
UNIT 12 FORCED MOULTING IN POULTRY

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12.1 LEARNING OUTCOMES

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| <p>a) Knowledge and Understanding: After studying this Unit, you will be able to:</p> <ul style="list-style-type: none">• Understand the meaning and purpose of natural and forced moulting• Explain the economic reasons behind forced moulting. <p>b) Practical and Professional Skills: After studying this Unit, you will be able to:</p> <ul style="list-style-type: none">• Discuss different methods of forced moulting.• Demonstrate the main welfare concerns in forced moulting. |
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12.2 INTRODUCTION

Dear Learner,

Most pressing welfare issues in commercial layer poultry (egg laying chicken) are beak-trimming and moulting. In the previous unit we discussed the welfare issues associated with beak-trimming. Further, in the Unit 10 on 'Welfare Issues in Commercial Layers' we studied briefly about moulting. In this unit let us discuss more details about moulting with the following questions:

- What is natural moulting and forced moulting?

- Why forced moulting is practiced in commercial layer poultry?
- What are different methods of forced moulting?
- What are the welfare issues involved in forced moulting?
- How to improve welfare of birds in forced moulting?

12.3 NATURAL MOULTING

Moulting is a natural physiological process in domestic hens at the end of their laying cycle, where the reproductive system also undergoes complete remodelling concomitant to feather replacement. Natural moulting represents the renewal of old feathers few times at different stages of life cycle including the end of the egg laying period. Moulting at different stages :

- **First Moulting:** It starts when the chick is about 6–8 days old and continues up to 4 weeks, when the early feathers (down) are replaced. Feathers are first lost from the head, neck, then the breast, and finally the tail and wings. Moults can be partial (occurring on particular parts of the body) or complete.
- **Moulting in Pullets:** By the time hen start laying eggs they undergo four moults – one complete moult during chick stage and three partial moults (7–9 weeks, 12–16 weeks and 20–22 weeks). The hard tail feathers grow during the moult at 20-22 weeks.
- **Moulting in Cockerels:** During moulting of male chicken, their body weight is reduced, reproductive system is in a resting stage and they are nearly infertile.
- **Moulting in Adult Hens:** Normally adult birds moult once in a year (around 16-18 weeks age), but occasionally twice a year or once in two years. During these moults, birds stop egg production and build up their nutrient reserves. This is the most important moult for egg layers to continue their progeny naturally.

Natural moulting usually begins sometime during March-April and may be completed by July when egg production recommences. The main factors which bring about natural moulting are (Fig 12.1):

- Physical exhaustion and fatigue.
- Hormones secreted by the thyroid gland.
- Completion of the laying cycle - birds only lay eggs for a certain period of time
- Reduction of day length, resulting in reduced feeding time, and consequent loss of bodyweight.

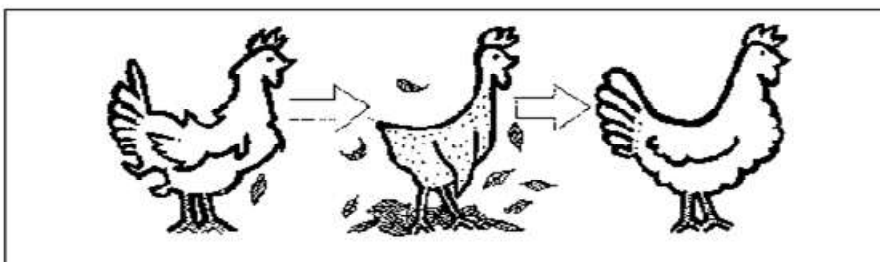


Fig. 12.1: Natural moulting (Source: Jim, 2004)

Before we proceed, please complete activity 1.

Activity 1 (Visit): Visit a nearby backyard / family poultry farmer and discuss about characteristics of birds during natural moulting. Write the outcome of the discussion along with your observations.

