WEEK FIVE

POULTRY FEEDING AND NUTRITION

Digestive System

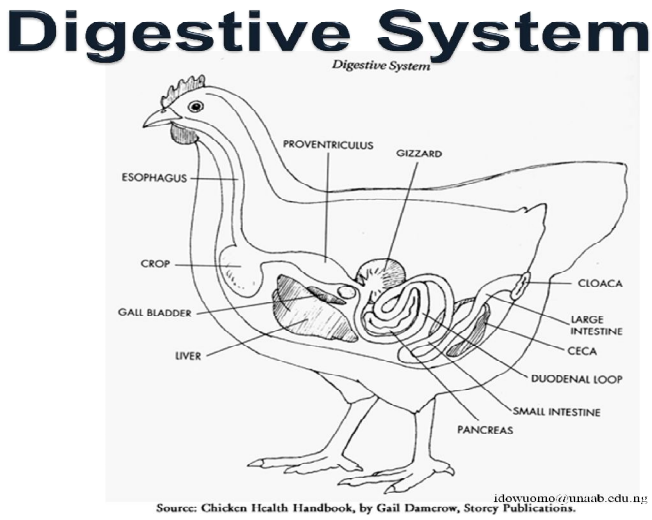
- Chicken's Body Length to the Digestive Tract ratio (1:4)
- Mouth contains no teeth
- Tongue consist of (top beak, tongue, Bottom beak)
- Tongue works off of a lever action concept

Parts

- ❑ Proventriculus
    - Secretes hydrochloric acid
- ❑ Gizzard
- Crush or grind the food (seed, grits)
- ❑ Pancreas
- Lies in the duodenum neutralizes the acid secretions of the proventriculus secretes enzymes that hydrolyzes protein, starches and fats
    - ❑ Duodenum

    Greatest site of absorption (loop)

How long does it take for a chicken to digest a meal?
About 3 hours



Feeding systems:

1-Whole grain method

2-Grain & mash

3-All mash: fed at first 8W

4-Wet mash feeding (more palatable)

5-Pellets

- With grain fed must used insoluble grit
- Also fresh green feed is fed to poultry.

Feeds and Feedings in Poultry Production

Poultry feeding is a major item of cost in poultry production. It is producing eggs and poultry meat. Adequate nutrition is essential in profitable chicken production enterprises. When chickens are provided with high quality feed at the required quantity, it promotes body maintenance, growth, improves egg production, and it gives energy, good health and vigour. Maintenance of the body is the first consideration in good feeding. Under normal conditions, production follows after the body needs are supplied. Considerable feed is required to build and maintain the body to the point of production. Actual production of eggs requires but a comparatively small amount of food in addition. Profit

comes from growth or production of meat or eggs. About three-fourth of the total feed consumed is used for maintenance when a fowl is in laying condition.

Terms which should be defined before the principles of feeding are discussed further.
Nutrient is any feed constituent or group of feed constituents of the same general chemical composition or a pure chemical compound that aids in the support of life. These consist of carbohydrates, protein, minerals, vitamins and water.

Feedstuff is synonymous with feed, food or fodder although it is broader, covering all materials included in the diet because of their nutritional properties. It includes natural feeds of animal origin,
synthetic and other pure nutrients which are added in the natural feeds.

Feed is a mixture of feedstuff blended/processed in a form which is acceptable to animals. It is merely the carrier of nutrient and potential energy in a ration.

Supplement is a feed/feed mixture used with another feed to improve the nutritive balance of total ration and it is intended to be fed undiluted as a supplement to other feeds. It could be:
• Offered free choice with other parts of the rations separately available
• Further diluted and mixed to produce a complete feed.

A **ration** is an allowance of feed given to an animal over a specified period of time, e.g. daily ration or weekly ration. It should furnish the entire nutrient required in adequate amount.

Diet connotes a feed which is offered to an animal over a non-specified period of time. It is formulated for special purposes– experimentation, special physiological conditions (sick, production); a ration is part of a diet.

