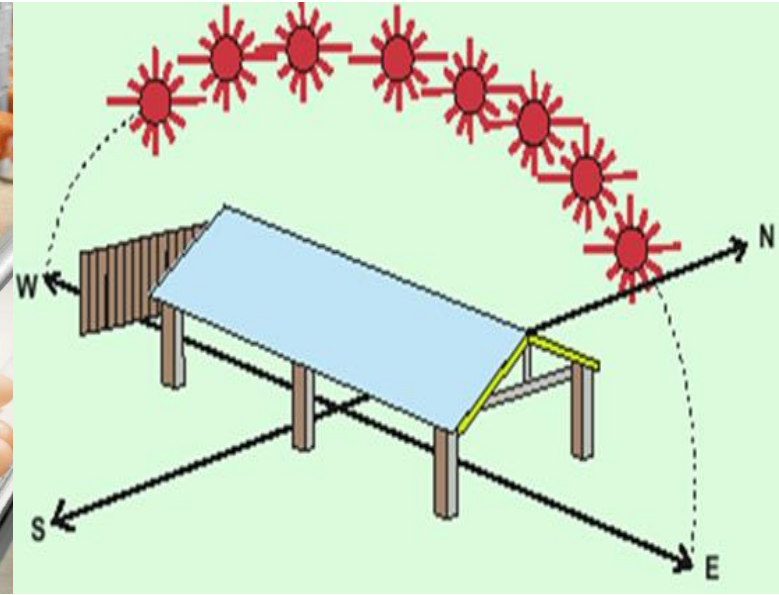


GROWER AND LAYER MANAGEMENT





Birds can be reared in deep litter system as well as in cages. There are three types of houses required for rearing:

The brooder house

The grower house

The layer house

The houses may **be environmentally controlled houses or open sided houses**. In India, open sided houses find favor and have proven successful.

Lengthwise, poultry houses should be in an east-west direction in hot –humid climate. The sheds should be well ventilated with even light distribution all over the house. Sheds should be constructed with rat-proof projections and should have an overhang (i.e. the outward projection of the roofing sheet) of five feet. Windows may be provided in the gable walls. Chicken wire mesh or chain link ($\frac{3}{4}$ sq. inch) should be provided lengthwise, on both sides in open sided houses.

Foundation

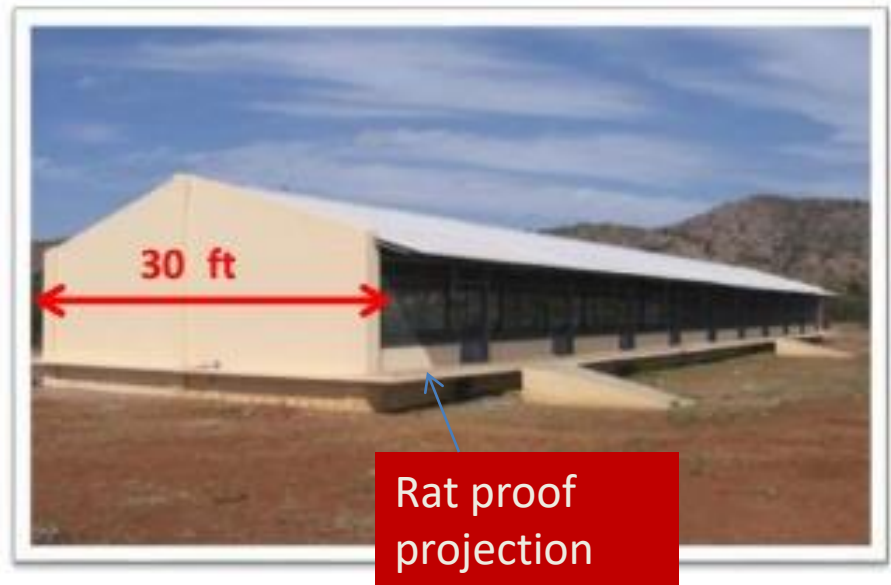
- Solid & Concrete, concrete blocks & bricks with 1 to 1.5 feet below the surface and 1 to 1.5 feet above the ground level

Length

- Can be of any extent

Width

- Not more than 30 feet
- If the width of the shed is more than 30 feet, **ridge ventilation** at the middle line of the roof top with proper overhang is must
- Can be of any width in EC houses upto 40 ft

