus is obtained and thus the age of the foetus can be ascertained by measuring the size of the image.

Table : Reproductive Cycle of Cow, Buffalo, Ewe and Goat

Particular	Cow	Buffalo	Ewe	Goat
Age of Puberty	24-36 mths	36-42 mths.	6-12 mths.	6-12 mths.
Length of oestrous cycle	21 days	21 days	17 days	20days
Duration of heat	12-24 hrs	12-24 hrs	24-36 hrs	24-36 hrs
Time of ovulation	10-14 hrs after end of oestrus	10-14 hrs after end of oestrus	Towards end of oestrus	Towards end of oestrus
Period of maximum fertility	Last 8 hrs of oestrus	Last 8 hours of oestrus	2 nd half of oestrus	2 nd half of oestrus
Gestation period	280 days	310 days	150 days	150 days
Breeding Season	Throughout Year	Sept. – Feb.	June – Aug. Jan. – Feb.	June – Aug. Jan. – Feb.



INTEXT QUESTIONS 4.2

Match the following:

A

1. Clinical examination
2. Chemical test
3. Microscopic examination
4. Immunological examination
5. Radiography method

B

- i) Ultra-sonography
- ii) Progesterone estimation
- iii) Barium chloride test
- iv) Large nucleated spherical cell
- v) Physical signs



4.5 WHAT YOU HAVE LEARNT

Pregnancy is the condition of female when a developing young is present in the uterus. The gestation period is divided into three parts i.e. period of ovum / Zygote, period of embryo and period of foetus in pregnancy. Pregnancy diagnosis is of great importance to know whether or not a female animal has become a pregnant after a service. Pregnancy diagnosis is useful in taking proper care, feeding of pregnant animals, selling, buying, registration and insurance of animals. Pregnancy diagnosis include clinical, chemical, microscopic, immunological and radiographical examination.



4.6 TERMINAL QUESTIONS

- 1) Write the stages of pregnancy.
- 2) Explain the economic importance of pregnancy diagnosis.
- 3) Write about the clinical examination of pregnancy.
- 4) Explain in brief the chemical tests of pregnancy diagnosis.
- 5) Write the Radiographical method of pregnancy diagnosis.

4.7 ANSWER TO INTEXT QUESTIONS

4.1

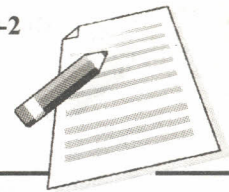
- 1) 10-12 days
- 2) endoderm, mesoderm, and ectoderm
- 3) 20-30 days
- 4) three

4.2

- 1) Physical signs
- 2) Barium chloride test
- 3) Large nucleated spherical cells
- 4) Progesterone estimation
- 5) Ultra – sonography

SUGGESTED ACTIVITY

- 1) Visit veterinary center for pregnancy diagnosis.



5

MILK PRODUCTION

5.1 INTRODUCTION

Milk is a whole, fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy milch animals, excluding that obtained within 15 days before or 5 days after calving or such periods as may be necessary to render the milk practically colostrum free and containing minimum prescribed percentages of milk fat and milk-solids - not-fat. In India, the term milk when unqualified refers to cow or buffalo milk or combination of the two.

Milk is an almost ideal food. It has high nutritive value. It supplies body building proteins, bone forming minerals and health giving vitamins and furnishes energy from milk fat and lactose.

5.2 OBJECTIVES

After reading this lesson you will be able to understand:

- Composition of Milk
- Factors affecting Clean milk production
- Clean milk production
- Purpose of cleaning milk

5.3 COMPOSITION OF MILK

Milk Constituents

The major constituents of milk are Water, Fat, Protein, Lactose, Ash or Mineral matter.

The minor constituents of milk are phospholipids, sterols, vitamins, enzymes, pigments etc.



Notes

Average chemical composition of milk:

Sl.	Name of Species	Water %	Fat %	Protein %	Lactose %	Ash %
1	Buffalo	84.2	6.6	3.9	5.2	0.8
2	Cow	86.5	4.9	3.2	4.6	0.8
3	Sheep	79.4	8.6	6.7	4.3	1.0
4	Goat	86.5	4.5	3.5	4.7	0.8

Factors affecting composition of milk

Milk differs widely in composition. All milks contain the same kind of constituents but in varying amounts. Milk from individual cows shows greater variation than mixed herd milk. In general, milk fat shows the greatest daily variation, and then comes protein followed by ash and sugar.