Protein-energy ratio means the amount of protein in the feed or group of feeds as compared with the combined carbohydrates and fat. When we say a ration has a protein – energy ratio of 1 to 5, we mean that it contains one part of protein to every five parts of carbohydrates and fat.

$$\text{Feed conversion (FC)} = \frac{\text{Feed intake (g or kg)}}{\text{Weight gain (g or kg)}}$$

Factors affecting feed conversion:

1-Type of feed fed

2-Strain of the birds

3-Environmental temperature

4-Age and weight of the birds

5-Diseases and condemnations

6-Rodent & flying bird control in feeding area

7-Antibiotics and medications ⇒improve FC

8-Debeaking & size of baby chicks

9-Feed wastage

10-Form of the feed

Ad Libitum Feeding

This practice means feed must be available to the birds at all times. This method of feeding allows the poultry to consume feed to appetite or want. Birds raised for meat (broilers) are preferably fed ad libitum.

Advantages:

• More uniform body weight attainment at maturity.

• Feed management technique is less complicated as compared to feeding regimen in feed restriction programmes.

• Birds that feed themselves at will are less stressed up.

Disadvantages

• Birds overeat and increase feed cost during the rearing period.

• Meat type (broiler) breeders tend to overeat and grow excessively, thus compromising production efficiency and profitability (more small/peewee eggs prolapse etc).

• Overweight broiler breeders are prone to prolapse, reduced fertility, hatchability and reproductive failures.

Controlled Feeding

In this practice feed is supplied to the birds in limited quantity and/quality. The strains of birds must be grown on the controlled feeding programme to limit weight, particularly with broiler breeder strains. The female feed intake may be adjusted to delay egg at sexual maturity to maintain desired body weight and reduce prolapses. If the birds are overweight, some form of feed restriction may be imposed. It is advisable to start the restricted feeding programme from 6 weeks of age, although some breeders recommend earlier ages (2–3 weeks of age).

Advantages

• Reduction in the cost of feeding the birds during the growing period.

• Feed restriction results in later maturing birds that lay larger eggs at the initial period.

• The birds are less fat, thus protecting the birds from breeding problems due to excess fat.

• It leads to the production of more hatchable eggs during the laying year.

Disadvantages

• Management of the restricted feeding programme is more complicated than ad libitum feeding.

• Birds may be more uneven in body size mainly because of the differential feed intake of “boss” vs “timid” birds.

• It is more troublesome to feed the birds because they fight among themselves in a bid to get at the feed.

• Increase in cannibalism and mortality problems.

Facts should be considered when computing ration for poultry:

1-Feed must contain all essential nutrients in right amounts & proportion required.

2-Different standards per age should be followed.

3-Palatability of the ingredients which used.

4-Unlike ruminants, poultry completely depend upon the dietary sources for all nutrients (essential AAs., vit.B groups & vit.K).

5-Include agro-industrial by-products to minimize cost of the ration,

6-Optimum level of ingredient inclusion as many of ingredients have a deleterious effect at higher levels.

7-Optimum Ca:P ratio for different purposes.

Nutrient requirements of poultry

The requirement for any nutrient may be defined as the amount of that nutrient which must be supplied in the diet to meet the needs of the normal healthy animal, given an otherwise completely adequate diet in an environment compatible with good health. Such a level of nutrient must be capable of meeting the requirements for maintenance, optimum growth and reproductive potential of the animal. Nnutrient requirement is the amount of a given nutrient required by the animal to maximize performance but not necessarily maximize profit. The nutrient levels or requirements are expressed in the amount of nutrient per kilogramme of air dry feed (i.e. feed as fed) or in terms of percentages on as fed basis (air dry basis).

Factors Affecting nutrients requirements of poultry:

1. Environmental Temperature: This has a marked effect on energy requirement and hence the feed intake. Animals tend to eat less in warm than in cold environments. Research has shown that for every 5 ^{o}C change in pen temperature, there is about 20 kcal change in the ME intake of birds. Pen temperatures of 18 to 24^{o}C are within the normal comfort zone of poultry.