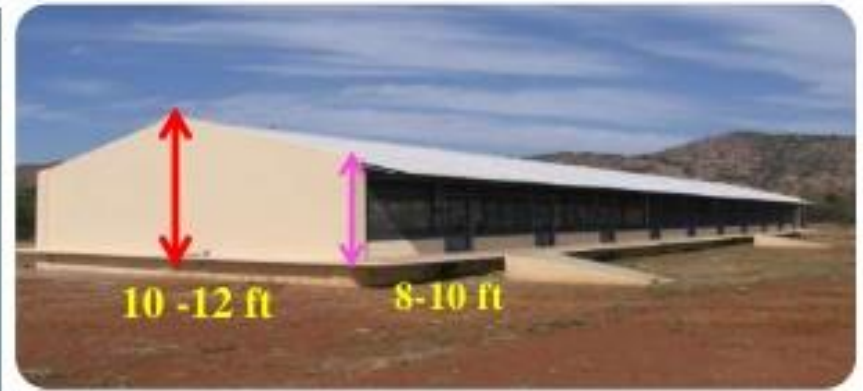


Height

- Height of the sides from foundation to the roof line should be 8-10 feet (eaves height) and at the centre 10 -12 feet
- In case of cage houses, the height is decided by the **type of cage** arrangements (3 tier or 4 tier)

Side walls

- Protects the bird from adverse climate and provides sufficient ventilation
- Usually **half to two-thirds** area will be kept open and fitted with wire mesh in **floor houses**
- In **cage houses**, avoid side wall
- EC houses should have solid side walls



Feeding Recommendations

Chick Mash

Chick mash should be fed to the birds from its arrival until the average body weight of the birds reaches 580 g. This is a feed-to-weight program rather than feed-to-age program. Body weight gains are better with pelleted/crumbled feed compared to mash feed. Therefore it is recommended to use pelleted/crumbled chick feed.

Grower Mash

The grower feed should be fed till flock reaches an average body weight of 1100 g. Do not administer pre-lay feed to the birds weighing below 1100 g.

Pre-lay Feed

Care should be taken to ensure pre-lay feed is introduced after the flock attains an average body weight of 1100 g and usually for two to three weeks.

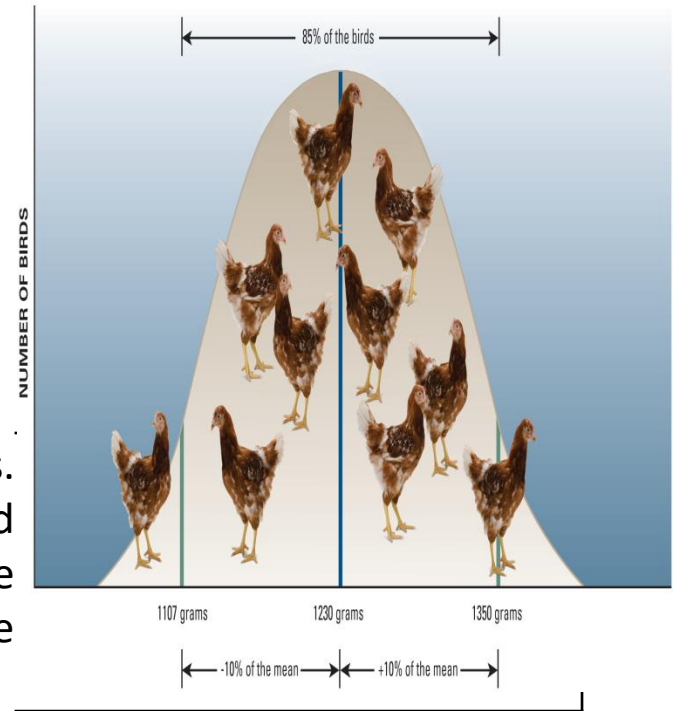
Layer Feed

Layer feed offered to the laying birds should be formulated according to the age of the birds and egg production. Accordingly, layer feed can be divided into three groups i.e. Phase I, Phase II and Phase III. Phase I feed should be given upto the age of 40 weeks and later Phase II ration may be given. Phase III feed should be given after the age of 60 weeks.

Weekly culling and Uniformity

- Under weight, emaciated, inferior, crippled and deformed birds should be removed from flock during growing period. Because these birds do not do well in laying houses.
- Sample weights are taken once in a week to find out the average body weight as per the breed suggestions.

Flock of ready-to-lay pullets should have uniform weights. Uniform flocks attain better peaks in productivity and sustain for a longer period than flocks showing wide variation in body weights. The following chart gives the criteria to decide the range of uniformity among the birds:



Flock Uniformity

Percentage of Pullets within $\pm 10\%$ of Avg. Flock Weight

85% and over

80 - 85%

70 - 75%

Less than 70%

Uniformity Rating

Excellent

Very Good

Fair

Unsatisfactory

Restricted feeding

It is adopted during growing period of layers or breeders. There are two types of restricted feeding.