1. Species of animal:

Each species of animal yield milk of a characteristic composition.

2. Breed :

The milk of some breeds of same species is comparatively higher in fat content than those of the other breeds e.g. Milk of Red Sindhi cow contains higher fat than those of H.F and Brown Swiss.

3. Individual variation :

Individuality of the animals is responsible for some of the greatest variations in the composition of milk.

4. Stage of Lactation :

The period from the time the calf is born until the cow ceases to give milk is called period of lactation. The secretion of milk immediately after calving is known as colostrum. It may last from 3 to 6 days. It contains more protein and more total solids than those of normal milk.

5. Age :

The fat content in milk rises from 1st to 3rd lactation period, then it remains fairly constant in subsequent lactation periods but later towards advancing age there is slight reduction in the fat content of the milk.

6. Seasonal Variation :

Generally, fat and Solids-not fat content in milk show slight but well defined variations during the whole year.

7. First and last milk :

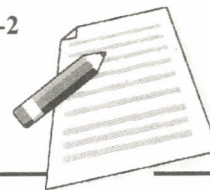
There is a considerable variation in the fat content of the fore milk, mid milk and stripping. The fore milk is very poor in fat and stripping are very rich in fat. This variation is more when the milk yield is high.

8. Feed of the animal :

When the milch animals are given sufficient balanced ration, feed has no significant effect on composition. When the feeding is changed there is some variation in the composition of milk but such variations are temporary.

9. Interval of milking :

In general, a longer interval is associated with more milk and lower fat test.

*Notes***10. Frequency of Milking :**

Whether a cow is milked two or three times a day, it has no great effect on the fat test.

11. Physical condition of the animal :

There may be a change in the composition of the milk if the animal is suffering from any disease viz. in the milk of cow or buffalo suffering from mastitis there is reduction in fat, protein, lactose content and marked increase in chlorides content.

12. Environment at the time of milking :

Anything which causes discontentment and uneasiness in the cow at the time of milking causes the cow to be nervous and leads to the holding up of her milk. As last portion of milk is rich in fat, hence it affects the composition.

13. Administration of drugs and hormones :

Certain drugs may affect temporary change in the fat percentage, injection or feeding of hormones results in increase of both milk yield and fat percentage.

14. Milker :

If the milker is not an efficient one and not able to draw milk completely from the udder, the fat content of the milk is reduced.

**INTEXT QUESTIONS 5.1****Fill in the blanks:**

1. Milk fat is the _____ constituent of milk.
2. The first secretion obtained after calving of animal is called as _____.
3. Vitamin is the _____ constituent of milk.
4. The _____ milk contains less milk fat.
5. Longer interval of milking is associated with _____ milk.

5.4 CLEAN MILK PRODUCTION

Milk is known to be one of the best foods but it may also become a harmful food if it is not produced and handled under sanitary conditions. Milk which enters into market must be clean so that it will have good flavour and be free from harmful bacteria and other disease organism. Milk produced under sanitary conditions will have longer keeping quality.

5. PURPOSE

- 1) To produce dirt free milk.
- 2) To secure milk of low bacterial count.
- 3) To keep milk free of disease organism.
- 4) To prevent bad odour.
- 5) To prevent spread of milk borne diseases.
- 6) To increase shelf-life of milk.
- 7) To make good quality dairy products.

Module-2



Notes

Principles of clean milk production

Sl.	Factors of Contamination of Milk	Desirable features for clean milk production
1	Mastitis udder	Test for milk on strip cup Test by California mastitis test if positive discard.
2	Fore milk	Remove two streams from each teat to reduce bacterial count.
3	Cow skin	Healthy, clean, well groomed hind quarter washed tail tied with legs at the time of milking.
4	Udder	Washed, wiped with clean towel soaked in antiseptic solution, kept dry at milking time.
5	Milker	Health, nail cut, clean hands, cleanliness habits, hand washed with chlorine solution of 200 ppm.
6	Utensils	Clean and sanitized, stainless steel metal, dome shaped top.
7	Barn	White washed, free from cob, webs, bad odour, floor clean and disinfected, and good ventilation.
8	Method of Milking	Full hand method and machine milking.
9	Feed and water	Free from weeds that have objectionable odour. No dusty roughage at the milking time clean and safe water at milking time.
10	Flies and other vermin	Fly control with fly sprays.



