VENCOBB400

Broiler Management Guide

MANAGING FOR PROFITS

Vencobb

VENKATESHWARA HATCHERIES PVT LTD.

INTRODUCTION

Venco Research and Breeding Farm Pvt Ltd was established as a joint Venture between Cobb Vantress, Inc, USA and Venkateshwara Hatcheries Pvt Ltd., in 1980 with a specific objective to undertake the pure line research and breeding in India. Today, a full-fledged breeding program exists with technical help from Cobb-Vantress, Inc.

Over the years the Vencobb Broiler has performed well both as a breeder and commercial broiler. It has acquired a reputation of being the best of its kind, having achieved more than 75% of the Indian market share. Present market demands broilers with good meat yield, better feed conversion & early growth along with all other traits. Vencobb400 is bred to meet those demands.

This management guide is the result of the collective wisdom and experience garnered by producing the Vencobb400 broiler in varied climatic and operating environments. We are pleased to release this as a guide in managing Vencobb400 broiler flocks.

Management should be finely tuned to benefit fully from the potential of breed. Cost effective approach, effective utilisation of houses, efficient management of flocks, and disease prevention help in achieving low cost of production of broilers. Following scientific norms of poultry husbandry practices with balanced approach to cost efficacy will help in exploiting maximum genetic potential of Vencobb broilers.

This guide provides information on basic principles of broiler management and critical factors which are most likely to influence flock performance. Use it as a guiding light to upgrade and update your management to achieve better livability, growth, F. C. R. and consistency in performance.

The data presented in this guide is based on the performance obtained by a number of producers. However, they are meant to be a guide only and in no way they should be taken as a guarantee or warranty of performance.

CONTENTS

1. HOUSING DESIGN

Objective of housing is to provide a congenial environment of least stress which facilitate the birds to achieve best performance of weight gain, uniformity, feed efficiency with least depletion and to make sure that health and welfare of the bird are taken care.

Throughout the world three important climates which are taken in to view while designing housing are temperate, hot and dry, hot and humid. In Indian condition most of the times in an year we have hot and dry climate in some areas, hot and humid climate in some areas, humid and rainy climate during rainy season. Chilling cold and dry climate is prevalent during winter season and moderate climate a month before winter and a month after winter especially in Northern part. A moderate climate is seen during winter in rest of India. Hence, it is very difficult to suggest a single effective design of housing which can suit to all the climates throughout the year in India. In this chapter we deal with system of housing in Indian climate which can fairly take care of seasonal climate variation with minimum adoption of cost effective technology.

Points to be considered before designing a poultry house are,

- Site should be on well-drained land and has plenty of natural air movement.
- Local climate, cost effectiveness, durability & provision of comfortable environment in all the seasons
- Should be oriented on East West axis to reduce the amount of direct sunlight on the sides during hot part of the day.
- Sufficient overhang to the roof is necessary to provide shade and prevent entry of direct rains into the house.
- Roofing material should provide good insulation from heat and should not allow rain water to enter the house. Houses constructed underneath the shadow of trees get better cooling effect.
- In open houses sufficient height of the roof is to be maintained to facilitate ample air exchange and to maintain optimum temperature conditions to the birds.
- Lighting should be fitted with a view to provide an even distribution of light through out the house.

- The width of the house needs to be decided taking into account climate during major part of the year. Usually it is 20 to 30 ft. Least being for hot and humid climate and highest for moderate climate
- The partitions are provided to have pens which can accommodate 600 to 700 birds.
- Chain link ridge ventilation needs to be given due consideration while designing the house.
- Usually the parapet wall is of 1 to 1 ½ feet on both the open sides of the house.
- Structure may be of R. C. C., bricks, stone or iron depending upon the cost efficacy.
- Flooring - We suggest concrete flooring. The alternate is sandstone flooring.
- Consider automatic or semi automatic water line arrangement along with providing separate water tank to provide cool and fresh water all the time and which help preventing wet litter condition.
- Nipple drinking system with pressure regulator has many advantages even though initial investment is high
- Keep provision in each house for storage of feed, medicine and additional equipments if any.
- Provision of open or bore well water source and water treatment.

2. EQUIPMENT

2.1 DRINKING SYSTEMS

Bell Drinkers – Open Drinking System

From day old to first 10 days of age a minimum of 16 - 20 chick (mini) drinkers should be provided per 1000 chicks. As the broilers grow older chick drinkers are to be replaced with Bell type drinkers at the rate of one drinker per 70 birds. These should be placed evenly throughout the house so that birds need not walk more than 8 feet to drink water. Drinkers should be checked for height on a daily basis. Height of the drinkers is such that the base is in level with the bird's back. This will minimise faecal contamination of the bell drinkers. It is important to maintain correct water level all the time which reduces spillage of water. Drinkers should be washed daily with good sanitizer of recommended dose. Do not use sanitiser on the day of water vaccination.

Nipple Drinking - Closed Drinking System

Nipple drinkers are preferred to Bell drinkers because chances of water contamination is least, no water wastage, no spillage over the litter and daily cleaning of nipples and pipelines is not required. Nipple drinkers should be adjusted to suit chicks' height and water pressure. The beak of the bird should easily reach the nipple point and its feet should remain flat on the floor all the time. One nipple drinker is enough for 10 to 12 birds. It should be ensured that all nipples are operational. Number of nipple lines in a house is to be decided based on the width of the house and density of birds. Usually the thumb rule is one nipple line for 10 feet distance. While installing Nipple drinking system, manufacturer's recommendation should be followed and pressure regulator should be included.

Water Source and Storage Tank

Usually water is sourced from bore well, open well or water canals (river water which needs proper treatment & storage). We may also require water for evaporative cooling system. Size of main storage tank has to be decided after considering the total water requirement for all purpose – drinking, cleaning, evaporative cooling, foggers, spraying over vehicles, foot and vehicle dips and so on.

In addition to main storage tank, we recommend two small water tanks of matching

housing capacity for each house which can store and provide water sufficient for 24 hours. It should be installed in a cool place preferably inside the house and easily accessible for water medication. Two water tanks help in providing required reaction time for water sanitisers, to add water medicine / supportive to exact volume of water for a given period of medication and in preventing over medication and drug toxicity.

2.2 FEEDING EQUIPMENTS

The most widely used types of feeders are: hand filled trough (Linear feeders), hand filled hanging hoppers, mechanical chain (trough type) and center -less auger with pans (tube type). Regardless of which type of feeding system is used, feeder space is absolutely critical. If feeder space is insufficient, growth rates will be reduced and uniformity severely compromised. Feed distribution and the proximity of the feeder to the birds are key to achieving target feed consumption rates. If the targeted feed consumption is achieved, birds will attain expected body weight. All feeder systems should be calibrated to allow for sufficient feed volume with minimal waste

Trough Feeders

Provide 25-30 numbers five feet (1.5 m) trough feeders per 1000 birds. Use grills and adjustable legs on all feeders and raise height of feeders as birds grows. This is to increase feed efficiency and to keep litter out of the feeder.