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Check Your Progress 1

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

- 1) What do you understand by the term natural moulting?
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- 2) What are the life stages in which natural moulting occurs in a hen?
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- 3) Write three main factors which bring about natural moulting?
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12.4 FORCED MOULTING

Normally hens live for more than six years. Egg laying in commercial hens starts giving eggs at around 16-18 weeks of age, reach peak at 25 weeks of age and continue up to 72 weeks. After that flocks are economically not viable and slaughtered as spent hens. However, instead of slaughtering, hens are force moulted to restart egg laying for one or two more laying cycles.

Forced moulting, sometimes known as induced moulting, is the practice of artificially provoking a flock to moult simultaneously, typically by withdrawing feed for 7–14 days and sometimes also withdrawing water for an extended period (Box 12.1).

Box 12.1: Forced Moulting

Forced Moulting is a process allowed in the egg production where hens are subjected to being starved and given no water for a period of 10-14 days. This “shocks” the hens into starting a new laying cycle and it is therefore done when egg production declines. This is a cruel and inhumane process that leads to a number of hens losing their feathers as well as dying from the starvation. It has been rightfully banned in some countries, but it continues to be legal in other countries. Forced moulting has been linked to *Salmonella* contamination in the eggs due to the weakened immune system of these animals. Forced moulting is not only unbelievably cruel but it is also a huge health hazard (Fig. 12.2).



Fig. 12.2: Forced moulting (Source: Rodriguez, 2017)

12.4.1 Common Moulting Stress Factors

The common stress factors which can induce moulting are (Jim, 2004):

- Lighting
 - o decreasing daylight
 - o decreasing artificial light
- Loss of bodyweight
- Diseases and internal parasites
- Climate - excessive cold, heat waves
- Feed, feeding and feedstuffs
 - o deficiencies of essential ingredients

- o irregular feeding
- o insufficient feed
- Predators eg. cats and dogs
- Fright (sudden fear due to wild birds and children)
- Peck order - low vitality
- Prolonged broodiness
- Mismanagement: overcrowding, movement to another house, water deprivation, insufficient feed and water space, faulty ventilation, wet litter, debeaking, vaccinations, exposed housing, etc.

12.4.2 Economic Reasons Behind Forced Moulting

During the forced moult, the birds cease producing eggs for at least two weeks, which allows the bird’s reproductive tracts to regress and rejuvenate. After the moult, the hen’s egg production rate usually peaks slightly lower than the previous peak, but egg quality and size are improved. The economic reasons behind forced moulting of egg laying hens are summarised in Box 12.2.

Box 12.2: Economic Reasons Behind Forced Moulting of Egg Laying Hens

Forced moulting is practiced due to the following economic reasons in layer poultry farms:

- Lowered egg production at the end of 1st egg laying cycle i.e. approximately after 72 weeks.
- Low egg rates in the market - moulting is done to save feed costs and to bring back layers for 2nd cycle of egg production.
- Shortage of replacement chicks/ high cost of day old chicks.
- To save feeding and rearing costs from chick to egg laying pullet stage.

The purpose of forced moulting is therefore to increase egg production, egg quality, and profitability of flocks in their second or subsequent laying phases, by not allowing the hen’s body the necessary time to rejuvenate during the natural cycle of feather replenishment.

Before we proceed, please complete activity 2.

Activity 2 (Visit): Visit a nearby commercial layer poultry farm practicing forced moulting and discuss with farm manager about purpose and economic reasons behind forced moulting of egg laying hens. Compare their reasons with the discussion given in the above section and write your observations.

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Check Your Progress 2

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

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

1) What do you mean by forced moulting?

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2) Why do farmers practice forced moulting?

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3) Write any four common stress factors which can induce moulting.

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4) What are the economic reasons behind forced moulting of egg laying hens?