2. Energy Content of the Diet: Poultry generally tend to eat to meet their energy requirements if fed ad libitum (i.e. if fed free choice). To put it another way, over a wide range of metabolizable energy (ME) concentration per unit weight of a balanced diet, and if fed ad libitum, most poultry will likely adjust feed intake in order to provide fixed ME

consumption. Thus ME consumption is more likely to be constant than total feed intake. Chickens fed low energy diets will eat more feed than those fed high energy diets. Therefore, the amount of required nutrients in poultry rations must be adjusted in relation to the energy level in the ration in order to ensure that the birds consume the right amount of needed nutrient.

3. Productive State of the Animal: The broiler chicken and turkey poult have high requirements for amino acids to meet the needs for rapid growth; the mature cockerel has a very low requirement than the laying hen, even though body size is actually greater and feed consumption is similar; high egg producing hens would require more nutrients than low egg producing hens.

3. Sex: Cockerels need more energy than pullets and chickens.

4. Age: Nutrient requirements change with the age of the animal.

5. Size of the Animal: Large animals (broiler finisher, matured turkey) need more feed and hence more nutrients than spent layers.

6. Effects of Diseases (Ill-Health and Infection): Diseases and the presence of internal parasites, coccidia, bacteria or external parasites may affect feed intake and the requirements for certain nutrients. Infection reduces feed intake. Poultry recovering from illness need more energy and nutrients than healthy birds.

7. Balance between Nutrients: This may affect the metabolic utilization of individual nutrients and hence their requirements, e.g. dietary protein level versus individual amino acids, vitamin D, calcium and phosphorus interrelationship.

8. The Presence of Toxic Factors in Feeding-Stuffs: Linamarin in cassava products increases the need for methionine, gossypol in cotton seed; trypsin inhibitor in soyabeans; progoitrin in canola seed; toxins from field fungi; aflatoxin in groundnut cake.

9. System of Management: This may affect recommended nutrient levels of poultry in terms of the floor or cage rearing; intensive or extensive system of management.

1-Energy requirement:

The largest single dietary need of an animal is for a source of energy. Energy is required for all processes of life. Without energy birds cannot move, eat, digest, grow, maintain body temperature and, in the case of layers produce eggs. The requirements for energy cannot be stated as precisely as the requirements for protein, amino acids, minerals and

vitamins. This is because good growth and egg production can be achieved with a wide range of energy levels. Most chickens have the ability to adjust feed intake in order to obtain the necessary energy required for optimum performance. Poultry eat to satisfy their energy needs when fed free choice, thus must control the intake of all nutrients by including them in a definite proportion to available energy level.

High energy cereal grains are the principal energy sources. Fat may be added at levels of 3-8% to increase dietary energy concentrations. Chicks aged day-old to 4–6 weeks are however not able to adjust feed intake to diet energy variations and thus tend to consume slightly more energy as the energy level of the diet increases. Not all energy eaten by the chicks is used. The energy that is used is called metabolizable energy (ME) and is measured in terms of kilocalories or kilojoules. The energy levels recommended for broiler chickens (3000 kcal/kg diet) are lower than those (3200, 2900 and 2900 kcal/kg diet respectively) recommended or assumed for temperate zones of America. At high temperatures, heat losses and basal metabolic rates are generally lower than those at lower temperatures. This means that at high temperatures, the energy is used more for reproductive and productive purpose and less on non-productive purposes.

Factors affecting feed intake:

1-Energy levels in the ration:

↑ energy level ⇒ ↓ feed intake

↓ energy level ⇒ ↑ feed intake

2-Environmental temperature:(SET, 16-24C)

↑ Temp. ⇒ ↓ feed intake

↓ Temp. ⇒ ↑ feed intake

3-Health of the bird

4-Genetics

5-Form of the feed

6-Nutritive balance of the diet

7-Stress

8-Body size

9-Rate of growth & egg production

2- Protein requirement:

The amount of protein required is proportional to the energy level in the ration. Poultry required the 14 essential AAs. Once the minimum amount of protein required supporting maximum growth rate or egg production is supplied, additional protein is oxidized for energy. The crude protein required in a layers diet has been reported to vary from 15 to 18 per cent which is lower than the requirement for pullet chicks (20%) and broilers (20-23%), since protein sources are expensive component of a ration, it is not economical to feed excess
protein to animals.