INTEXT QUESTIONS 5.2

Match the followings

A

- 1) Mastitis
- 2) Fore milk
- 3) Grooming
- 4) Flavour
- 5) Milk borne disease

B

- i) Tuberculosis
- ii) Smell and taste
- iii) protein
- iv) more bacterial count
- v) cleaning of animals
- vi) Inflammation of udder

5.5 WHAT YOU HAVE LEARNT

Milk is an ideal food, the major constituents of milk are water, fat, protein, lactose, Ash or Mineral matter and minor constituents are phospholipids, sterols, vitamins enzymes, pigments etc. Milk differs in composition. All milks contain the same kind of constituents but in varying amounts. Milk produced under hygienic and sanitary conditions will have longer keeping quality.



5.6 TERMINAL QUESTIONS

1. Write the major and minor constituents of milk.
2. Write the factors affecting composition of milk.

3. Write the purpose of clean milk production.
4. Write the principles of clean milk production.

5.7 ANSWER TO INTEXT QUESTIONS**5.1**

1. Major
2. Colostrum
3. Minor
4. Fore
5. More

5.2

1. Inflammation of udder
2. More bacterial count
3. Cleaning of animals
4. Smell and taste
5. Tuberculosis

SUGGESTED ACTIVITY

- 1) Visit a dairy farm to study clean milk production.





STUDY OF POULTRY

6.1 INTRODUCTION

The present per capita availability of animal protein is 14g in the form of fish, egg and meat which constitute 11 percent of the requirement. Poultry provides the promise to bridge up the gap between requirement and availability with least cost compared to other sources of animal protein like sheep, goat, pig, beef and milk cows. However, the aim is to produce 55g of animal protein from poultry per person per day (30 g from the egg and 25g from the meat). This would mean that availability should be 180 eggs and 9 kg of chicken meat per year per person. Present availability of egg is only 32 and poultry meat is 550 gm. This big gap can be bridged up by increasing poultry production.

Poultry is the fastest growing sector of Indian agriculture. Broiler production was started as a novelty in early 1970's and has turned out to be popular with its rearing of 750 million in year 2000. The steep growth in broiler production is also reflected in the increased number of hatcheries from 77 in 1980 to over 750 in the year 2000.

In 2000 A.D. a Network of 600 hatcheries, feed mills, veterinary pharmaceuticals and equipment manufactures have made poultry a dynamic agricultural business.

6.2 OBJECTIVES

After reading this lesson you will be able to understand.

- Important breeds of poultry.
- Feeding of poultry.
- Layer & Broiler Management Practices.

6.3 SOME IMPORTANT BREEDS OF POULTRY

The term 'poultry' is applied to birds of several species like fowls or chicken, ducks, turkeys, quails, swan, pigeons, guinea fowl, pea fowl, pheasants etc.

Fowls may be classified on the basis of utility, purpose such as meat type, egg type, dual purpose, game, ornamental etc. Birds are also classified into



different classes based on the country or particular region of their origin such as Asiatic, Mediterranean, American, and English etc. Each class is further classified into breeds based on shape, size and colour etc. such as Minorca, leghorn, RIR, Hampshire. Each breed may be classified into varieties based on type of comb and colour of plumage e.g. leghorn varieties are single comb, white leghorn. Each variety can be further redivided into strains which can be named after a breeder or farm etc.