1. **Feeder space allowances**

- Day old to 14 days – Allow 2 linear inches (5.0 cm) per bird
- 15 days to 35 days – Allow 3 linear inches (7.5 cm) per bird
- 36 days to market – allow 4 linear inches (10.0 cm) per bird

When determining the amount of space per feeder, measure both sides of the feeder. Grills should be provided on all trough feeders.

Hanging Hoppers

Hanging feeders made up of PVC material are available in various sizes from 5 KG to12 KG capacity. Generally these feeders are used from second week onwards till culling of the birds. One hanging feeder is used to feed 50 birds. During first week of age, plates are used for feeding the chicks.

2.3 HEATING SYSTEMS

One of the keys to maximizing bird performance is providing a uniform and consistent housing environment. A fluctuation in house temperature and floor temperature will stress young birds. With a goal to consistently control temperature, various heating systems are available.

Types of Heating Sources

- Electrical Brooding
- Gas Brooding
- Coal Brooding

Depending upon the season, brooding practices vary in tropical countries where large conventional open housing is normally practiced.

Winter : Use 1/3 area of the house for brooding

Summer : Use 1/ 2 area of the house for brooding

Even though efforts are made to conserve heat, it is often noticed that ventilation is not given due importance. In view of fast growth and high rate of metabolism, commercial broilers need special attention for provision of enough ventilation. Therefore it is necessary to give due importance to air exchange along with temperature control. It can be achieved only by keen observation of behaviour of the chicks, measuring room temperature

Gas Brooding

Use of LPG operated Gas Brooders gives much more uniform heat as compared to conventional types of brooding practices like Electric Lamps / Coal or Wood Heaters. The radiant Gas Brooder creates micro-climate for the chicks so that they can choose their most comfortable place and warmth at any time. This results in proper growth and weight gain which is more uniform. LPG Gas Brooding can be done either by Central Control System or by Individually Controlled Infra Red Radiant Gas Brooders. Remember that any brooding system must have a temperature control device. The advantage of temperature control is in energy saving and to meet the precise heat requirement of the birds which changes with their age.

Infra Red Radiant Brooder can be placed 90 to 130 cm above the ground level depending upon the heat requirement. The number and types of Gas Brooders can

be decided as per the specifications of the Gas Brooder supplier. It is very important to note that the Gas Brooder which you select spells out the specifications in terms of BTU or kW rating, operating pressures etc. It is always safe to select the brooder, which has got international quality mark for safety and reliability. Before chicks arrive, ensure that the filled LPG Gas Cylinders are available at the site. Maintain temperature of 32° to 34°C on day one. Measure the same at 10 to 25 cm above the litter level. Lower the temperature approximately by 3°C per week until reaching a temperature of 25°C. The temperature can be sensed by a sensor connected to individual Gas Brooder or to the Central Control System.

2.4 VENTILATION SYSTEM

For effective and efficient ventilation, the system should be properly designed, maintained, controlled and operated as per the needs. This will help to provide an environment which maximizes bird's performance. Good ventilation system for the house is to ensure that there is good air quality. Every house should have two separate ventilation systems in it. One should be for minimum ventilation and the other for summer ventilation.

- Provide adequate oxygen to meet birds metabolic demand
- Control relative humidity
- Maintenance of good litter condition.

The need for ventilation of poultry houses today is greater than it was ever before. Because of the fast growth of broilers we now have the air quality and oxygen demand for the birds has increased two to three times. In summer season, we do find reduction in performance and therefore it is necessary to choose cost effective methods to provide proper ventilation and temperature for bird taking into consideration various odds, like availability of power supply. One needs to decide the strategy. In Indian conditions ,it is necessary to decide width / height / roof etc

Following are the reasons why we should have a proper ventilation system

- To have continuous adequate supply of fresh air and oxygen to the birds.
- Removal of foul air, harmful gases like ammonia, carbon-monoxide, carbon-dioxide etc.
- Maintaining required correct temperature and humidity as per the age of birds.

- Dilute disease causing infective agents like bacteria and maintain healthy environment in poultry house.
- To maintain good litter conditions by reducing moisture
- To increase housing capacity of the house and to achieve optimum performance.
- High relative humidity (90%) with high temperature is problematic and affects flock performance.

Natural or Open house: In Indian conditions, because of the climate we do have poultry houses with both sides open. Temperature is controlled with the help of curtains. Depending upon the season one has to operate the curtains or use heaters or brooders to increase the temperature. In summer season, we recommend fans, sprinklers, foggers where the temperature are higher. One can either use low pressure fogger nozzles or high pressure fogger nozzles for those houses located in hot and dry climate. With the help of expert one may choose the suitable fogging system. We also suggest to have roof insulation (thatch).Where there is a water scarcity and high temperature, on wind side mesh, one can use wet Gunny cloth curtain to lower down the temperature

Mechanical / Tunnel Ventilation : In recent years, stress created by greater bird density, rapid growth rate, increased metabolic activity, higher body weights, etc., have caused the need of environment control systems. Air movement over the flock increases the birds comfort level tremendously hence, environmentally controlled houses are designed to satisfy maximum requirements of the birds. However feasibility of electricity available, Tarif and economics needs to be considered while taking the decision.

Air Temperature		Volume of Air per Minute per kg (2.2 lbs) Body Weight (at 60% Relative Humidity *)	
°C	°F	Litre Per Minute	Cubic Feet Per Minute
41	106	76.5	2.7
38	100	73.5	2.6
35	95	70.5	2.5
32	90	68.0	2.4
29	85	62.0	2.2
24	75	56.5	2.0
18	65	48.0	1.7
3	55	39.5	1.4
7	45	31.0	1.1
0	32	22.5	0.8

- When relative humidity exceeds 60% increase air movement considerably.

3. HOUSING ENVIRONMENT

3.1 LIGHTING

Most of the broiler farming in India is carried out in conventional open sided houses. Days being warm and nights being cool, most of the farmers keep lights on throughout the growing period (from brooding to liquidation). In many places, light is used as source of warmth also. Lighting programs are devised to improve FCR and reduce mortality. The basic principle in designing a lightning program is to allow the birds to feed properly and leave a rest period for feed utilization or digestion.