- ↑ Temp. ⇒ ↓ feed intake ⇒ ↑ protein req.
  ↓ Temp. ⇒ ↑ feed intake ⇒ ↓ protein req.
- The amino acid levels are expressed as percentages of the diets and decrease as the recommended protein level decreases. Some AAs can met by other AAs:
  Cystine ⇒ methionine, Tyrosine ⇒ phenylalanine
  Glysine ⇒ Serine
- Overheating or underheating during processing can affect the availability of some amino acids.

Essential AAs for laying hens:

- **Leucine, isoleucine, lysine, methionine, tryptophan and arginine.**
- **Methionine is first limiting Aas for egg production.**
- **Mash for laying hens should contain not less than 3-4% animal protein supplement.**
- **Feather are high in sulfur amino acids (required methionine).**

The recommended protein levels decrease as the chickens get older. Under normal circumstances, birds eat more as they grow older. Thertotal protein consumed increases as the birds gets older and presumably increases in weight.

Mineral Requirements of Poultry

Minerals are basic elements required for skeletal tissue development and maintenance. Special mention must be made of the recommended levels of calcium and phosphorus, particularly for "layers", because of the roles these two minerals play in egg formation. The levels of calcium and total phosphorus recommended for commercial layers (for table egg

production) and breeders (for hatching chicks) are respectively 3.5% and 0.85%. The requirements for these minerals appear to be higher for warm climates than the cold climates. As a general rule, a level of 4-4.5% calcium and 1-1.1% total phosphorus should be provided at all times for birds reared in the tropics. In practice, 0.30–0.50% common salt or sodium chloride would take care of the requirements for sodium and chloride by all classes of poultry. All other **macro – minerals** are provided in ample amounts by the usual natural ingredients used in formulating poultry feeds. The **micro–elements** are often included in

most commercial premixes. The amount of a micro–element is sometimes expressed in parts per million (ppm) or milligrams per kilogram of diet. In practice, about double the amount of premixes added to chicken diets should be used in turkey diets.

Points to note :

Calcium & Phosphorus:

- **The recommended ratio P:Ca in diet of poultry is 1:1.2 (range 1:1 to 1:1.5)**
  For laying hen 1:4 (Ca important for bone & shell formation)
- **↑ Ca in diet ⇒ ↓utilization of Mg, Mn & Zn.**
- **Inorganic P have a higher availability than organic P**
- **All P from animal origin & 40% from plant origin (wheat bran & rice bran) is available.**

Salt (NaCl):

- **The amount added depend upon the feed ingredients.**
- **The recommended level in the ration 0.25-0.5% of the ration.**

- **Adult poultry can tolerate much higher inclusion but the water consumption increased.**

D- Iodine:

- **Iodine included at rate of 0.5mg but when fish meal included at 5-10% no need iodine suppl.**

- **↑ Ca & P in diet ⇒ ↑ iodine requirement**

E- Magnesium:

- **No Mg Suppl. Needed for poultry ration.**
- **↑ Mg in diet ⇒laxation**

Vitamin Requirements

Vitamins are organic compounds required in extremely small quantities but essential for normal growth, health and productivity. Unlike protein, vitamins are usually supplied to poultry feeds in excess of their minimum requirements. However, if only minimum levels are provided, variations of expected feed consumption must be considered, and very high energy rations must be more liberally supplied with vitamins than low energy rations. Requirements are expressed in international units (I.U) which are the same as United States Pharmacopoeia units (U.S.P.). Most requirements for poultry are precisely known, particularly for those vitamins likely to be deficient in practical rations. Rations for young starting chicks and starting broilers are usually very liberally supplied with supplemental vitamins. Dietary **vitamins premix** inclusion is at the rate of 2.0–2.5 kg/tonne of feed. There are 13 vitamins listed as required by the chickens. The vitamins are classified as fat soluble vitamins (A, D, E and K) and water soluble vitamins (the B-complex vitamins and vitamins C).

