

## First lecture

### Commercial production for meat breeds.

**The breeding of meat breeds is now an industry called the name of the meat Chicken (Broiler Industry).**

It has become a science industry, joining a group of science: - **Management, Diseases, Medicine and Immunity**

-Large commercial groups to ensure the production of high-quality breeds and control of international markets.

**One of the most important & famous groups and strains of world of Chicken Meat (Broiler Industry).**

**A): The AVIAGEN GROUP:-** Is the largest conglomerate founded in 2001 and has headquarters in Scotland and another in the United States of America, and now includes strains :-

- 1)- **Ross,**
- 2)- **Arbor Acar, and**
- 3)- **Hy line**

**B) MERIAL GROUP:-** which includes both;-1)- **Hubbard, 2)- Shaver, 3)- Isa, 4)- Babcock**

**C)- NUTRICO GROUP:-** which includes:-

- 1)- **Hydro ,**
- 2)- **Hisax**
- 3)- **Bovans and**
- 4)- **Dekalb..**

**D) The LOHMAN INDIAN RIVER GROUP:-** which originated from the LOHMAN and INDIAN RIVER associations, joined AVIAGEN GROUP to become the largest group controlling **47%** of global meat sales, and **60%** of Middle East sales.

**E) COBB VANTRESS:-** which produces the meat breeder COBB .

**The main advantages of modern breeds of meat breeds: -**

- 1) **RAPID GROWTH.**
- 2) **High efficiency of food conversion.**

#### **1) RAPID GROWTH**

-This is the result of the intensive genetic selection made by the international companies specialized in the production of these breeds such as: - Hybro - Ross -

Lohman –Arbor Acar- Cobb and others. --In 1976, the body weight of the chicken was not more than 2000 g at the age of 63 days.

--In year (2006) the average body weight for both sexes (males and females) was 3052 g at 49 days.(7 week).

--- **If there is a boom, In large growth speed**, some companies have recommended that chicken be marketed at a very early age and not exceeding 36days.Because the chicken reaches in this age to the weight (1500-1700) g.

-Preferably European countries and even today, is marketed this age to get the proportion of meat explain more (More Lean Meat).

-Because after this age will increase the proportion of grease in meat (More Fat).

- This may affect the health of consumers in the future.

Table (1) (Rapid Growth breed result of the intensive genetic selection mode the international companies specialized to production these breed.)

<b>Year)(</b> ----- <b>BEFOR/1976</b>	<b>(Body Weight )(g)</b> ----- <b>1500- 1700</b>	<b>Age)(</b> ----- <b>80 / Days</b>
<b>1976</b>	<b>2000</b>	<b>63/ Days</b>
<b>2006</b>	<b>3052</b>	<b>49/ Days 7/ Week</b>
<b>2015</b> ----- <b>NOW/ 2017</b>	<b>1500 – 170</b> ----- <b>1500 - 1700</b>	<b>36/ Days</b> ----- <b>34/ Daye</b>

-This is a great development in the rapid growth of meat breeds accompanied by another development:

**2) – THE High EFFICIENCY OF FOOD CONVERSION:-**

I -So that the chicken to gain one gram of increased weight, it needed to consume more than (2) grams of feed in 1976 .

II -This amount dropped to 1.79 grams in 1996.

III -But in 2006, the chickens did not need more than 1.65 grams of food to increase the weight by one gram.

**Table (2) Efficiency of Food Conversion:-**

- To gain 1g Weight -----Consume 2g ---of food ----was in year 1976.
- To gain 1g Weight----- Consume 1,7g -- of Food -----was in Year 1996
- To gain 1g Weight-----Consume 1,65g—of Food-----Was in Year 2006.
- Introduction to the head and became these birds round and round shape.

- Because the companies are concentrated relative increase of the piece (Chest).
- which is the election of broad-chested chickens, this piece represents more than 30% of the total proportion of carcasses, which include each piece: - (THIGH ) – the (DORSAL) - the (NECK) –the( wings) on top of the (CHEST) piece.
- This is a focus on the chest piece (segment) and its percentage, was created because consumers in the US and European countries want to buy and consume the piece of chest only.
- Because Chest, it contains a high proportion of protein, the proportion of Fat and Cholesterol it is lower than the THIGH MEAT.
- People suffer from obesity, which is caused by overfeeding and over-eating.
- This is what causes them health problems known as:- Atherosclerosis and heart or cerebral thrombosis.
- And therefore prefer to buy piece of chest by a price that may cost the price of a whole chicken.
- This encouraged some countries of Brazil, for example, to produce and import more poultry meat, and to cut these seeds and export only pieces of Breast, to European countries at high prices and the rest of the pieces are offered cheaply.
- This shows that companies produce chickens according to the specifications required by the market. -And global companies producing meat breeds:-
- company such as Ross-Hubbard-Lohmann-Hybro-Acar-isa-Cobb.
- All these companies are in a state of constant competition to control the global markets, and to introduce competing strains meet the specifications required by the market and prices and specification prefer.