Class and Breeds of fowls :-

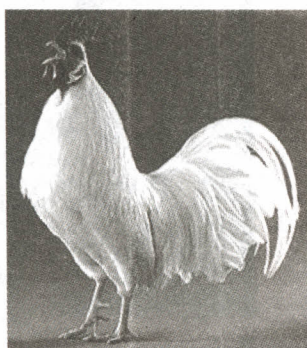
Class	Breeds
American	Chanticleer, Dominique, Java, Jersey Black Giant, Lamona, New Hampshire, Plymouth Rock, Rhode Island Red, Rhode Island white, Whyandotte.
Asiatic	Brahma, Cochin, Langshan.
English	Australorp, Cornish, Orpington, Red cap, Sussex.
French	Crevecoeur, Houdan, faverolle, La fleche.
Continental	Capine, lakenvelder.
Oriental	Sumatra, Malaya, Cubalaya.
Mediterranean	Leghorn, Minorca, Ancona, Spanish, Andulasian, Butter Cup.
Hamburg	Hamburg
Polish	Polish
Miscellaneous	Sultan, Frizzle

Classification of Chicken Breeds (Based on Utility):

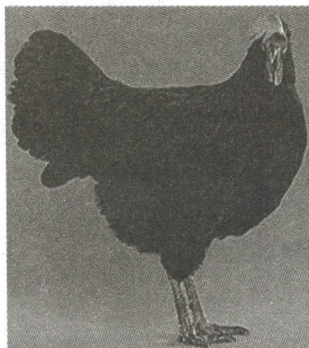
Egg type	Meat type	Dual purpose	Fancy Breeds	Kept for Pleasure	Kept for Game	Miscellaneous
* Leghorn * Minorcas * Anconas * Campines	1. Brahma 2. Cochins 3. Langshan 4. Cornish 5. Jersey Giants 6. Assel 7. Chittagong	1. RIR 2. Plymouth Rock 3. Whyandotte 4. Australorp 5. Orpington 6. Dorking	1. Polish 2. Hamburg 3. Andulasian	1. Brahma 2. Cochin	1. Assel	1. Punjab Brown 2. Kala Hasti

CHICKEN - BREEDS

Leghorn



Minorcas

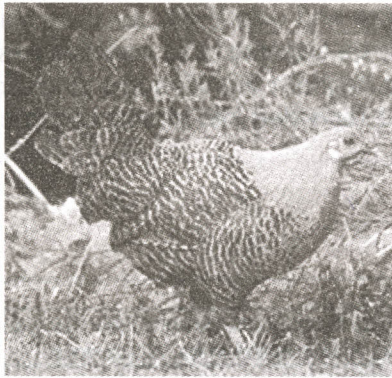


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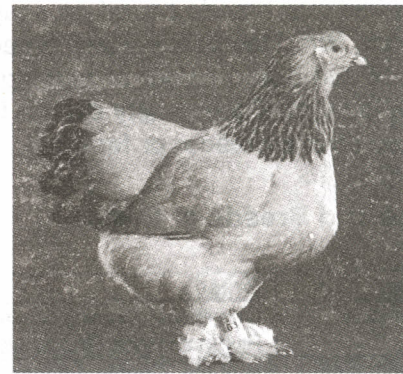


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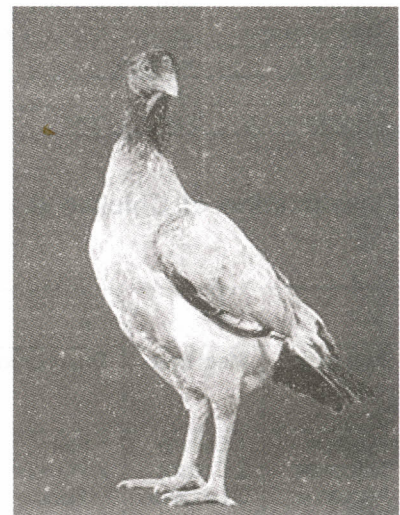
Campines