Light intensity distribution and duration affect the performance of the flock therefore proper positioning of lights & its distribution will encourage chicks to find feed, water and warmth during rearing period and it helps in gain in weight and to improve production efficiency. Both incandescent & florescent lights are used for broiler farming depending upon electricity voltage available in the farming area.

3.2 VENTILATION

Ventilation may be the most challenging aspect of housing management and requires constant attention. Ventilation affects air quality, temperature and relative humidity. Without proper ventilation, feed conversion, weight gain, and health will deteriorate. In poor ventilated houses more space is to be given for the comfort of the birds.

A well ventilated poultry house should

- Provide adequate fresh air at all times to meet the birds' oxygen requirements.
- Distribute fresh air uniformly
- Regulate effective temperature.
- Remove odors, waste gases and moisture

Air quality is evaluated on the basis of air volume, ammonia, carbon dioxide, carbon monoxide and relative humidity. Dust, virus particles, bacteria, and mold spores also contribute to air quality. When in excess, contaminants will damage the respiratory tract and decrease the efficiency of respiration resulting in diminished performance. Continued exposure to poor air quality can induce ascites and chronic respiratory diseases.

AIR QUALITY GUIDELINES	
Oxygen	> 19.6%
Carbon dioxide	< 0.3%
Carbon monoxide	< 10 ppm
Ammonia	< 10 ppm
Relative Humidity	45-65%
Inspirable Dust	< 3.4 mg/m^3

EFFECTS OF AMMONIA EXPOSURE	
Target	< 10ppm
Human detection	> 5 ppm
Cilia stop/respiratory tract damage	20 ppm (3min)
Body weight/FCR diminished	25-51 ppm
Eye damage/Starve outs/Dehydration	46-102 ppm (12 hours)

3.3 CLIMATE

Birds must be provided with adequate housing, hygiene, management, feed and nutrition to achieve their genetic potential. In extreme climates providing a perfect environment is difficult. However, there are ways to improve productivity by following some procedures to limit climatic extremes.

Relative Humidity

Relative humidity (RH) is the measure of how much moisture or water vapor is present in the air compared to how much moisture the air can hold. In other words, RH refers to the percent water saturation of the air at a given temperature. When a given amount of air is heated its capacity to hold moisture is increased. As relative humidity increases, the ability of the bird to lose heat by evaporation decreases.

High relative humidity along with high ambient temperatures (i.e. 32°C / 90°F, 90% RH) is especially problematic. Higher the body weight more the problem. Unless there is an adequate heat loss from the body, the bird's ability to control its internal body temperature and normal body functions will come down which can initially lead to heat stress and performance loss followed by heat stroke. Hence, reducing relative humidity by way of using fans inside the house is recommended. Fans can disperse the moisture in the air and thus reduce relative humidity.

Ambient Temperature

In order to achieve maximum performance, temperatures must be kept consistently within the bird's comfort zone. Temperature should be kept uniformly throughout the house. If optimal housing temperatures are not achieved, the bird will utilise additional energy to regulate its body temperature and feed conversion ratio (FCR) will increase.

The bird's temperature comfort zone changes as the bird gets older and is influenced by bodyweight, ventilation(air speed), feed Intake, relative humidity and ambient temperature

Hot Climate

Feed consumption decreases when temperatures rise above the thermo neutral zone. The thermo neutral zone is the effective temperature at which the bird does not spend additional energy to heat or cool itself. Feed consumption can decrease by as much as 1% for each 1°C (2 °F) rise in temperature above the thermo neutral temperature. This means that if temperatures rise from 25 to 35°C (77 to 95°F), feed consumption can fall by approximately 10%.

In open sided broiler housing system, modifications of management may be necessary during high ambient temperatures.

Options include the following

- Reduce stocking density (give at least 1.2 sq. ft space per bird)
- In cross ventilated housing, direct incoming air downward at high speed over the birds for maximum cooling effect.
- Flush the water system twice daily to reduce water temperature.
- Walk the birds gently and regularly with out causing much stress to encourage air circulation around the bird and increase water consumption.
- Remove feed from the birds by lifting the feeding system six hours before the

hottest part of the day. This removes a barrier to air movement and reduces the birds' heat output due to feed metabolism.

- Anticipate these conditions by over ventilating at night to reduce the house temperature as far as possible.
- Hang supplementary fans inside the building (e.g. 36 inch fans 30 feet apart, moving air in the direction of the prevailing wind).

Aids for Cooling

- Water sprinklers can be used to cover the roof of the poultry house so as to reduce temperature
- The external surface of the shed's roof may be painted with white paint to reduce house temperature. This may be practiced in a water scarce area.
- Construct a maximum “overhang” of the roof to keep sun off the walls
- Use good insulation materials for roof and walls eg. Sugarcane or paddy straw thatch.

Cold Climates

In cold climates, heat conservation and the removal of expired gases and moisture are the primary focus. Temperature adjustments in cold climates should be made by using appropriate heating system.

3.4 LITTER & LITTER MANAGEMENT

Litter management is another crucial aspect of Poultry house management. Proper litter management is fundamental to bird health, performance and final carcass quality which subsequently influence the profit of farmers and integrators. Litter should be applied evenly to a depth of 10 cm (4 inches).

Types of litter

The type of litter used will depend upon availability, suitability and economics. A litter material should posses the quality of good moisture absorption, biodegradability, comfort and cleanliness, light weight, non-toxic, low dust level, non tainting, consistent availability and economical to use. Types of litter most commonly used include rice husk, wood shavings, sawdust, straw, corn cobs and groundnut hulls. When using rice husk for brooding it is advisable to use thin layer of corrugated paper on top of the litter during first week of brooding. It is to prevent

the feeders and drinkers from getting filled with husk.

Important function of litter

- To absorb moisture
- To dilute birds' excreta (faecal matter)
- To minimise the contact between bird and manure
- To provide insulation from cold floor

Precautions

If wild birds or rodents have access to the litter material in side the house or at storage place, there is a risk of getting salmonellae or other pathogens. Litter material should be checked before adding for the presence of any ectoparasites like ticks, louse and fleece and make sure that it is dry.

Litter Management

The objective is to maintain litter in a dry condition. Normal dry litter usually contains 10 to 12% moisture. Whenever it holds more moisture it becomes caked. A practical way to evaluate litter moisture is to pick up a handful and gently squeeze it. The litter should slightly adhere to the hand and break down when dropped to the floor. If moisture is in excess it will stay compacted even when dropped. If litter is too dry it will not adhere to your hand when squeezed. Excessive litter moisture (>35%) may cause welfare and/or health problems. An increased incidence of breast blisters, skin burns, hock burns, condemnations at plant may result. Litter with high moisture content also contribute to high ammonia levels in side the house. **Therefore additional ventilation and removing wet or caked litter is important, to maintain litter quality. Addition of fresh litter will help in maintaining proper litter condition. Ensure that litter is not dusty.** If litter below the drinkers becomes wet, it should be removed and replaced with fresh litter material.