## Second lecture

Environmental factors which affect the poultry production, the appropriate environment conditions for the living birds breeding success factors within the housing in order to obtain the highest production while maintaining the health of birds.

### 1-Temperature:-

Poultry are warm blooded animal homotherms regardless of the temperature surrounding the animal and Poultry has ability to maintain its body temperature constant during the physiology of the thermal equilibrium, and the body temperature ranging between (40-42.8) degree.

The chicks has not the ability to regulate its body temperature compared with the adult birds due to the incomplete of its nervous system, therefore the brooding and rearing of the small chicks considered the most important stage of poultry production because the small chicks has no **stockpile** of food item.

### Effect of low temperature on poultry:

1. Effect of low temperature on the developed chicks and the appear of the symptoms of respiratory disease.
2. Effect of low temperature lead to increase of food consumption and affects the food conversion ratio.
3. Effect of low temperature lead to drop in egg production, all so small egg size and bad egg shell quality.
4. Low temperature in the cold season, Ventilation problem it is difficulties to keep the houses warm.
5. Low temperature lead to causing the congestion of the chicken in the floor system, lead to increase of pecking, {Cannibalism} and competition on feeders and waters.

### Effect of High Temperature on Poultry:

1. Effect of high temperature lead to decrease in food consumption then negatively affect on growth and production.
2. Effect of high temperature lead to Increasing water consumption, the chicks trying to cool itself by panting and too much moisture in the waste, causing Increasing water consumption lead to more ventilation.
3. Effect of high temperature lead to drop in egg production, bad egg shell and small size of eggs.

4. Effect of high temperature lead to general idleness beside pecking and {Cannibalism}.

## **2-Humidity in poultry House:**

Include water vapor in the house beside the moisture in litter. Humidity consider a factor severely influencing the growth and the production of poultry, because its associated directly with the environmental temperature.

The importance of humidity:-

**The need** of poultry to humidity in the beginning of age.

-High Humidity:- Leads to stimulate the process of feathering.

-Low Humidity:-Leads to tolerate the high temperature by panting through respiration therefore the bird loose excess heat by evaporation.

**The** humidity considers an important factor should be exist in the poultry houses in a limit quantity, the best **relative** humidity should be between (50-70%), its very important to control it in the house and the litter.

### **Effects of Low Humidity:**

1. Low humidity lead to damage the **health** of poultry and reduced production.
2. Low humidity lead to weak growth of **feathers** .
3. Low humidity lead to **slow** growth of chickens.
4. Low humidity lead to the appearance of pecking and **cannibalism**.
5. Low humidity less than **30%** causing dust and trouble in the respiratory system.
6. Low humidity less than 30% cause hardening of the **litter** and difficulty in turning over.

### **Affects of high humidity:**

1. High humidity lead to saturation of the litter and the house walls with large amount of moisture in cold seasons.
2. High humidity lead to the litter lose its characteristics such as insulation.
3. High humidity lead to the litter become in the form of mud, lead good media to grow worms and pathological bacteria.
4. High humidity lead to increase the concentration of ammonia gas.
5. High humidity cause birds many infect with respiratory diseases because its **sleeping** on the **wet** litter.

# Third lecture

## Poultry management 3

### 3-Ventilation

#### Poultry ventilation benefits:

- 1-Ventilation provide to the birds, sufficient quantity of air.
- 2- Ventilation:- Lead to moderate the house temperature.
- 3- Ventilation:- Lead to reduce the access of moisture.
- 4- Ventilation:- Lead to get rid of bad air which carrying harmful gases like CO<sub>2</sub>, ammonia, H<sub>2</sub>S .

#### Air components in animal houses

AIR:- is a mixture of different gases are colorless and odorless and do not interact with each other in the natural condition. It is well blended at a high distance and latitudes.