1) Quantitative feed restriction

In which the amount of feed is reduced below the normal requirement of birds. This can be done on day-to-day basis or skip-a-day programme or skip-two days in a week programme. But this restriction depends on the matching of the flock average body weight with standard body weight provided by the breeder.

2) Qualitative feed restriction

In which the quality of the feed is reduced below the standard requirement of the bird. This can be done by including unconventional feeds or lesser nutrient feed ingredients in place of high protein or high energy diet. Here the quantity of allotment to the bird is not restricted. During restricted feeding programme, provide more number of feeders and see that all the birds are taking feed simultaneously or otherwise dominant birds will take more amount of feed and the weaker will be subjected feed deprivation and hence the uniformity will be affected.

Advantages of feed restriction during growing period

1. A considerable saving on feed cost because, only 80% of the calculated feed requirement will be offered.
2. They are likely to consume less feed per dozen eggs even during laying period when they are offered *ad libitum* feed.
3. The pullets accumulate less fat and therefore produce more eggs.
4. It is easier to identify weaker birds at an early age during feed restriction. Culling of such birds helps not only saving feed but also promoting layer house survivability because, healthier birds will be moving to laying house.
5. Layers feed-restricted during growing period have been found to produce heavier eggs in longer clutches than those fed *ad libitum*.

Uniformity

At a given age, growing pullets should have average body weight very closer breeder recommendations and at least 70% of the birds' weight within 10% of flock average. Points to be considered for getting uniformity among growing pullets are,

- 1) Receive chicks of uniform weight.
- 2) Provide proper feeding, watering and floor space.
- 3) Change the feeder and waterer according to the age.
- 4) The height of the feeder and waterer should be at the back height of the bird.
- 5) Provide proper energy in the diet.
- 6) Sample weights of the pullets are taken at regular intervals and change the feed accordingly.
- 7) Provide proper feeding space, so as to all birds consume feed simultaneously.



Suggested Nutritional Requirements Chicks and Growers

Chick Mash

up to 580 g

Grower Mash

580 - 1100 g

Nutrients

Metabolizable Energy kcal/kg

2750

2500

Crude Protein % (min.)

20.5

17.0

Expected crude fibre level:

Chick feed - 5% maximum

Grower feed - 7% maximum

Suggested Nutritional Requirements Prelay and Laying Period

	Prelay Feed	Phase I	Phase II	Phase III
Age in weeks	16 to 18	19 to 40	41 to 60	61 to liquidation
Nutrients				
Metabolizable Energy kcal/kg	2500	2500	2500	2500
Crude Protein % (min.)	17.0	17.5	16.0	15.5



Lighting

Types of Lighting

Two types of light sources are available for use in poultry houses. These are - fluorescent and incandescent.

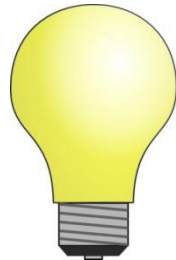
Light day (total light in hours), should not be allowed to increase during growing period.

In India, we have open sided houses. **Grower** needs no special lighting programme during growing period. Therefore, do not give any artificial lights after 8th week of age.

Increasing natural day length during Growing Period

Monitor feed consumption and see that increase in the length of day light at sexual maturity coincides with an increase in feed consumption. During the initial period of lay, egg production rises rapidly and there is a rise in body weights too. Each of these changes needs additional feed intake. In areas where longer day length coincides with summer, one must take additional care for making feed allotments in cooler parts of the day to induce feed consumption.

LIGHTING SCHEDULE FOR LAYER



Role of light on egg production

The egg production is associated with the length and intensity of the light received by the bird daily. Light stimulates the anterior lobe of the pituitary gland through optic nerve for the release of FSH and LH. Light energy also penetrates through the skull, skin and feathers. FSH increases the growth of the ovarian follicles. Upon reaching maturity, the ovum is released by the action of LH.