Causes of Poor Litter Quality:

- Poor quality litter material / insufficient depth
- Leaky or faulty drinkers or high pressure
- Poor ventilation
- High salt, high protein feed, low quality of protein
- Poor quality fat, very high fiber content

- High stocking density
- Intestinal disorders, loose droppings
- Low water quality
- High humidity

Litter turning (raking)

This provides better aeration to litter, help in drying the litter and turns surface pathogens up side down.

Treatments

Use of Lime, Bleaching Powder reduces litter moisture and Bleaching powder helps to reduce bacterial count.

4. BIRD MANAGEMENT

4.1 Stocking Density

The Floor space to be allocated per bird will be determined by a combination of following factors:

- The weight of the bird at market age
- Type of housing
- Climatic conditions
- Type of the farm - Open sided or environment controlled.

In general the following floor space allotments are recommended for broilers:

In Non – Insulated Houses, 1 sq. feet to 1.2 sq. feet per bird depending upon the season and marketing weight.

In Controlled Environment Houses, 0.5 - 0.8 sq. feet per bird depending upon market weight and the season.

4.2 Preparation for arrival of chicks

Confirm the number of chicks to be placed & depending upon the house size decide the distribution of batch. This will provide equal opportunity to all the chicks.

Equipments:

Drinkers

- 14 to 16 drinkers/1000 chicks (includes chick drinkers) should be provided within the brooding area of which 8 to 10 can be bell type drinkers.
- Chick drinkers could be removed between 15 to 21 days
- Should be completely flushed to remove any residual sanitizer
- Water must be clean and fresh.
- In case of nipple drinkers set pressure to produce a droplet of water visible on each nipple without dripping.
- Check for water leaks and air locks.
- Ensure nipple drinkers are at the chicks' eye level.
- Supplemental drinkers should be placed in such a way that the chicks will make the association between supplemental drinkers and the main system.

Feeders

- Supplemental feeders (additional chick feeders) should be provided for the first 7 to 10 days in the form of paper, trays or lids.
- Trays should be provided at a rate of one per 100 chicks.
- Supplemental feeders should be placed between the main feed and drinker lines and adjacent to the brooders.
- If using paper, the feed area should be a minimum of 25% of the brooding area. 50-65 grams of feed per chick on the paper is recommended.
- It is of utmost importance that the additional feeders should not run empty as this will reduce yolk sac absorption.
- Additional feeders should be refreshed (refilled) three times daily, until all the chicks are able to gain access to the main feeding system. This generally occurs at the end of the first week.
- Feed should be provided as a good quality crumble or mash
- Do not place feed or water directly under the heat source
- The automatic system should be placed on the floor to make access easier for the chick

Litter

Ensure that litter is spread evenly and temperature on the litter surface is minimum of 32°C (90°F). If spot brooding system is used the litter temperature should be 40.5 °C (105°F) under the heat source. Litter temperature should be recorded before each placement. This will help to evaluate the effectiveness of pre-heating.

4.3 Chick Placement

- Chicks from one source should be placed in a house.
- Chicks are to be placed immediately in to brooding area upon arrival. Delays in placement can contribute to the dehydration of chicks, resulting in higher chick mortality and reduced growth rate.
- Ensure the proper numbers of chicks are placed in each brooding area
- Dim house lights during chick placement to help calm the chicks and reduce stress.
- Chicks must be carefully placed and evenly distributed near feed and water throughout the brooding area.
- Take sample chicks weight for record purpose.
- Chick boxes should not be stacked one above the other in the brooding area

as rapid Over heating and suffocation may occur.

- Chick boxes should be removed immediately following chick placement.
- Lights should be brought to full intensity within the brooding area once all chicks have been placed.
- Allow one to two hours for the chicks to get acclimatized to the new environment and then check all systems and make adjustments if necessary.
- Monitor the distribution of the chicks closely during the first few days. This can be used as an indicator for any problems in feeder, drinker, ventilation or heating systems.

Chick Quality

Hatcheries can have a tremendous impact on the success of broiler rearing. All the hatcheries take proper and required steps to produce best quality disease free chicks and to minimise stress to chicks till deliverey at farms.

Characteristics of a good quality chick

- Well dried, long fluffed down.
- Bright round active eyes.
- Look active and alert.
- Have completely healed navels.
- Legs should be bright and waxy to the touch.
- Free of red hocks.
- Chicks should be free from deformities (i.e. crooked legs, twisted necks and cross beaks).

4.4 Brooding Management

The importance of the brooding period is such that it can or break performance of a flock. The first 14 days of a chick's life sets the foundation for good performance. Extra effort during the brooding phase will get rewarded in the final flock performance. An extra gram of body weight at seven days of age can produce an additional six grams of body weight at 35 days of age. Check chicks two hours after placement. Ensure they are comfortable with the temperature.

- Chicks too warm will try to move away from heat, will be panting, will appear quiet and their wings may droop.
- Chicks too cold will crowd towards the heat, will huddle in groups and be noisy.
- Chicks at the correct temperature will be evenly spread, show varied behavior

(eating, drinking, resting, and interacting) and will be softly chirping.

There are several ways for setting up a house for brooding. Housing design, environmental conditions, season and resource availability will determine the housing set up for brooding.

Whole House Brooding

Whole house brooding is generally limited houses located in mild or moderate climates. The most important aspect to whole house brooding is to produce an environment without temperature gradients.

Partial House Brooding

Partial house brooding is commonly practiced and is helpful to reduce heating costs. By reducing the amount of space to be heated for brooding purpose, one can conserve the amount of heat required and reduce energy costs. In addition, proper temperatures are more easily maintained in a small area. There are several ways of dividing the house for the purpose of partial house brooding. Tying floor to ceiling curtains are most commonly used to divide a house. A solid 20 cm (8 in) barrier should be placed on the floor in front of the curtain to ensure that cold drafts do not blow over the chicks.

Spot Brooding

Spot brooding is the one in which individual heating source is placed or suspended at a height with in a brooder area or ring so that only a required and limited area is heated. This is the most economical way of heating the house. There is temperature gradient between different areas with in the brooder ring. Right under the heating source temperature is usually 40* C and temperature is around 30* C near the brooder ring.