#### The Air Contains

At zero temperature and atmospheric pressure 760 mm Hg.

Gas	%
Oxygen	20.95
Nitrogen	78.04
CO <sub>2</sub>	0.03
Argon	0.933
H <sub>2</sub>	0.00005

#### The Effect of Gases in Air Poultry Housing.

##### 1)-Oxygen (20,95 ):-

The human or animal can live, Normal life at the low level of oxygen gradually to the extent of 15% a level that does not burn the candle and matchsticks.

The life continuous normal with -low oxygen even at 11-12%,.

But much lower than this level leads to increase rate of breathing and heartbeat, and the animal loses its life as a result of suffocations when the level of oxygen is less than 7%.

## **2)-Nitrogen oxides (78,04) :-**

Nitrogen oxides exist more disturbingly in the air of industrial areas and big cities because of gasoline burning. Long exposure to this gas leads to low immunity in the animals because of the low rate of antibodies production, the arrival of these oxides to pasture and crops leads to occurrence cases of poisoning especially in the cattle's & poultry

## **3)-Carbon dioxide:**

Exhaled air contains 5% of CO<sub>2</sub> this gas is heavier than the air so its gradually fall to the birds level , 2% of this gas in the poultry house increases the need of deep breathing with difficulties . 5% CO<sub>2</sub> causing very deep breathing with great difficulties and some mortalities . 10% of CO<sub>2</sub> die all the birds within few minutes.

## **4)-Hydrogen sulphate H<sub>2</sub>S:**

Comes from the decomposition of organic material such as broken eggs, waste in the litter and dead birds, and blood drops mixed with litters, this malodorous heavy gas affect the birds comfort and its productivity , 20 ppm of this gas in the house indicates poor ventilation and its necessary to get rid of it by using of fans , we can feel the existence of this gas by smell or by paper wet with lead acetate solution, which is getting black color when there is a large proportion of this gas.

## **5)-Ammonia gas:**

This gas is produced as a result of degradation of the protein materials in the litter and feces of birds at high temperature and humidity , it's a gas lighter than air and increasing in the higher ceiling and come down to the level of birds gradually with cold air currents from the ventilation holes and leads to severe infections of the eye , in severe cases causing ulcers in the eye and inflammation of the mucous membranes and cause the blind al ammonia , in the chickens (15 ppm) of this gas causing burning in the eye , and disclosed by using turmeric paper which changes the color from yellow to brown when there is a high percentage of this gas.

## **MANAGEMENT OF HATCHERY**

### **HATCHERY:-There are two types of hatching:-**

- 1)- Natural Hatchery.
- 2)- Artificial Hatchery.

**1)- Natural Hatchery chicks :-** The chicken laying a few eggs, kept & incubating there eggs during the period of fetal growth which takes (21)day, (for chicken) until the eggs hatch into chicks} Without Human intervention }

This type of hatching today is not following in the modern poultry industry, which was based industry around the world on Artificial Hatching Chicks.

**2)- Artificial Hatching Chicks:-**

The modern hen is a Tradition as an alternative means, where predispose automatic hatching machine requirements for embryonic development of { Ventilation, Temperature & Humidity, and Turn Over Eggs}. With Human intervention (100%)

Possibility produce of large numbers of hatching chicks at one time.

### **Hatchery specification**

The necessary conditions that should be available in the hatchery building.

1- Floor of cement and free from cracks and holes and sloping towards the direction of water courses to facilitate the discharge of wash water.

2-The building to be higher than the ground to the level of the building dock to facilitate the loading and discharging vehicles .

3-Rooms and halls hatchery are not subject to air currents and direct sunlight.

4-Be of good ventilation to get rid of bad air and excess moisture.

5-Provide generators for uses in case of power failure.

6-Provide batteries to bosom surplus chicks have not been marketed.

### **Conditions to be Provided in the Fertilized Eggs to the Hatchery Contained:**

1-The eggs should be output from breeders dedicated to produce hatching eggs.

2-Fresh eggs should be stored in an appropriate atmosphere that does not affect the vitality of embryo, and the storage period should not be more than one week, more storage time less hatchability.

3-The eggs should be oval shape and rounded but not elongated or very large or very small but should be medium-sized.



## **Elements of hatching**

1-Temperature:-The embryo needs high temperature in the early days of hatching and needs less heat in the last days as a result of integration of the embryo and began to produce self heat.