COMMERCIAL LAYER LIGHTING SCHEDULE

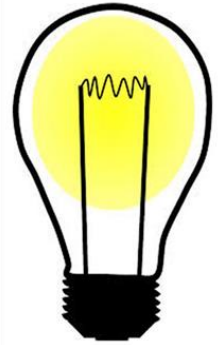
Lighting Options	Flock Age	Light Intensity lux (foot-candles)	Photo Period (hours of light per day)	
Option 1	Pullets			
	Brooding (1 - 3 days)	20 (2)	23	
	Growing (4 days - 19 weeks)	5 (0.5)	9 to 11	
	Laying (20 - 72 weeks)	10 - 30 (1 - 3)	Increase by ½ hour per week to maximum of 16 - 17 hours.	
Option 2	Pullets			
	Brooding (1 - 3 days)	20 (2)	23	
	Growing:	(4 days - 2 weeks)	5 (0.5)	23
		(2 - 3 weeks)	5 (0.5)	21
		(3 - 4 weeks)	5 (0.5)	19
		(4 - 5 weeks)	5 (0.5)	17
		(5 - 6 weeks)	5 (0.5)	15
		(6 - 7 weeks)	5 (0.5)	13
		(8 - 9 weeks)	5 (0.5)	11
		(9 - 20 weeks)	5 (0.5)	11
Laying (20 - 72 weeks)	10 - 30 (1 - 3)	Increase by ½ hour per week to maximum of 16 - 17 hours.		

Light during the Laying Period

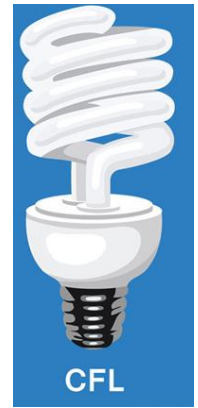
Sexual maturity is controlled by the lighting program during the rearing period. The length of day i.e. number of hours of light per day and the intensity of light are both factors that need to be considered. Lighting programs are designed to have a flock lay 5% production at 19th week of age and attain peak production by 25th week of age. The average body weight of pullet at the age of 20 weeks should be 1400 g. Many farmers use Compact Fluorescent Light (CFL) during laying period. CFLs of 12 watts, are economical, as they save on electricity, provide an even distribution of light, and whose results are comparable. Natural light should be made use of till the flock achieves the desired body weight and 80% production. Later, increase the artificial light by $\frac{1}{2}$ hour every week till it reaches 16 hours, inclusive of natural light.

Things to Remember

- Do not increase the light suddenly.
- Ensure the length of the day (natural + artificial), intensity and equal distribution of light in poultry house.
- Never allow rise in day length more than one hour. Preferably, increase $\frac{1}{2}$ hour per week to reach required period of maximum 16hours at peak period.
- As a thumb rule, provide 1 watt per 4 sq.feet area or 5 to 10 lux.
- Keep the bulbs clean.



Incandescent
Lamp



CFL

FEEDS FOR DIFFERENT AGE GROUPS

Chick ration	
Ingredient	% composition
Maize	30
Wheat	20
Wheat bran	10
Rice bran	10
Sunflower cake	10
Cotton seed cake	5
Fish meal	2
Beans	10
Bone meal	1
Limestone	0.5
Salt	0.5
Mineral premix	1
	100

Grower rations	
Ingredient	% composition
Maize	25
Wheat	25
Wheat bran	15
Rice bran	10
Sunflower cake	5
Cotton seed cake	11
Fish meal	2
Beans	5
Bone meal	1
Limestone	0.5
Salt	0.5
Mineral premix	1

Layer ration	
Ingredient	% composition
Maize	35
Rice bran	35
Soya cake	10
Fish meal	15
Limestone	2
Ground dried Legume leaves	3.5
Salt	0.5
Mineral premix	1
	100

Culling from outward Appearance

The appearance of a bird though not an index of its laying ability gives an idea about its health and vigour. The main characteristic for distinguishing a layer from a non-layer is given below.

Character	Laying hen	Non-laying hen
Comb and wattle	Full, red, waxy, warm and velvet like	dry, hard cold, coarse and shrunken with white scabs
Beak	Stocky, well curved, worn -out and less yellow	Very long, thin and sharp pointed, yellow
Eyes	Bright and alert	Dull and sleepy
Ear lobes	Full, waxy and velvet like	Shrunken, wrinkled and coarse
Pelvic bones	Usually spread apart more than 2 fingers, thin and pliable	practically close together thick and stiff
Abdomen	Large, spread 3 to 5 fingers, soft and less of fat	Small usually less than 2 fingers, hard and more of fat
Vent	Full, large and moist	Small, dry and puckered

Culling on the Basis of Moulting:

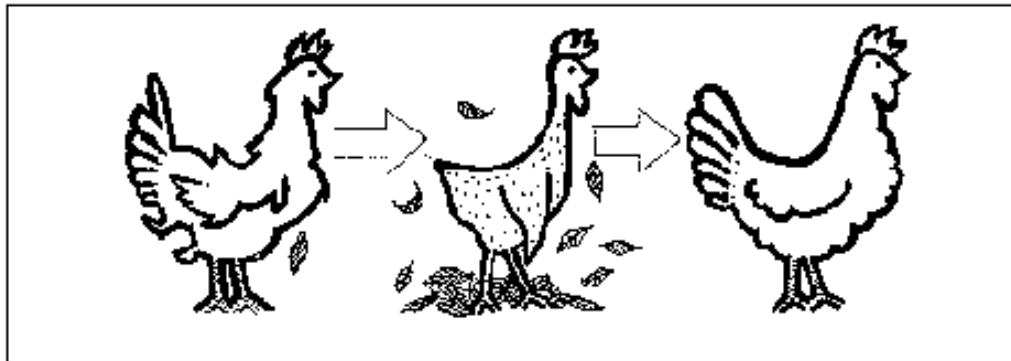
Moulting which refers to the shedding of feathers provides some indication about the laying capacity of a bird. **Good layers not only moult late but also complete the moulting period quickly** and sometimes continue to lay even during moulting. Poor layers on the other hand moult early, take a long time to complete the process and do not lay any eggs during the moulting period. It is possible to determine the beginning of moulting by counting the stiff primary feathers in the wing. The first one to be dropped is the inner one next to the axial feather which separates the primary from the secondaries. It takes about 6 weeks for the first new primary feather and 2 weeks for each additional full-grown feather. A wing having 4 new primaries during moulting season indicates that the bird has been in moulting for 12 weeks.

Chickens will lose feathers in a sequence starting with the **head and neck and then down the back, across the breast and thighs and finally their wings ,tail feathers.**

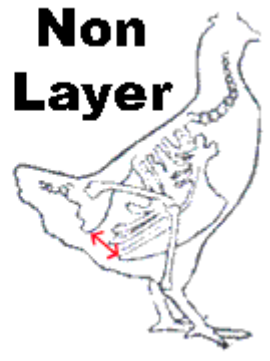
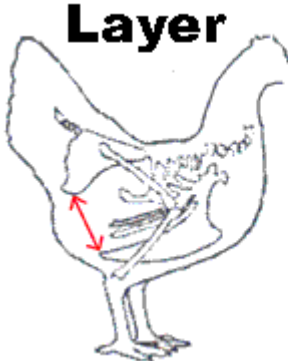
The new feathers that emerge are called pinfeathers and will grow in following the same sequence they were lost.

Forced molting/Induced molting

- At 65 to 70 weeks of age
- To reduce cost of replacement by newer pullet
- Light duration reduced suddenly from 16 hours to 12 hours
- Quantitative feed restriction
- Sometimes severe feed ,water or both deprivation
- Molting takes place at a time for all the birds
- Molting completes within 4-6 weeks
- Birds are provided with protein enriched feed



Culling of non layer and poor layer



DETERMINING WHETHER A HEN IS LAYING BY POSITIONS-OF PUBIC BONES AND BREAST BONES



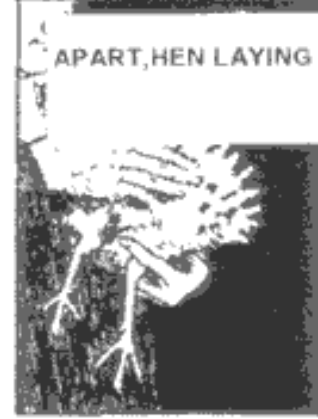
A-PUBIC BONES TOO CLOSE TOGETHER.