Floor temperature

Whichever method of room heating is adopted, the floor temperature is the most critical. Chicks do not have the ability to regulate body temperature for the first 5 days and thermo regulation is not fully developed until two weeks of age. The proper litter temperature is very important for the chicks. If conditions are too cold, internal body temperature will decrease leading to stunted growth and susceptibility to disease. At day one, litter temperatures should be at least 32°C (90°F) with space heating and if spot brooding is used floor temperatures should be 40.5 °C (105°F) under the heat source.

Brooder Guard

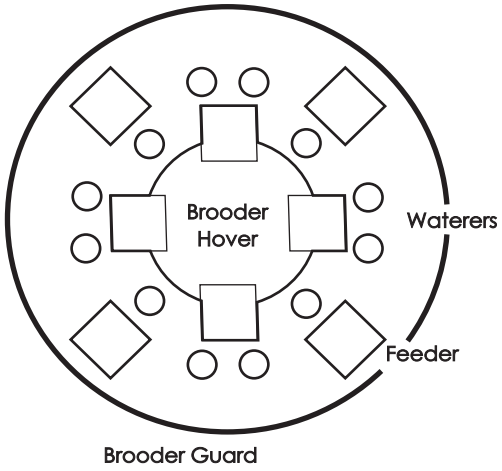
- Make the guards from material which can be properly sanitised
- Height of guard should be approximately 16" to 18"
- Guards will ensure chicks to stay near the source of heat
- Help in preventing chilling and piling
- See the diagram on page 19 to place equipments inside the brooder guard
- Reduce guard circle in the night and expand in day time.
- News paper is often used during first few days to prevent spillage of litter in feed troughs.
- Wet paper needs to be removed and replaced with new paper daily or some time more than one time daily

Brooder Management

- Start and adjust the brooder stoves well before the arrival of chicks
- Ensure that they are working properly
- Adjust the temperature to 95°F (35°c) at the edge of the brooder 2" (5cm) above the litter.
- Lower the temperature by 5°F (2.8°C) each week until it reaches 70°F (25°C)
- Keep alternate heating arrangement ready in case electricity or gas is not available.

One should remember that H. D. P. curtains do not facilitate air exchange like gunny cloth. Gas brooding consumes oxygen present in brooder house. Providing window curtain by slightly lifting the curtains on non windy side will help in air exchange. This needs to be done judiciously considering local climate, temperature and wind velocity.

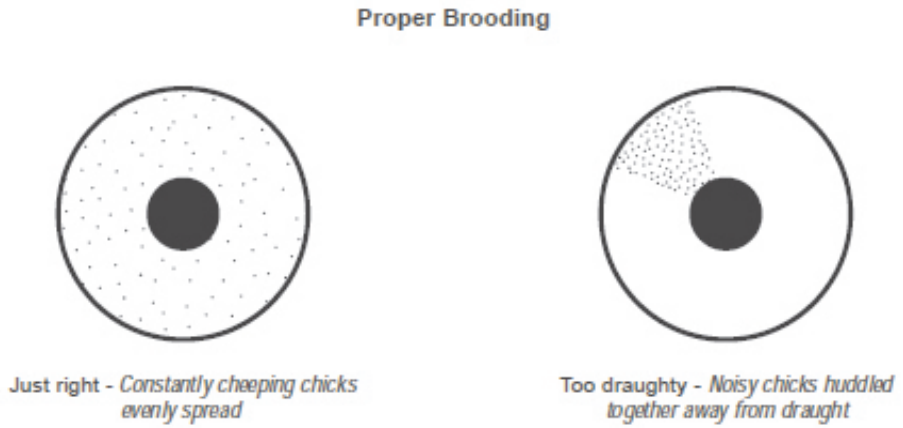
The following illustration is given as a guide for the placement of equipments around the brooder during the early brooding stages

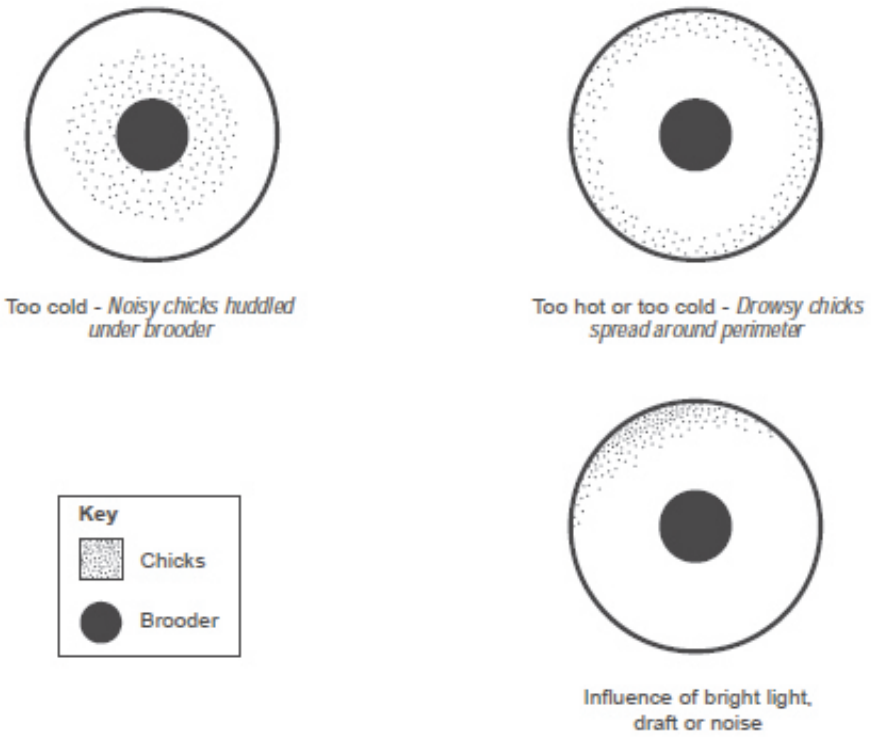


Evening is the best time to observe the chicks and make temperature adjustments. Also, during this time, respiratory problems or vaccination reactions can be observed.

Thermometers often do not work correctly and may vary a few degrees. Therefore, in addition to using the thermometer, use your chicks as a guide since they will indicate by their actions whether they are comfortable or not.

The following diagram illustrates how to use your chicks as a guide for judging the comfortable brooding temperature :





An excellent indicator of floor temperature is the temperature of the chick's feet.By placing the feet against your neck or cheek one can readily learn how warm or cold the chick is. If the feet are cold, re-evaluate the heating systems and litter temperature. If they are comfortably warm, the chicks should be actively moving around the brooding area.

Brooder height & guard circle can be adjusted as per the temperature, season and heat requirement. Provide required temperature as per age alongwith proper air exchange and see that heat conservation is done properly.

Climatic conditions and feathering of the flock are some of factors which needs to be given due consideration while reducing the temperature as the flock grows.