Vitamin A:

- **Liberal supply of vit.A or carotene is needed for normal growth & health.**
- **Def. Symptoms: retardation of growth, emaciation, staggering gait & ruffled feathers, reduced immunity**
- **Sources: fish liver oils & other animal sources.**

Vitamin D:

- **Vit.D required for bone formation, egg production, reproduction & prevention of rickets.**
- **Def.symptoms:poor growth, lameness & rickets.**
- **Poultry do not exposure to sunlight, ration must suppl. With vit.D.**

C- Vitamin E:

- **Vit.E in vegetable is not readily available as in oil concentrates.**
- **Vit.E essential to prevent encyphalomalacia or crazy chick disease.**

D- Vitamin K:

- **Def. of vit.K $\Rightarrow$ delay clotting time of the blood & produce serious hemorrhage**
- **All mixtures should be suppl. With vit.K**
- **Treatment by sulfonamide $\Rightarrow \uparrow$ vit.K req.**

Riboflavin:

- **Def. of vit.B2 $\Rightarrow$curled-toe paralysis, dwarfism & degeneration of nerve trunks.**
- **Requirement: Broilers & breeder 4.4mg/kg**

  Layers 2.5 mg/kg ration

F- Thiamin:

- **Def. of thiamin $\Rightarrow$ nerve deg., convulsion & heart abnormalities.**

G- Niacin:

- **Def. of niacin $\Rightarrow$inflammation of tongue & mouth cavity (black tongue).**
- **Young chick required niacin more than adult due to less bacterial action synthesis.**

Vit.B12:

- **Animal proteins are good sources of vit.B12.**
- **Def. of vit.B12 $\Rightarrow$irritability, poor feathering & poor hatchability.**

Water Requirements

The quantities of water required by one hundred layers is about or over 24 litres per day or about one – quarter of a litre per bird per day. Normally, poultry consumes about 2 -3 parts of water for every part of feed on a weight basis (i.e. 2 to 3 kg water per kg consumed feed).

Depending on the age, turkey should be provided with about two to five times the amount of water recommended for pullets. During hot weather, consumption of water may rise to about 4-5 times the intake of feed. This has been suggested as being responsible for inadequate feed

intake in the tropics.

FEEDING OF BROILERS

Age / Nutrients	Protein (%)	ME (Kcal/kg)
Starter ration (0-3weeks)	22-24	2800
Grower ration (3-5 weeks)	20-22	3000
Finisher ration (5-7 weeks)	18-20	3200

FEEDING OF LAYING HENS

Nutrient requirements of laying hens:

1-**Energy requirement:**

- For maintenance (2kg wt.) = 220 Kcal

  For 70% production = 130 Kcal

  For 1 g gain/day = 3 Kcal

- The usual energy conc. Is 2.8 Mcal ME/kg diet

↓ Energy conc. Than 2.3 Mcal ⇒↓energy intake & egg production

2-**Protein requirement**:

- Laying hen receiving diet containing 3.1 Mcal ME/kg DM require 16.5% protein.
- To get maximum economic return from laying hen flock, a feed efficiency of 1.6-1.8 kg of feed per dozen of eggs produced is need.
- A laying ration should contain about 15% protein based on 2900 Kcal ME/kg of diet.

Effect of environmental temperature:

- Small light body weight hens consumes:
- In Summer ⇒90g feed (19% protein ⇒
- 17g protein/ hen/ day).
- In Winter ⇒ 110g feed (15.5% protein ⇒ 17g protein / hen / day)

Essential AAs for laying hens:

- Leucine, isoleucine, lysine, methionine, tryptophan and arginine.
- Methionine is first limiting Aas for egg production.
- Mash for laying hens should contain not less than 3-4% animal protein supplement.
- Feathers are high in sulfur amino acids (required methionine).