The high temperature accelerate the rate of embryos growth and leads to destruction the hatched chicks therefore will be small in size and weaker than the chick hatched in natural time.

Low Temperature:- delays the embryo growth and leads to occur abnormalities in the embryo and delay in hatching time and some mortality.

The fluctuation of the temperature all the time displays the embryo to the different speeds of growth of its members lead to the distortions and imbalance in the composition of the body and loss of embryos at an early age

2-Ventilation:- The embryo needs oxygen as its natural proportion in the air through all the stages of growth , and also needs CO<sub>2</sub> in the early days of the incubation period as its used in the interaction with the crust and withdrawal of calcium needed to build the skeleton structure , therefore we must not exceed the proportion of CO<sub>2</sub> more than 0.5% in the first days of the incubation and hatching, and not less than 0.3% at the end.

Excess CO<sub>2</sub> proportion leads to weakness of the embryo vitality , distorted and suffocation , generally must be renewed air brooder eight times per hour and depending on the size of the hatchery and to increase to 12 times in the last two days before hatching.

### **3- Eggs Humidity :**

Humidity in the egg content: Evaporates continuously through cortex pores, this process could be managed by controlling the relative humidity surrounding the egg. If the humidity is low around the eggs, evaporation increases from the egg to outside of egg and vice versa.

Humidity is necessary for metabolism and to get rid from biological wastes and to regulate the temperature. Low moisture leads to a large number of chicks conjoined to the egg shell.

### **4-Turning:-**

The process of turning eggs it's the key factor that provide correct embryo growth and prevent him from sticking to the shell especially in the early days of the incubation period as the egg yolk always floats to the top because of its high fat content that holds the germinal disc in the upper surface, when the embryos growth starts in the confine space

between the yolk and egg shell membrane sticks to the interior of the shell and lead to mortality.

Turning egg usually at an angle of 90° degrees 45 ° degree to the top and 45 degree to the down ward.

Turning the eggs during the period of incubation only (the first 18 days) starting after the third days.

Reduced gradually and stops on 18 days. The last 3 days leaving the embryo in preparation for hatching.

### **Sources and causes of moisture in poultry houses:**

- 1-The birds itself throws and **dropping** water vapor in to the house.
- 2- Sources and causes of moisture coming from outside, air humidity its high especially in the winters.
- 3- Sources and causes of moisture coming from dispersion of water during process of drinking water as a result of competition.
- 4- Sources and causes of moisture coming from, few chances of leakage of water from the ground or drinking water.
- 5-The arrival of rain water leaked from water pipes.
- 6- Sources and causes of moisture lead contamination of drinking water of some bacteria causing **diarrhea** and increase the proportion of waste and increasing the moisture in the litter.
- 7-The little number of ventilation fans to renew housing and low air temperature to the weak heating in the cold winter.

### **Methods to reduce or to get rid of moisture in the poultry houses:**

- 1- Increase fresh air in the housing.
- 2- Using deep litter or get rid of wet litter.
- 3- Using of materials that absorb moisture such as hydrated lime rate of 1kg/20mt<sup>2</sup> for drying litter.
- 4-Waste disposal(get rid) in the cage system.

**5**-Avoid the increase in density of birds.

**6**-Using insulation materials in poultry housing.

**7**-Using of administrative methods to control valves and waters to reduce scattering of waters, we should lift the caterers to the back of bird level.

## Fourth lecture

### Poultry management (4 )

#### Embryonic mortalities

Although the embryonic mortalities occurs through the hatching periods due to many factors but there are critical periods abounds or increases the fetal loss.

**1-Early period of incubation(3-5) Days:** these mortalities usually occurs between the third day and the five day of incubation and attributed to;

**A-**Imbalance in the process of breathing and not dispose of harmful secretions such as CO<sub>2</sub>, ammonia, and lactic acid appeared in the feeding of proteins.

**B-**Because of the temperature increasing in early period of the incubator, lead to embryonic mortalities.

**C-**Not turning enough of the eggs, lead to embryonic mortalities in early period of incubation.

#### **2-The middle period of Incubation (14) Days.**

Mortalities occurs in the second week of incubation due to the bad nutrition of the breeders which is leads to a lack of some basic compounds of the egg.