Feed and water

Ensure that both the feeders and drinkers are in adequate supply matching to number of chicks brooded and are placed at appropriate positions. Feeders and drinkers should be placed in close proximity to each other and within the “thermal comfort zone”.

Drinkers

Details of the drinkers to be provided to the day old chicks are as given below

Chick Drinkers

- Should be provided at a rate of 16 per 1000 chicks.
- Should never be allowed to dry out.
- Must be cleaned and refilled as necessary.
- Maintain maximum water levels until chicks are large enough to create spillage.
- Should be removed approximately 48 hours after placement.
- Should be placed slightly higher than litter to maintain water quality yet not so high that access is impeded.

Bell drinkers

- Height should be maintained such that the lip is at the level of the birds' back.
- Frequent assessment and adjustment is essential.
- Must be cleaned regularly to prevent buildup of contaminants.
- Water should 0.5 cm (0.20 in) from the lip of the drinker at day of age and reduced gradually after seven days to a depth of 1.25 cm (0.5 in) or thumbnail depth.
- All bell drinkers should be tied with some heavy weights from at the bottom to reduce spillage.

Nipple drinkers

- Height should be at chicks' eye level for the first 2 to 3 days of age and then maintained slightly above chicks' head.
- Pressure should be such that there is a droplet of water suspended from the nipple but no leakage.
- The birds' feet should always be flat on the litter and a bird should never have to stand on its toes to drink.

Feeder management

Feed should be provided in crumb or mash form and placed on trays, lids or paper sheeting for a minimum of 10 days. Feeders' height should be raised incrementally throughout the growing period so that the lip of the trough or pan is in level with the

bird's back at all times. The feed level within the feeders should be set so that feed is readily available while spillage is minimized

Light

Light intensity should be a minimum of 20 lux (2 foot candles) in the darkest place in the brooding area during the brooding phase.

Assessing feed and water intake

Crop assessment is a useful tool to make sure that chicks have consumed enough feed and water. Randomly select 100 chicks and gently palpate the crop six hours after the placement of chicks. The crop should be soft and pliable. If the crops are hard, this is an indication the chicks have not found adequate amounts water. If the crops are swollen and distended with water, the chicks have not found enough feed. A minimum of 95% of the bird's crops should be full and pliable.

First week body weight

Body weight at the end of seventh day is an excellent indicator of how successful is the brooding management. Failure to achieve optimal first week weight will result in poor broiler performance. The target for first week body weight is four to five times that of day old weight. If this level of performance is not achieved, pre-placement and brooding management techniques should be critically evaluated and corrective measures should be taken up.

Brooding checklist

Flock supervisor should visit the brooder house as often as possible during the first week and make a keen observation on the following items:

- Chick Behavior - Evenly distributed, active and chirping with moderate loudness
- Air quality- ammonia levels < 10ppm and carbon dioxide < 0.3%
- There should not be cold wind drafts anywhere in the brooding area
- Water flow rates and availability all the time
- Feed supply and quality
- Light distribution - 20 lux in the darkest place in the house
- Check temperature of chicks' feet and crop fill

Check points in rearing

1. Feed level in feeders should be such that, no wastage happens through

spilling but available during cool hours.

2. Feeding space needs to be adequate & its height needs to be adjusted as per the age. Feed should be available all the time.
3. Floor space adequate with temperature control
4. Water space and its height – Clean and fresh water available for all the time
5. Nipple drinkers at chicks eye level. Adequate nipple pressure to maintain proper flow without spillage.
6. Birds feet needs to flat on ground and should never stand on toes for water or feed
7. Body weight check: Every week average body weight achieved should be compared with standards

4.5 UNIFORM GROWTH

Entire rearing programme needs to be designed to achieve uniform growth of the flock. Optimum feed conversion & livability, timely achieving the growth and uniformity will help in proper marketing of entire flock. Therefore management factors like feed quality, feeding space, water quality, watering space, floor space, uniform temperature, air exchange, light, proper placement of the equipments as per the norms and good source of supply of healthy chicks needs to be taken into consideration.

Flock Uniformity	Evaluation
80.00%	Uniform
70.00%	Average
60.00%	Poor

If there is poor uniformity, we need to analyse the factors responsible for variation & they need to be timely corrected to achieve the uniform growth.

4.6 PREPARATION FOR LIQUIDATION

Feed Withdrawal

Just before the liquidation, it is practiced to withdraw the feed

- Approximate day and time of liquidation is decided.
- Preferably 6 to 8 hours prior to catching period feed is withdrawn depending

upon catching time and distance of market it may suitably change. Withdrawal of feed sufficiently before reduces the carcass contamination in processing plants.

Preparation for liquidation

- Water must be available till the start of catching the birds
- It is better to reduce the lights so as to keep the birds calm & reduce activity
- Remove or lift up equipments which are likely to interfere while catching the birds.
- It is always advisable to handle the birds at night time.
- Care should be taken to provide adequate ventilation to the house
- Do not bring any birds back into the poultry house from the cull van as a bio security policy
- Decide the loading density as per the season, size of the crate and experience. This will reduce transit deaths.

4.7 MANAGEMENT FACTORS THAT CAN REDUCE BIRD QUALITY

While managing the flock from Brooding stage till liquidation the flock in charge should be aware of the management errors that could lead to reduction in the bird or meat quality and result in loss to the farmer or producer. Following management factors can affect the quality

1. Incorrect housing layout, bad handling can cause bruise and leg problems
2. High stocking density can lead to bruise, leg problems, hock and breast burn and breast blisters
3. Poor drinker management, incorrect or poor nutrition, disease conditions can lead to wet litter problems
4. High temperature and incorrect nutrition can cause poor feathering leading to skin scratches
5. Poor litter condition can lead to hock and breast burn, leg problems and breast blisters

4.8 MORTALITY OR DEAD BIRD DISPOSAL

The timely disposal of mortality is essential to an effective disease prevention program. Dead birds act as a source of disease that can be spread by rats, mice, dogs, cats, flies, beetles, mosquitoes, free flying birds and insects that may act as

carriers of the disease. No single method is perfect for disposal of dead birds, but a method once decided, should be used consistently and correctly.

Methods of disposal may vary from farm to farm and area to area depending upon local condition and resource available. :

Incineration

A good incinerator is probably the best means of disposal, especially in an area where there is poor soil drainage or a danger of contaminating the water supply. While building or purchasing an incinerator, the following points should be taken into consideration:

- Capacity: Choose a large enough unit which will take care of expansion needs for the future.
- Cost of operation: Design an incinerator which will be cost effective.
- Sturdiness : Make use of special long lasting fire bricks
- Automatic controls: Saves fuel costs.
- Locate the incinerator in a place where it will be convenient to use but wind from the incinerator should not blow over poultry house and local residents.
- Make sure that all the dead birds are burned to a white ash.