Fat supplement:

- Fat addition ⇒ ↑ egg yield in cold weather
- Fat addition ⇒ ↓ amount of feed required / dozen eggs.

3-**Mineral requirements**:

A-Calcium:

- Laying birds need large amounts of Ca because egg shells composed entirely of CaCo3

↓ Ca in laying ration ⇒ ↓ egg production & egg shell weak.

• Bird stored Ca for about 10-14 days before the first egg was laid in the marrow of long bone.

B-Phosphorus:

• Protein supplement used in poultry rations (mat meal, tankage, fish meal & dairy by-products) usually be sufficient in phosphorus.

• Plant protein supplement (SBOM) should supplement with P & Ca.

• Inorganic P is more available than phytate P.

C-Manganese:

↓ Ca in laying ration ⇒ ↓ egg production & egg shell weak & ↓ hatchability.

D- Iodine:

↓ Iodine in laying ration ⇒ goiter

• Iodized salt must be used instead of common salt in the ration of poultry.

E- Selenium:

↓ Se in laying ration ⇒Exudative diathesis

F- Zinc:

↓ Zn in laying ration ⇒skeletal abnormalities, ataxia, necrotic dermatitis & thin shell & hyperkeratinization of epidermis.

G- Salt:

• 0.15-0.25% of the total ration salt

4-Vitamin requirements:

A-Vitamin A :

• Laying hens require higher content of vit.A in their feed in very hot weather than cold because they consume less feed.

• ↓ vit.A in laying ration ⇒Nutritional roup (sticky materials from eye & nostrils)

B-Vitamin D :

↓ vit.D in laying ration ⇒thin shell eggs, ↓ egg production & hatchability, breast bone become soft & bones of legs & wings become fragile.

C-Riboflavin & vit.E :

↓ Riboflavin & vit.E in laying ration ⇒low hatchability

Phase-feeding of laying hens:

To adjust nutrient intake in accordance with the rate of egg production

A-Phase I (most critical period):

During 20 W period (22-42 W of age) pullet :

1-↑ egg production from zero to peak (85-90% production).

2- ↑ body weight from 1300 to 1900g.

3- ↑ egg size from 40g/egg at 22W to over 56g/egg at 42W of age

B-Phase II :

- Period after 42W of age when the hens attained mature body weight
- The period ranged from 42-72W of age.

Effect of temp. on egg shell:

- Hot weather ⇒ ↑ respiration rate ⇒ ↑ Co2 loss ⇒ ↓ blood bicarbonate level ⇒ ↓ egg shell formation

Stage of egg production:

- Egg production hen usually cover a period of 15 months
    - Commences at 20-22W of age ⇒ peak at 28-30W of age ⇒gradually decline to 65% after 15 months of lay.
    - ↑ lighted period ⇒ ↑ feed intake & ↑ stimulation of pituitary gland ⇒ ↑ egg laid

      Feeding systems:
    - 1-Whole grain method
    - 2-Grain & mash
    - 3-All mash: fed at first 8W
    - 4-Wet mash feeding (more palatable)

      5-Pellets
    - With grain fed must used insoluble grit
    - Also fresh green feed is fed to poultry.

      Nutrition and egg quality:

A-Egg size (egg weight):

Factors affecting egg size:

- 1-Level of protein in diet:
- 4-20% CP rations ⇒balanced AAs ⇒heavier eggs
- The choice of protein level in layer diet depend on accurate evaluation of extra-cost for the additional protein compare with the income from larger eggs obtained.