#### **3-The last period of Hatching (19-20-21) Day.**

A high percentage of mortalities (50%) happens after (18<sup>th</sup>) day of Hatchery due to;-

**A)-**weakness of the embryo therefore couldn't complete its last life, so its unable to get out through the crust.

**B)-**The incorrect:- Temperature, Humidity and Ventilation in the incubator.

**C)-** rough treatment during transporting the egg from the incubator to the hatcheries.

**D)-** Leave it truly of the incubator eggs for a long time outside of the machines leads to a lower temperature and loss of embryos.

#### **Comparison between good chicks and bad chicks.**

##### **Good chicks**

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**1-Chicks:-** The ability to stand on their legs and showing sign of vitality and activity, yellowish legs.

**2- Good Chicks:-** Must be open eyes and shiny, head wide. & Back wide and long. Short beak, thick and clean.

**3-Chicks** well covered with clean fluff, organized wings.

**4-Chicks** vent exit must be clean and free Accumulation .of dirt and Feces.

**5-Chick** integrated and slow claws.

**6-The average weight of breeder Chicks** not less than 42gms, Meat chick 40gms, & layer Chicks 38gms.

### **Bad chicks**

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**1-Inability** to stand and without vital signs and activity and legs inclined to blue.

**2- Chicks:-** non shiny closed eyes, tightly head, short back, weak beak formation.

**3-uncomplete** short fluff covered, non clean, non organized wings for chicks

**4- Chicks** vent exit dirty or bloody.

**5-Weak** and there is a lack in composition.

**6-The average weight** for weak chick is less.

### **The cost of hatching**

**1-The cost** of fertilized eggs.

This constitute a large proportion of the cost and the hatching eggs should have a good specification to make it fit for hatching.

**2-wayes** of labor:-

The work of preparing eggs for hatching and grading, sorting, fumigating and types, sorting, sexing, vaccinating the chicks, cleaning the building and machines.

**3-The cost** of the fuel ( electricity, gas , kerosene).

4-The cost of water.

5-The extinction(old) of the building and machines and cars.

6- Maintenance and sustainability.

7-The cost of miscellaneous items (boxes for transfer chicks disinfectants, cleaning tools) items

## **Density of birds in the housing**

Importance of the density factor and their determinants, the density of the birds means the number of birds per one square meter of ground. It is very important to allocate sufficient space of ground housing or cage for each bird to get its need for food water, light, heating and ventilation, with comfortable feeling without stress and therefore get the best efficiency performance.

### **The Density is Determined By the Following Factors:-**

#### **1)- The temperature of the environment.**

The density of the birds is affected by the environmental temperature that have a primary role in determining the number of birds per unit area especially in the open houses, which greatly affected by the temperature of the external environment degree heat, the density usually in summer is lower than in winter.

#### **2)-Ventilation system efficiency;**

Ventilation system is a key factor in determining the number of birds in enclosed housing, where they can put the required number of birds or increased in the case of working ventilation equipments with high efficiency.

#### **3)-Different strain and race of the birds**

The strain and races are different in their tolerance to environmental conditions, the heavy breeds and races needs bigger floor area units then the medium and slight strain and races

#### **4)-Age and type of birds effected on density of birde:-**

Chicks placed in great number per unit area compared with meat chickens, meat chickens set in great number than layers, layers set in great number than the turkey.

### **Effect of Different Bird Densities per Unit Area**

#### **Broiler:**

Problems created when increasing the number of birds on the number supposed to put in housing.

1. Increased heat resulting from the birds in the house which calls for disposal especially in the summer season and in warm areas.
2. Increase the moisture in the atmosphere of the house and the litter, which negatively affects the activity of the birds.
3. The need to increase the ventilation rate under the natural conditions to provide fresh air to the house to the surplus number of birds and to disposal of harmful gases and excess moisture and to regulate the temperature.
4. Low feed consumption and growth rate and bad feed conversion ratio .
5. The need to increase the number and length of feeders and waters to avoid the competition of the birds on food and waters.
6. The cannibalism occurs and the risk of illness and the with body deformities and breast blisters and the birds may die from weakness and suffocation.

The need to increase the serves and care.

#### **The layers:**

Effect of laying hen densities on production in the case of

##### **A)-Floor system.**

1. Need to increase the number of nests.
2. Low egg production.
3. Increase the number of broken eggs.

##### **B)-Cage system.**

In the case of setting five hens per cage the feed conversion efficiency and the egg production has decreased.

In the case of setting two layers per cage decreased profit of production has been shown best efficiency and productivity of high profit in the case of setting four hens per one cage.

## **Fifth lecture**