Brahma



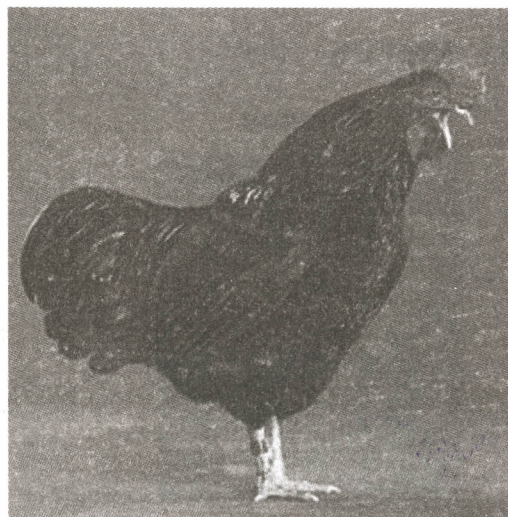
Assel



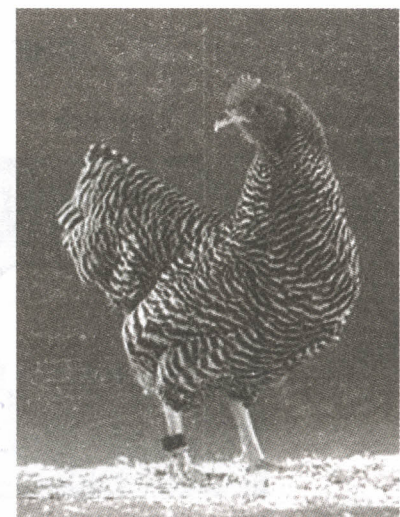
Cochins



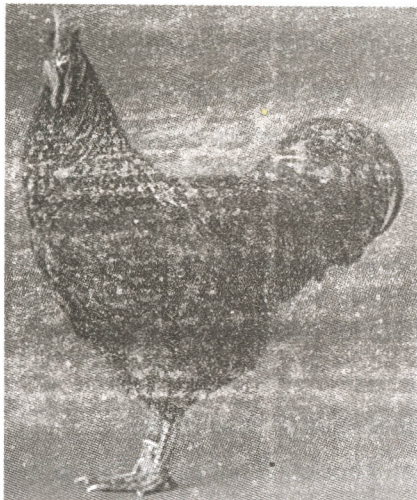
RIR



Plymouth Rock



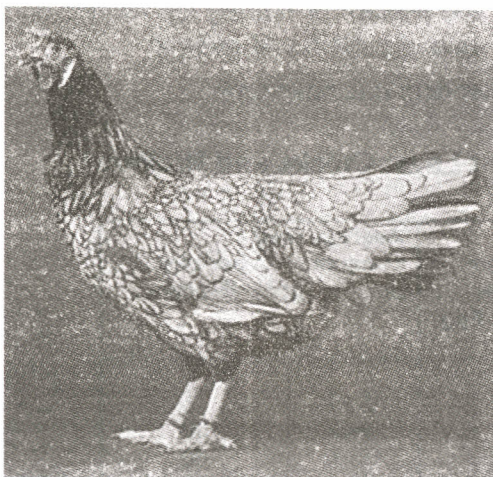
Australorp



Orpington



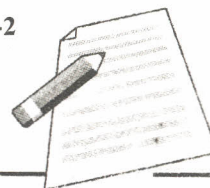
Andalusian



Punjab Brown



Module-2



Notes



INTEXT QUESTIONS 6.1

Match the following:

A

1. Egg type
2. Meat type
3. Fancy breeds
4. Dual purpose
5. Kept for pleasure

B

- i) Hamburg
- ii) Orpington
- iii) Cochin
- iv) Cornish
- v) Leghorn

6.4 FEEDING OF POULTRY

The primary objective of feeding poultry is to convert low quality feeds like cereal grains, oilcakes and other by products of agriculture and industry into high quality food like egg and meat.



Module-2

Notes

Principles of feeding poultry

1. Birds have no lips and teeth and hence cannot chew the feeds therefore, ration must have chiefly concentrates (grains, oil cake, by products).
2. Birds have simple stomach, hence requirements are more precise and specific.
3. Birds have higher rate of metabolism than other farm animals therefore different feed for different class of birds is required as per recommended standards.
4. They are fed in groups.
5. Birds have no sweat glands to cool down their body hence their respiration, pulse rate and body temperature are relatively higher. Consequently their metabolic rate is higher. Accordingly, nutritional adjustments is needed.
6. Feed must be free from Aflatoxins.
7. Clean, fresh and cool water must be made available at all times.
8. Birds are non-ruminants and hence feed must contain not more than 6 to 7 percent of crude fibre.
9. Birds are reared for different purpose (Meat, egg etc.) and hence according to purpose, age, breed, size and system of rearing the requirements must be determined with definite ratio of protein and energy.
10. Feed must have all essential nutrients in balanced form.