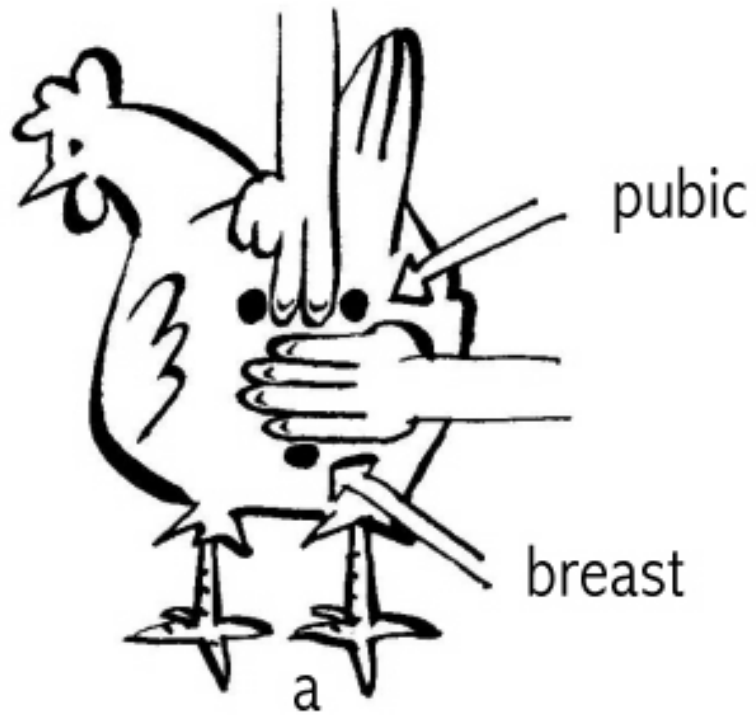
B-PUBIC BONES FAR APART, HEN LAYING



C-PUBIC AND BREAST BONES CLOSED. NON LAYER



P-PUBIC BONES AND KEEL FAR APART, HEN LAYING



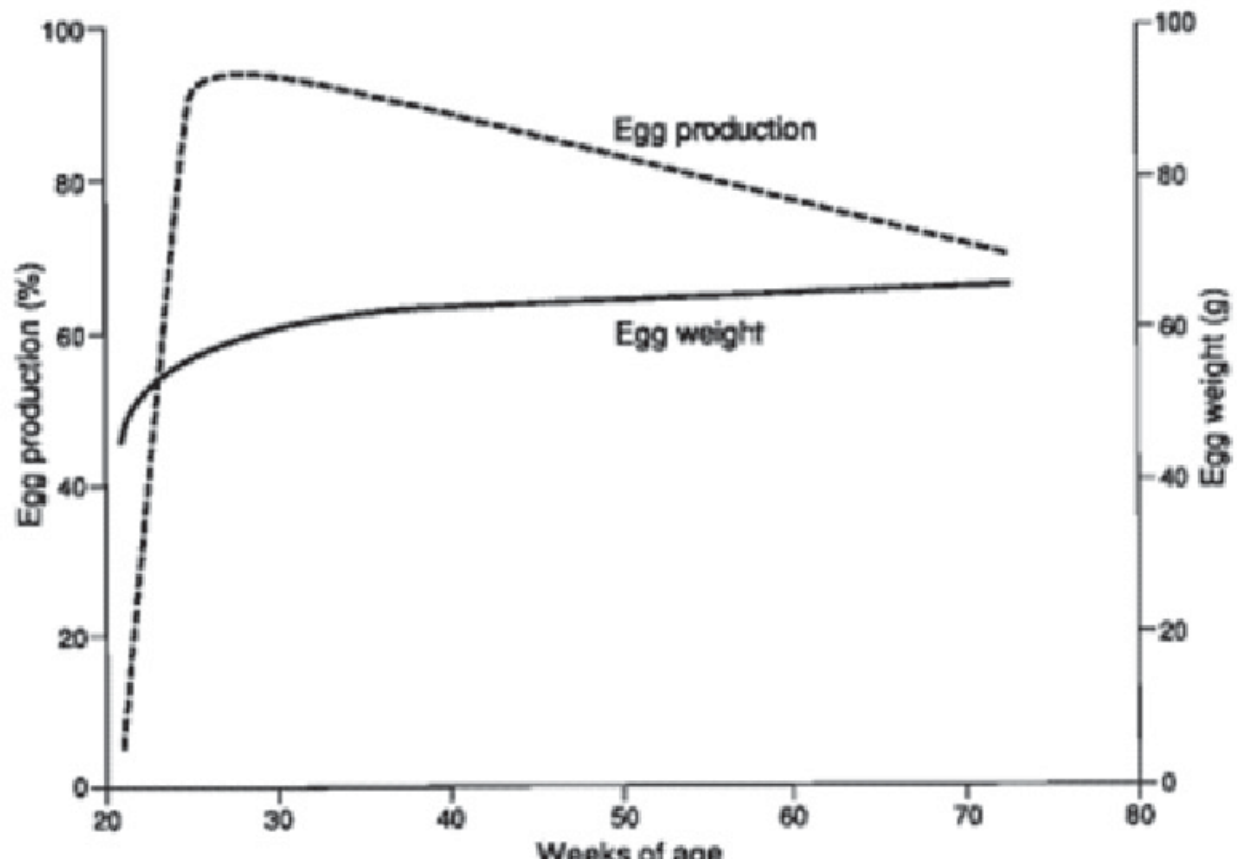
Hen in lay (a) and outside lay (b)