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12.5 METHODS OF FORCED MOULTING

In the laying hens following are the methods practiced to induce moulting:

- 1) Fast induced moulting
 - a) Feed withdrawal
 - b) Water withdrawal
 - c) Combination of both feed and water withdrawal

- 2) Hormonal treatment
- 3) Mineral induced moulting
- 4) Food waste material
- 5) Photoperiod alteration

Among all the methods, fast induced moulting is widely practiced due to economic reasons.

12.5.1 Fast Induced Moulting

- Economic and widely practiced in egg laying hens and breeder birds.
- Fasting of hens to a particular length of time (number of days), or to a targeted body weight reduction (usually up to 30%)
- Length of moulting: Time taken from the initiation of fasting till the birds reach up to 50% egg production.
- Most common fasting duration
 - o Short term fasting: 4-6 days
 - o Medium fasting: 10 days
 - o Long term fasting: 12-16 days
- Fasting sometimes accompanied with water removal or followed alone. However, over the years practice of water removal is stopped and in turn increased the number of days of feed withdrawal.
- Prolonged feed withdrawal up to 14 days is widely practiced conventionally for achieving better eggshell quality during post moult production.
- Method of choice: Complete removal of feed for 10 - 14 days and reduction in photoperiod from 16 to 8 hrs (birds are out of production for a relatively short time).

12.5.2 Hormonal Treatment

- Moulting in laying hens can be induced with the use of hormones (Iodothyronines, thyroxin, triiodothyronine, progesterone etc).
- Hormonal treatment makes the reproductive tissue regress and induces moulting.

12.5.3 Mineral Induced Moulting

- High levels of dietary Zinc, Copper and Aluminium in the form of a soluble salt induce moulting.
- High dietary Zinc for 14 days reduces feed intake and consequently results in cessation of egg production.
- Dietary Zinc induced moulting was proved to be better in improving the immune status as well as the production performance and now becoming the favourable alternative to the conventional fast moulting procedures.

12.5.4 Food Waste Material

- The use of wastes generated from food processing industries like grape pomace, wheat middlings, cottonseed meals and jojoba meal have

experimentally proved to be a successful alternate to fast induced moulting methods.

- Similarly, alfa alfa is also used as feed additive to induce moulting in layers.

12.5.5 Photoperiod Alteration

- Annual change in photoperiod influences reproductive cycles of most birds.
- Most programmes also restrict the amount of lighting to provide a daylight period that is too short to stimulate egg production, providing a simulated autumn, the natural time of moult and minimum egg production.
- Lowered daylight terminates reproduction in many temperate, subtropical and tropical birds.
- Feather loss during this period may impair flight performance thus making moult and reproduction incompatible.

Among all the methods, fast induced moulting is widely practiced due to economic reasons. The other methods of forced moulting have not been widely used by the layer farms. Fast induced method is the cruel and inhumane moulting process that leads to a number of hens losing their feathers as well as dying from the starvation. The other methods also involve cruelty in one or the other form.

In the next section welfare issues involved in forced moulting are discussed for your comprehension.

12.6 WELFARE CONCERNS IN FORCED MOULTING

Feed withdrawal for 10-14 days is a serious and dreadful compromise of birds' welfare for whatever may be the economic reasons. This has received severe criticism from animal welfare organizations across the globe. Fasting of birds leads to negative impact on the welfare of hens. Various welfare concerns in fast induced moulting vis-à-vis compromise in five freedoms are summarised in Box 12.3.

Box 12.3: Welfare Concerns and Five Freedoms in Fast Induced Moulting	
Welfare Concerns	Compromised Freedom(s)
<p>Hunger and Thirst Concerns</p> <ul style="list-style-type: none"> • Birds are subjected to severe starvation and dehydration, which is inhumane. • Leads to malnutrition and stress to the highest order. • Higher morbidity and mortality during the early stages of moulting. • Dehydration results in impaired functioning of all body organs. • Research results proved that feed and water deprivation is not necessary to achieve moulting in poultry. 	<p>Freedom from hunger, thirst and malnutrition.</p> <p>Freedom from fear and distress.</p>