Daily Average feed consumption of Layer Chicks and Broilers :-

Stage	Feed consumption per bird per day (g) for Egg production	Average feed consumption per bird per day (g) for Broilers	
Starters			
0-15 days	15 g	0-15 days	15
15-30 days	30 g	15-30 days	20
30-45 days	40 g	30-45 days	60
45-60 days	60 g	45-60 days	80
Growth Stage			
2-3 months	70 g		
3-4 months	80 g		
4-5 months	90 g		
Layer stage			
Up to 25% egg production	100 g		
25 to 50% egg production	110 g		
50 to 75% egg production	115 g		
Above 75% egg production	120 g		



INTEXT QUESTIONS 6.2

Fill in the blanks:

- i) Poultry birds have no _____ glands.
- ii) Poultry feed should not contain more than _____ percent crude fibre.



- iii) Above 75% of egg production, per bird feed requirement is _____ grams.
- iv) _____ birds are reared for meat purpose.

6.5 MANAGEMENT OF CHICKENS

Layer Management

Layer House — Layer house is of two types:

- a) Rearing house : For starters and growers of age group 0 to 20 weeks.
- b) Laying house : For birds above 20 weeks and for round the year egg production.

Adopt 3:1 housing system (3 laying houses for 1 rearing house)

Average distance between two laying houses is 10.5m.

Chicks

- i) Should come from healthy parents.
- ii) Good quality irrespective of cost.
- iii) Vaccinated at hatchery for Marek's.
- iv) Uniform in size, colour, clean hatched and well dried.
- v) Alert, active with round bright eyes with leg, no leg deformities.
- vi) Start one day old chick on 8% sugar water for first 15 hours and soluble electrolytes be used for first 2 days.
- vii) Three hours after chicks have drunk water, give feed of top dressed cracked maize.

Lighting

- a) 15 to 16 hours lighting period per day for maximum egg production.
- b) Rate : 1 Watt light intensity per 1 to 1.5 bird or per 0.28 sq.m. or 40 Watt bulb for 9.3m² floor space.
- c) Bulb height : 2m above the floor
- d) Distance between two bulbs – 2.5m to 3m.
- e) Care
 - i) Use reflectors to direct all light on the floor.
 - ii) Clean all bulbs periodically & regularly to remove dust and maintain enough light.

Ventilation

- 1) Side Walls = Height 1.8 m; 1/3 closed by brick wall (60 cm) and 2/3 open (1.2 m) covered with hexagonal wire netting.
- 2) End Walls = Solid with doors both sides.

Module-2



Notes

3) Care

- i) door must be covered with wire netting to prevent sparrows and rodents.
- ii) 1/3 side wall made solid to prevent rodents, predators and natural enemies (dogs, cats) out of sight.

Temperature

1. Most comfortable temperature for chicken is 55° F (13° C) to 75° F (21° C).
2. Preferred temperature is 65° F (18° C).
3. Birds remain under stress if temperature is above 23° C.

Insulation

Roof weather proof with proper slope and fall of 1.2m.

- Care :**
- i) Keep litter dry and specially take care in monsoon.
 - ii) Keep house cool in summer.

Floors

1. Provide 0.18 m² (2 sq.ft.) per bird.
2. Keep floor 30 cm above the surrounding level to prevent water seepage and flooding or water stagnation.
3. Kind : Floor should be made of concrete and it must be kept smooth and dry

Age (weeks)	Light breed	Heavy breed
0 – 8	700 minimum	700 minimum
9 – 12	950 minimum	950 minimum
13 – 12	1900 minimum	2350 minimum
Above 20	2300 to 2800 minimum	2800 to 3700 minimum

4. Care : Avoid dampness to prevent infections.
5. Recommended floor space in cm² per bird.

Feeders

Feeder designs are of two types:-

- ii) Circular drum type – hanging one.