Disposal Pit

A less desirable but acceptable method of dead bird disposal is through the use of an adequately designed and tightly covered disposal pit.

- This saves labour and at times it is unnecessary to dig a hole or start a fire each time a bird dies.
- Birds cannot be dug up by dogs or rodents
- It has no noticeable odour if tightly covered
- No fire hazards
- Pit can be used year round
- Birds decompose fairly rapidly without the use of chemicals.

A pit 6 ft (1.83 m) in diameter and 6 ft deep (1.83 m) is large enough to take care of one 10,000 capacity broiler unit. Contact a local government or agricultural agency to verify whether that disposal pits are permissible in your area,

Composting

- Currently advocated as an environmentally friendly alternative yielding a valuable fertilizer product.
- Composting is management intensive and requires equipment, time and

attention to detail.

- Transportation costs associated with the final product is one more disadvantage

Rendering

- A convenient means of disposal with no associated pollution.
- Results in value added feed products.
- Transportation or associated storage cost are a drawback of this method

5. WATER MANAGEMENT

Water is an essential and cheapest nutrient for poultry and there is no substitute for it and it has got an influence on all physiological functions of the bird. Water makes 65 to 78% of the body composition of a bird. Loss of 10% of water from body through dehydration and / or excretion results in serious physical disorders. Water should be made available to broilers at all times that is 24 hours in a day. Water intake is influenced by factors like temperature, relative humidity, composition of feed and rate of body weight gain. Water consumption increases as the age advances and body weight increases. If water consumption decreases at any point of birds' life cycle, it indicates impairment in any one or combination of two or more of the factors like bird health, environment and farm management practice.

WATER QUALITY

Good water quality is very important to obtain efficient broiler performance. Water contributes to flock comfort, nutrition and health hence, quality water must be provided in adequate quantity. Water quality is measured in terms of pH, mineral levels, and the degree of microbial contamination. Water should be tested periodically for its suitability for chicken consumption and compulsorily before housing the chicks. Water testing need to be carried out in a reputed laboratory. Water samples for testing should be collected from source (open well or bore well), water tank (main & sub), Nipples, Bell Drinkers and water channels. A flock manager should note that providing potable (fit for consumption) water throughout the life cycle of bird will help in preventing water borne diseases and reduce unnecessary medication cost and will help in achieving performance goals.

Water pH

Water pH is the measure of how many hydrogen ions are present in a water solution. It is measured on a scale of 1 to 14. A pH of 7 is considered as neutral. A pH reading lower than 7 indicate the water is acidic where as that of higher than 7 indicate the water is basic (alkaline) The degree of acidity increases as the pH drops below 7 and pH of 1is most acidic where as degree of alkalinity increases as the pH increases above 7 and pH of 14 is most alkaline. Ideally water should be neutral to slightly acidic with a pH below 7. A pH higher than 8 reduces the

effectiveness of chlorine disinfectants and may have a negative impact on water consumption. Vinegar, citric acid can be used to lower pH if water is too basic.

Mineral contents and levels

Iron and manganese give water a bitter taste that may decrease consumption. In addition, these minerals support the growth of bacteria. To control the iron filtration & chlorination are effective. It is recommended to use 40-50 microns filter which needs to be checked and cleaned every week.

Calcium and magnesium in the water are measured by hardness. These minerals in combination can form scale or deposits that will reduce the volume of the water flow through the pipeline or will choke the nipples hence reduce the effectiveness of a drinker system. Water softeners can be used to lessen calcium and magnesium levels.

Presence of Nitrate as low as 10 ppm in drinking water can potentially hinder Broiler performance. Water should be tested for nitrates because high levels may indicate sewage or fertilizer contamination. Hence, water with high nitrate content should not be used for Poultry

Microbial contamination

Routine water testing should always include tests for microbial contamination. When testing water, evaluating the total coliform bacterial count is important as high levels can cause disease. Chronic poor performance may indicate contaminated water. Assessing the total bacteria through a plate count will reflect the effectiveness of the water sanitation program. Microbial contamination could happen from source of water till the water is consumed by birds. If an effective water sanitation program is not followed, proliferation of bacteria will occur.

Water sanitation and system cleanout

A regular program of water system cleaning and water sanitation can help to reduce microbial contamination as well as bio-film buildup and scale formation. The use of cleaning agents like citric acid will remove scale and bio-film as well as binding minerals and flushing medications. The ideal method to kill microbes is a water line cleanout followed by water sanitation. The application of chlorine to the water is a very common sanitation method. For sanitary purposes, the most effective concentration of chlorine is 4 to 6 ppm with a pH of 6 to 7 measured at the end of the water system.

Drinking system cleanout between flocks

- Drain water from drinking system (drinking water lines) and water tanks.
- Wherever possible remove water tank and scrub it clean with soap solution
- Calculate the capacity of the drinking system (water lines)
- Make sure protective clothing and eyewear are worn when using chemicals.
- Prepare the cleaning solution to the manufacturer's recommendation in the water tanks
- Turn on the tap at the end and at the beginning of drinking water lines and let the sanitized solution run through the whole length of water lines and close both the tapes
- Raise each drinker line.
- Leave the sanitising solution in the water lines for at least twelve hours.
- Drain the water lines, flush the system thoroughly to remove bio film and sanitizing chemical.

Water Consumption

(Moderate climates)

AGE IN DAYS WATER CONSUMPTION PER 1000 BROILER BIRDS PER DAY (LITRES)				
	70°F/21.1°C	80°F/26.7°C	90°F/32.2°C	110°F/43.3°C
0 -7	27	28	32	78
8 – 14	72	85	122	216
15 – 21	108	153	248	324
22-28	144	200	324	432
29 – 35	184	256	400	552
36 – 42	221	302	464	663
43 – 49	256	340	510	768
50 – 56	280	352	536	840

Note: At temperatures above 77°F (25° C) water consumption increases and at temperatures above 85°F (29°C) additional drinkers should be provided.