<p>Poultry Health Concerns</p> <ul style="list-style-type: none"> • Fasting leads to morbidity and mortality • Fasting makes the moulted hens more susceptible to and colonization of <i>Salmonella enteritidis</i> - a threat not only to hens, but also to the safety of eggs produced in next laying cycle. • Moulting promotes systemic disease conditions. • Fasting induced stress results in increased adrenal corticoids and decreased leukocytes, resulting in impaired immune response and more susceptibility to diseases. • Feed withdrawal is detrimental to the skeletal integrity of hens. • Feed withdrawal increases pH and alters the microenvironment of the birds' intestine. 	<p>Freedom from pain, injury and disease.</p> <p>Freedom from fear and distress.</p>
<p>Behavioural Concerns</p> <ul style="list-style-type: none"> • Increased pecking behaviour • More aggressive birds with other cage mates • Changes in vocal sound pattern 	<p>Freedom from pain, injury and disease.</p> <p>Freedom to express normal behaviour.</p>
<p>Metabolism Concerns</p> <ul style="list-style-type: none"> • High levels of dietary Zinc, Copper and Aluminium reduce feed intake up to 15%. • Zinc inhibits utilization of Calcium leading to bone and skeletal problems. 	<p>Freedom from hunger, thirst and malnutrition</p>

All methods of moulting are inhumane and severely compromise the welfare and five freedoms. Non-feed removal methods are slightly reasonable in comparison to the conventional total feed removal methods. However these methods need to be standardised in welfare friendly as well as cost effective form and made available to layer farmers, so that they will not practice forced feed withdrawal method.

12.6.1 Prevention of Cruelty to Animals (Egg Laying Hens) Rules, 2019

Globally it is recognised that forced moulting results in grossly inhumane treatment of hens and a significant health risk to humans who consume eggs from forced moulted hens. However, forced moulting is a very common management practice among egg producing poultry farms in several countries. The European Union, Australia, Canada and many other countries have prohibited forced moulting considering welfare grounds and safety of eggs for human consumption.

The Animal Welfare Board of India (AWBI) in 2011 ordered all poultry farms in India to immediately discontinue starvation forced moulting, stating that the practice is in violation of India's Prevention of Cruelty to Animals Act (1960),

3) What minerals are commonly used to induce moulting?

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4) Write the major welfare concerns in fast induced moulting.

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12.7 LET US SUM UP

- Moulting is a natural physiological process in domestic hens at the end of their laying cycle, where the reproductive system also undergoes complete remodelling concomitant to feather replacement.
- Main factors of natural moulting are: physical exhaustion and fatigue; completion of the laying cycle, and reduction of day length.
- Forced moulting, sometimes known as induced moulting, is the practice of artificially provoking a flock to moult simultaneously, typically by withdrawing food for 7–14 days and sometimes also withdrawing water for an extended period.
- Forced moulting is practiced due to the economic reasons like lowered egg production at the end of 1st egg laying cycle, low egg prices in the market, shortage of replacement chicks/ high cost of day old chicks, and to save feeding and rearing costs from chick to egg laying pullet stage.
- The methods practiced to induce forced moulting are: fast induced moulting (feed, water and combination of both feed and water withdrawal); hormonal treatment; mineral-induced light-dark manipulation and addition of food waste material to moulting diet.
- Due to economic and convenience reasons fast induced moulting is widely practiced.
- High levels of dietary Zinc, Copper and Aluminium in the form of a soluble salt are the commonly used minerals to induce moulting.
- The major welfare concerns in fast induced moulting are: hunger and thirst, malnutrition and stress, higher morbidity and mortality, susceptibility to salmonella other diseases due to impaired immunity, skeletal problems, increased pecking behaviour etc.
- The withdrawal of feed to induce moulting is prohibited in India now through Prevention of Cruelty to Animals (Egg Laying Hens) Rules, 2019.