Age (weeks)	Feeder space / bird in cm (minimum)
0 – 2	2.5
3 – 6	4.0
7 – 12	7.5
Above 12	10.0

- iii) Trough type with supporting legs.

Space / bird: - in trough types 10 cm (4") per bird or 5 tabular feeders per 100 birds.



Age of Bird (wks)	Running length of Channel type trough (m)	Capacity of fountain type trough (litre)
0-2	25	9 liters
3-12	100	18 liters
Above 12	250	22.5 liters.

Care : Avoid overfilling of feeders.

Keep maximum distance of 15 ft. between feeders and waterers.

Waterers : (Water space requirement per 100 birds)

Litter

Arrange 3" (8cm) depth of litter. Use saw dust, paddy husk and straw. One kg super phosphate may be mixed per 9.3 m² area to prevent ammonia smell if occurs.

Prevention of Vices

Vices in birds are cannibalism, feather picking, breaking egg, egg eating, bullying etc.

1. Debeak the pullets at the age of 14 weeks.
2. Repeat the process at 6 months again.
3. Increase the salt in feed to 1% temporarily.

Age (Week)	Vaccination
1 Day old	MD in hatchery.
5-7 days	For Ranikhet disease (F - strain)
9-12 weeks	For Ranikhet disease (R2 - B strain)
6 to 10 weeks	For fowl pox (FC - Broth)

4. Prevent over crowding, provide balanced feed in mash form and adopt proper lighting programme.

Vaccination

For prevention from diseases the vaccination is essential. In this connection following information is given:-

Care:

Vaccinate the birds in the early morning.

Give rest of two weeks between two vaccinations.

Cage System

Housing layers in wire cages has been regarded as a super intensive system (with 465 to 560 cm² cage floor area per bird) of poultry production wherein the layers are kept in one, two or more per cage arranged in single, double or triple

Module-2



Notes

rows. Cage system of housing layer is generally considered to be very beneficial and modern.

Sanitation

- i) Remove utensils, equipments outside of house clean & disinfect them using 0.5% carbolic acid.
- ii) Restrict the entrance of visitors.
- iii) Arrange foot bath at the entrance of door.
- iv) Fumigate the damp house by use of formalin

Broiler Management

Chick Quality

- 1) Chicks from healthy parents
- 2) Average weight of 100 chicks should be between 3.8 to 4.0 kg.
- 3) Uniform size and colour.
- 4) Well dry, fluffed and cleanly hatched.
- 5) Should be alert, active and free from deformities.
- 6) Vaccinated at hatchery for Marek's disease and tested negative to gumboro (IBD)

Housing

- i) Space per chick under brooder is 32 cm²
- ii) Space per broiler is 1 sq. ft.
- iii) Adequate ventilation & proper temperature.
- iv) Temperature : Minimum temperature should be 70° F, fresh air.

Litter Arrangement

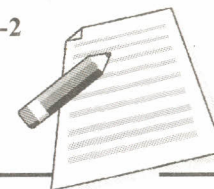
Kind of litter :- Rice husk, saw dust, wood shavings etc.

Type of litter : Clean, dry, new, free from dust & Aflatoxins.

Period	Temperature (°F)	Light
1 st week	95	23 hours continuous
2 nd week	90	
3 rd week	85	

Depth of litter : 5 to 7 cm.

- Care :
- i) Keep free from dust & moisture (between 20%).
 - iii) Free from injurious material like fungus.

**Lighting**

Put on dim light all the night for three weeks during brooding and maintain the temperature according to requirement.

Wateres

1) Requirement of Drinking water per 100 chicks:

0 to 2 weeks age 2 litres capacity waterers.

3 to 8 weeks age 3 waterers of 1 gallon capacity.

2) Birds for water should not go beyond 3 m. distance.

3) Keep wooden board below waterers.

4) Keep water fresh, clean and cool.

Age	Space
Day old to 2 weeks	2.5 cm / bird
2 to 3 weeks	5.0 cm / bird
Above 3 weeks	7.5 cm / bird

Feeders

1) Type – Linear feeder.