PERSISTENCY OF LAY

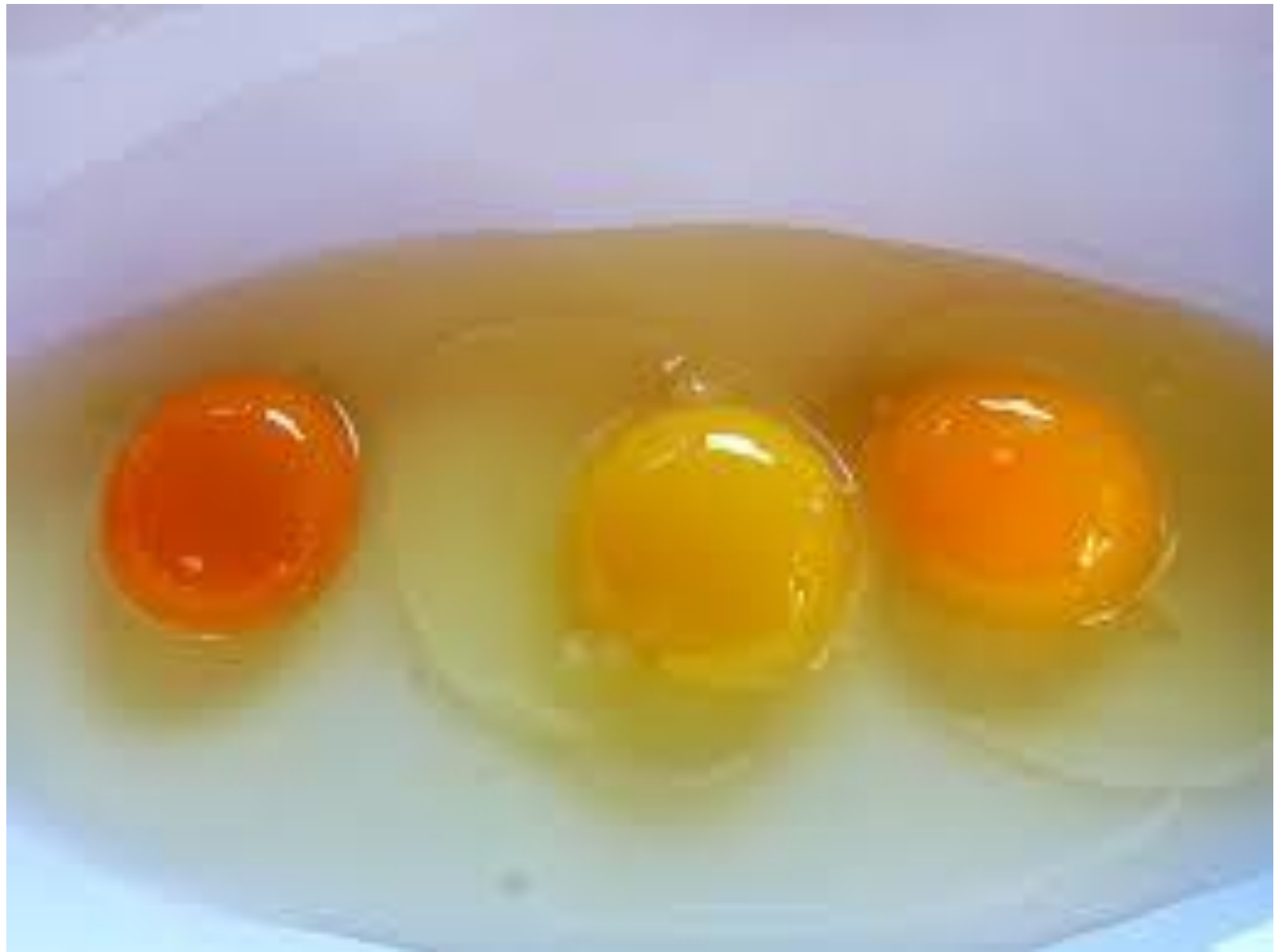
Persistency of lay refers to the number of eggs laid over a specific period of time. **Intensity of lay** refers to the current level of egg production. With yellow-skinned hens, such as Leghorns, loss of pigment from their skin is an important characteristic for determining the persistency of lay. As a pullet grows, yellow pigment is deposited in the skin, beak, shanks and feet. Once the pullet starts laying eggs, the pigment is then removed from the pigmented areas to provide the yellow colour in egg yolks. This pigment is due to the deposition of **carotenoid pigment** mainly **xanthophylls** coming from the feed of the birds.