12.8 KEYWORDS

Feather Pecking: Gentle feather pecking occurs when one hen pecks at the feathers of another, without pulling or removing the feathers. Severe feather pecking occurs when feathers are pulled violently or removed.

Forced Moulting: Also known as induced moulting, is the practice of artificially provoking a flock to moult simultaneously, typically by withdrawing feed for 7–14 days and sometimes also withdrawing water for an extended period.

Immune Response: The immune response is how hen's body recognizes and defends itself against bacteria, viruses, and substances that appear foreign and harmful to the bird.

Moulting / Natural Moulting: Moulting is a natural physiological process in domestic hens at the end of their laying cycle, where the reproductive system also undergoes complete remodelling concomitant to feather replacement.

12.9 BIBLIOGRAPHY AND FURTHER READING

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12.10 SELF ASSESSMENT EXERCISES

- 1) Discuss the difference between natural moulting and forced moulting.
- 2) Why forced moulting is practiced in commercial layer poultry?
- 3) Explain different methods of forced moulting?
- 4) Critically analyse the welfare issues involved in forced moulting with respect to five freedoms.
- 5) How to improve welfare of birds in forced moulting?

12.11 ANSWERS / HINTS TO CHECK YOUR PROGRESS

Check Your Progress 1

- 1) Natural moulting represents the renewal of old feathers few times at different stages of life cycle including the end of the egg laying period.
- 2) Natural moulting life cycle stages in hen occur during: chick stage (6–8 days old to 4 weeks); pullet stage (7–9 weeks, 12–16 weeks and 20–22 weeks), and; adult hens (normally once in a year-around 16-18 months age).
- 3) Main factors which bring about natural moulting are: physical exhaustion and fatigue; completion of the laying cycle, and; reduction of day length, resulting in reduced feeding time and loss of bodyweight.

Check Your Progress 2

- 1) Forced moulting, sometimes known as induced moulting, is the practice of artificially provoking a flock to moult simultaneously, typically by withdrawing food for 7–14 days and sometimes also withdrawing water for an extended period.
- 2) The purpose of forced moulting is to increase egg production, egg quality, and profitability of flocks in their second or subsequent laying phases.

- 3) The common stress factors which can induce moulting are: decreasing daylight, loss of bodyweight, diseases and internal parasites, climate - excessive cold, heat waves, deficiencies in feeding.
- 4) Forced moulting is practiced due to the economic reasons like: lowered egg production at the end of 1st egg laying cycle; low egg rates in the market; shortage of replacement chicks/ high cost of day old chicks, and; to save feeding and rearing costs from chick to egg laying pullet stage.

Check Your Progress 3

- 1) The methods practiced to induce forced moulting are: fast induced moulting (feed, water and combination of both feed and water withdrawal); hormonal treatment; mineral-induced and; light-dark manipulation and addition of food waste material to moulting diet.
- 2) Due to economic and convenience reasons fast induced moulting is widely practiced.
- 3) High levels of dietary Zinc, Copper and Aluminium in the form of a soluble salt are the commonly used minerals to induce moulting.
- 4) The major welfare concerns in fast induced moulting are: hunger and thirst, malnutrition and stress, higher morbidity and mortality, susceptibility to salmonella other diseases due to impaired immunity, skeletal problems, increased pecking behaviour.

MAW-002: ANIMAL WELFARE ISSUES

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BLOCK 2	ANIMAL WELFARE ISSUES IN SMALL RUMINANTS
Unit 3	Small Ruminants
Unit 4	Welfare Issues in Small Ruminants
BLOCK 3	ANIMAL WELFARE ISSUES IN PIGS
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BLOCK 4	WELFARE ISSUES IN POULTRY
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Unit 9	Welfare Issues in Commercial Broilers
Unit 10	Welfare Issues in Commercial Layers
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Unit 11	Beak - Trimming in Poultry
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Unit 22	Disasters and Animal Welfare