2) Space per chick is 5 cm

Method : (i) Group feeding, (ii) Feed chick mash up to 4 weeks (iii) Feed pelleted or crumbled form for 5th weeks.

Feed conversion ratio 2 kg. feed for 1 kg. gain in weight.

Feeding space.

Broiler House Management

It includes:

1) Check electrical equipment & thermometer.

2) Two days before chicks arrive turn brooders to maintain 95° F to 100° F (35 to 38° C) temperature.

3) Use solid guard of 45 cm (18 inches) height & 60 cm away from brooders to prevent straying of chicks.

4) Place chick mash in trays.

5) Place waterers between feed trays.

6) Switch on white light or 40 watt bulbs.

First Two Weeks (Most critical period)

1) Place the chicks quickly under the brooders on arrival.

2) Check, if they huddle together – increase temperature.

3) Check, if they spread beyond brooders – decrease heat.

4) Feeding movement observed – a satisfactory condition.

5) Mortality up to 2 percent.

Module-2



Notes

When 4 Days Old:

- 1) Place tabular feeders 2 feet away from brooders.
- 2) Move guards back.
- 3) Increase feeders and waterers space.
- 4) Remove damp litter.

One week old:

- 1) Reduce brooder temperature by 5° F.
- 2) Reduce light intensity if vice are noted.

After Two weeks:

- 1) Reduce brooder temperature to same as ambient temperature.
- 2) Keep brooders up to 1 month.
- 3) Keep continuous lights up to 6 weeks.
- 4) When brooders are removed provide 40 watt bulb light for 100 sq.ft. floor space.
- 5) If necessary debeak the birds to control cannibalism.

Disease Control

- 1) Vaccinate for Ranikhet disease – at 5th day age, if not done at hatchery.
- 2) Keep litter dry to prevent coccidiosis as its organisms thrive on wet litter.
- 3) Use coccidiostat in feed.
- 4) In case of outbreak, use coccidiocidal drugs in drinking water at recommended level.

Suggested Vaccination Programme for Broilers:

Age	Vaccine	Administration
0 to 2 days	Marek's disease (HVT Strain)	Subcutaneous (at Hatchery)
5 th to 7 th day	Ranikhet disease F-1 strain or (LASOTA – Strain)	Nasal drop, oral drop or in drinking water.
14 th to 15 th day	Gumboro disease (Live)	Oral drops or in drinking water
3 rd to 4 th week	Ranikhet disease F-1 strain / LASOTA strain	Drinking water or oral / nasal drops.



INTEXT QUESTIONS 6.3

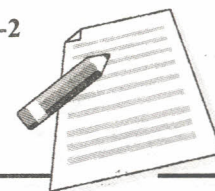
Match followings:

A

- i) Maximum egg production
- ii) Preferable temperature for chicken
- iii) Litter

B

- a) cannibalism
- b) Paddy husk
- c) M.D.



- iv) Vaccine at hatchery
- v) Vices in birds
- d) 15 to 16 hours light.
- e) 18° C temperature

6.6 WHAT YOU HAVE LEARNT

The term poultry includes birds of several species like fowls or chicken, ducks, turkeys, quails, swan, pigeons, guinea fowl, pea fowl, pheasants etc. The primary objective of feeding is to convert low quality feeds like cereal grains, oil cakes and other by products of agriculture and industry into high quality food like egg and meat. Layer and Broiler management for profitable egg and meat production.



6.7 TERMINAL QUESTIONS

- i) Classify the poultry birds on basis of utility.
- ii) Write the principles of feeding poultry.
- iii) Give the vaccination schedule for broilers.
- iv) Write about Lighting, Ventilation, Temperature, Feeders in layer farming.

6.8 ANSWER TO INTEXT QUESTIONS

6.1

- 1) Leghorn
- 2) Cornish
- 3) Hamburg
- 4) Orpington
- 5) Cochin

6.2

- i) Sweat
- ii) 6 to 7
- iii) 120 grams
- iv) Broiler

6.3

- i) 15 to 16 hours light
- ii) 18° C temperature
- iii) Paddy husk
- iv) M.D.
- v) Cannibalism

SUGGESTED ACTIVITY

Visit to Layer and Broiler poultry farm to study the managerial practices