2-Energy intake

3-Mineral & vitamin levels:

- ↑ Ca & ↓ vit.D ⇒ ↓ egg weight
- 4-Level of linoleic acid:
- • Linoleic acid ⇒ formation lipoprotein in liver ⇒ ovary uptake by ova ⇒ higher egg weight

5-Strain

B-Shell quality:

- The quality of egg shells depend on the presence of adequate levels of vit.D_3 & certain minerals including Ca, P & Zn.
- Def. or imbalance of vit,D_3 , Ca & P ⇒ ↓ shell thickness & misshapen eggs ⇒ ↓ egg production
- ↓ Mn ⇒ thin & brittle-shelled eggs
- The blood carbonate is the source of carbonate in the shell formation
- Very hot weather ⇒ poor quality egg shells
- End of laying period ⇒falls egg shell quality due to failure in Ca metabolism & ↓ Ca of ration
- Sulphonamide drugs ⇒thin shelled eggs
- Insecticides & fungicides in grains ⇒malformed eggs
- Rancid cod liver oil in diet ⇒rough shells

- Diseases ⇒poor shell quality

Period	Protein (%)	ME (Kcal/kg)

C-Internal egg quality:

- The nutritive content of the egg depends upon the level of these nutrients in the diet of laying hen
- Suitable iodine in diet ⇒ ↑ content of eggs
- Def. of vit.B2 ⇒slight yellowish-green tinge in albumin

D-Yolk colour:

- The colour of egg yolk depend upon the presence of carotenoid pigment (xanthophylls) in the ration
- (fresh & good dried green feeds & feed additives)
- When 30% yellow maize or 5% good quality alfalfa or up to 22mg xanthophyll/kg ⇒ deep-yellow yolks
- Highly pigmented plants ⇒undesirable coloured yolks
- Large amount of untreated CSM ⇒brown mottled yolk & pinkish tint of albumin
- Pimento pepper in diet ⇒ orange-red yolks

FEEDING OF TURKEYS

The general principles of feeding turkeys are similar to those for feeding broilers. Major differences are in the protein levels required and the importance of the vitamins biotin & pyridoxine in turkey diets

- Poults must be fed & watered as soon as possible after hatching & if feeding delayed beyond 36h after hatching ⇒difficulty learning to eat & drink.
- Vits. & minerals suppl. of the diet essential for good hatchability of turkey eggs.
- At 10-12W of age separate hens from toms

First 3 weeks	30-33	2930-3000
0-4 W	28	2930-3000
4-8W	26	2900
8-12W	20-22	3100
13-16W	19	3200
17-20 W	16	3275
21 W-market	13-14	3350
Laying hen	15-18	2925
Peak production	19	2755

Nutritional disorders of turkey:

1-Leg weakness disorders:

Cause: def. of Ca, P, vit.D, choline, biotine, folic acid, Mn & zinc.

2-Enlargment of hock joint:

Cause: def. Of niacin, biotin, vit.E & zinc.

3-Footpad dermatitis:

Cause: biotin deficiency

Symptoms: sticky droppings adhere to the feet & cause dermatitis

4-Pendulous crop:

Cause:yeast proliferation in crop

Symptoms:gas production from fermentation of carbohydrate ⇒interfere with passage of ingesta from crops to proventriculus ⇒pendulous crop

Treatment: fungal inhibiting antibiotics

5-Ascitis:

Cause: high salt intake ⇒fluid accumulation in body cavities

6-Exudative diathesis:

Cause: Selenium deficiency

7-Aflatoxicosis:

- Aflatoxin affect the immune system ⇒increase susceptibility to disease
- Mycotoxin ⇒hemorrhage may bluish the carcass

FEEDING OF DUCKS & GEESE

- Commercial feeds in mash, pelleted or crumbles form available for ducks & geese
- If a commercial feed for ducks & geese is not available, chicken feed may be used (not contain coccidiostat)
- Geese will start to eat pasture when they are only few days old & feed additional grain if pasture is not of good quality.

Period	Protein (%)	ME (Kcal/Kg diet)
0-4 W (starter)	20	2900
After 4 W (grower)	15	3000
Breeding	15	2900

FEEDING OF DUCKS

Period	Protein (%)	ME (Kcal/Kg diet)
0-2 W (starter)	22	2900
2-7 W (grower)	16	3000
Breeding	15-18	2900