RELATIONSHIP BETWEEN DEPIGMENTATION OF BODY PARTS AND NUMBER OF EGGS LAID

<i>Order of depigmentation</i>	<i>No. of eggs laid to bleach the body part</i>	<i>Time taken to bleach (after first egg is laid)</i>
• Vent	0 to 10 eggs	0 to 2 weeks
• Eye ring and ear lobe		
• Beak	35 eggs	6 to 8 weeks
• Shanks:		
Bottom of feet	68 eggs	12 to 16 weeks
Front of shank	96 eggs	16 to 24 weeks
Entire shank	175 eggs	24 to 32 weeks



TYPICAL EGG PRODUCTION CURVE



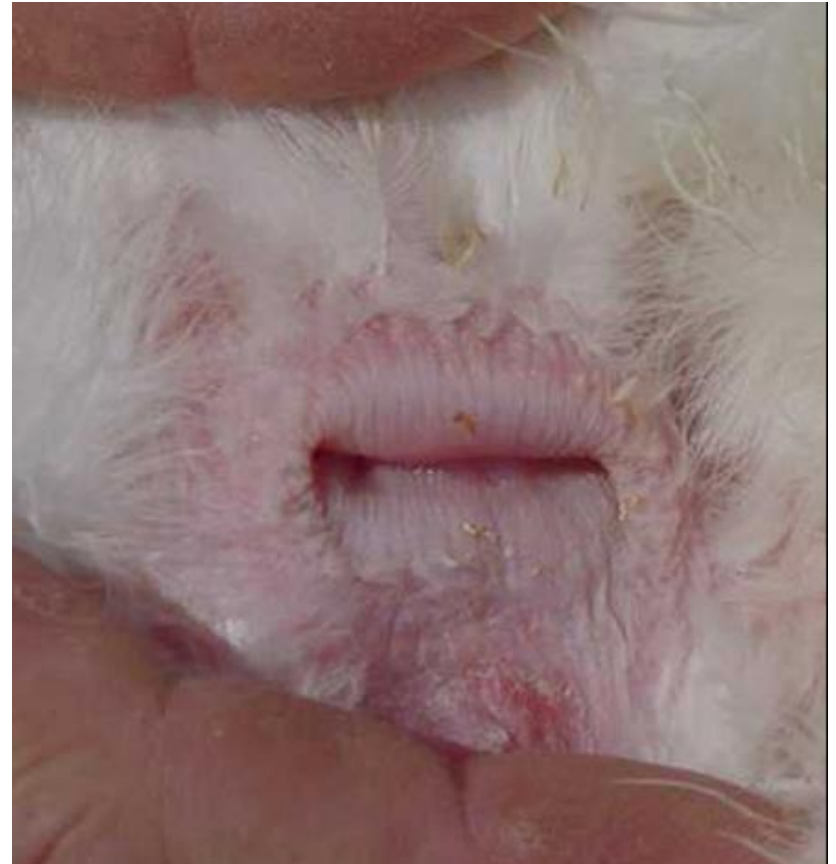
Yolk colour varies with different types of feeds



Comparison of the yellow colour in the eye ring, ear lobe and beak of a poor layer (photo on the left) and a good layer (photo on the right)



**Loss of pigment from the front of the shanks
and tops of toes.**



Comparison in the colour of the skin around the vent of a poor layer (photo on the left) and a good layer

LAYER VACCINATION SCHEDULE

S. No.	Age	Vaccine	Route of administration
1	First day	Marek's disease	Under skin
2	5 th day	Raniket disease (F/B)	I/O or I/N
3	7 th day	Marek's disease booster	Under skin
4	10 th day	Debeaking	-
5	12-14 th day	Marek's disease - Intermediate	Eye
6	20-22 nd day	IBD Plus	I/O / water
7	27 th day	LaSota	water
8	30 th day	Infectious Bronchitis(IB)	water
9	42 nd day	Fowl Pox	wing
10	47 th day	Deworming	water
11	52 nd day	LaSota	water
12	64 th day	R ₂ B	I/M
14	86 th day	Coryza / Fowl Cholera	Under skin
15	93 rd day	IB	water
16	100 day	Debeaking (second time)	-
17	110 th day	Deworming	water
18	112 th day	LaSota	water
19	126 th day	RD - Killed	Under skin
20	280 th day	Deworming / LaSota	water

Laying flocks are generally to be **depopulated** after one year of production, since keeping them longer into second year of production may be uneconomical. If there is any outbreak of vertically transmitted diseases, like salmonellosis, total culling is recommended.