WATER QUALITY STANDARDS FOR POULTRY

CONTAMINANT, MINERAL OR ION	LEVEL CONSIDERED AVERAGE	MAXIMUM ACCEPTABLE LEVEL
Bacteria		
Total bacteria	0 CFU/ml	100 CFU/ml
Coliform bacteria	0 CFU/ml	50 CFU/ml
Acidity and hardness		
PH	6.8 - 7.5	6.0 - 8.0
Total hardness	60 -180 ppm	110 ppm
Naturally occurring elements		
Calcium (Ca)	60 mg/l	
Chloride (Cl)	14 mg/l	250mg/l
Copper (Cu)	0.002 mg/l	0.6mg/l
Iron (Fe)	0.2 mg/l	0.3 mg/l
Lead (Pb)	0	0.02 mg/l
Magnesium (Mg)	14 mg/l	125 mg/l
Nitrate	10 mg/l	25 mg/l
Sulfate	125mg/l	250 mg/l
Zinc		1.5 mg/l
Sodium (Na)	32 mg/l	50 mg/1

Source : Muirhead, Sarah, Good, clean water is critical component of poultry production, Feedstuffs, 1995.

6. FEED AND FEEDING

The quality of the diet is affected by following factors:

- Total required nutrient levels and availability of essential nutrients to the birds
- Metabolisable energy
- The proportion of saturated to unsaturated fats for pre-starter diets (due to the limited ability of chicks to digest saturated fats)
- Quantity and quality of protein and other additives

Electrolyte Balance

Deep panting for prolonged periods leads to increased CO2 loss which further results in change in acid :base balance in the bird's blood plasma. The consequence of these changes in respiratory alkalosis, dehydration affecting the birds' metabolism. To correct this imbalance, sodium bicarbonate should be added to the feed at the rate of 3 kg to 7 kg per ton depending upon the severity of the temperature . Adding electrolytes to drinking water stimulates water consumption. Potassium based salt mixtures appear to give better results than sodium based salts and also help in increasing water consumption.

Factors Affecting Quality of Feed

- Anti- nutritional factors , e.g. histamines (biogenic amines) in fish meal, trypsin inhibitors in Soya bean meal
- Toxins, e.g. Mycotoxins produced in the field (ergot and fusarium in wheat) or in storage(aflatoxin)
- The addition of enzymes to improve the digestibility of wheat or other raw materials.

Form of Diet

Under Indian conditions, broilers are fed crumbled / pelleted as well as mash feed. Consistency in product quality is the key to maintain satisfactory feed consumption. Variations in pellet hardness are caused by both, ingredient

changes and manufacturing process.

A consistent high quality pelleted feed is consumed faster than a dusty product, whilst a mash feed may make up to three times longer to consume. Consistent physical quality of pellets also prevents the separation of feed ingredients and ensures that birds receive a diet of the intended nutritional specifications.

Fat Quality

Day old chicks are not capable of digesting saturated fats properly, so the fat in the starter feed should be largely unsaturated (e.g. Soya oil). The ability of chickens to metabolise fats improves as they grow, so the finisher diets can include increasing amounts of saturated fat (e.g. Palm oil).

The birds must be fed with an appropriate diet if they are to perform upon their true genetic potential. In order to ensure that they receive feed that contains the right amounts of energy, protein, essential amino acids, minerals, vitamins and trace elements and other feed additives, it is important to assess the correct levels of nutrients in the feed ingredients while formulating broiler feed.

The feed is, however, only as good as the raw materials from which it is made of and many of the nutritional problems that arise are the result of a lack of adequate attention to the quality of raw materials. The quality of the finished feed is dependent on raw material quality, feed formulation, weighing and manufacturing process employed. Accurate testing of raw materials and finished feed ensures availability of proper quality and quantity of nutrients to the birds. Look for assured supply of quality raw materials.

Improving Broiler Performance at High Environmental Temperatures

In order to maintain performance during summer it is important to ensure that feed consumption and nutrient intake meets the requirement of birds. A supply of cool water must be available at all times. Reducing water temperature has shown to lower body temperature. Evaporative cooling of houses is the best proven alternative in summer. For open houses, fans, foggers, sprinklers and side wet curtains can also be used. For open houses the width of 20' is more beneficial where there is uncertainty of electricity supply.

Feeding Management

Feeding Management is the simplest method to ensure adequate nutrient intake in hot climate, and it is also effective to combat acute heat stress. In the summer season it is beneficial to feed birds during the cool hours of the day / night. At intervals, fresh addition of feed or running the feeder at frequent intervals will stimulate interest in feeding and may help to increase feed intake. It is advisable to withdraw feed during the hottest parts of the day. If the birds have finished digesting their last meal before hot hours, their metabolic heat production will be reduced.

Feeder Management Practices

Maintain height of all trough and pan feeders so that the lip of feeders is at level with the backs of the birds. Manufacturer's recommendations should be followed properly to ensure top performance and longevity of equipment.

Important: All automatic feeders should be checked regularly to make certain that there are no operational problems

Feed Types

Various types of broiler feeding programs are followed in India. Widely used is the pre-starter, starter and finisher ration.

The nutrient specifications given in subsequent pages are intended to optimize the performance at varying ages of birds and in different seasons. The tables should be used as a guide to determine the nutrient requirements of broilers. Consult the local Vencobb 400 nutritionist. The formulations may be designed to meet the market requirements.

7. BIOSECURITY AND FARM SANITATION

Prevention of entry of poultry pathogens is a must. Adopt necessary effective control strategy to restrict men and material movements, feed vehicles, culls vans, wild birds and other animals etc.

Use of effective disinfectants and their regular spray will help in prevention and control of entry of pathogens into the poultry house.

7.1 BIOSECURITY

All In All Out System of Rearing

This system is strongly recommended for maximum exploitation of genetic potential of Vencobb broilers.

All the birds of one age are housed in entire farm / poultry house or area, preferably of same breed and source of supply. This system of placement of chicks, its management and performance are better than multiage farms. In case, all in all out system is not possible, minimise number of age groups in farm.

Flock management, sanitation, disease prevention program, bio-security, vaccination programs become more complicated and less effective in multiage sites. Cluster farming and all in all out system are useful for farmers who place chicks of same breed and source at a time. It reduces disease problems and medication cost, improves livability and performance.

Sales personnel, bird lifters, cull birds van, service persons and visitors' entry be restricted in to bio-secure area. Cull birds van should be parked away from the poultry premises. In case of multiage group farm, younger age group flocks should be visited first and later older flock. Affected flocks, if any, should be visited at the end.

Dispose off empty vaccine vials by burning and dispose off all unwanted material timely.

Foot Bath and Footwear

Provide foot bath with approved disinfectant at recommended dilution at entry of each house. Disinfectant needs to be changed periodically. Provide clean,

disinfected footwear for everyone entering the bio-secure zone.

Bird catching team and Cull Van

Personnel involved in catching birds need to take special bio-security precautions while handling and visiting different farms on same day. Precautions should be taken to prevent contamination that could occur through culls van.

Given below are the various key points to a successful bio-security program

- Limit non-essential visitors to the farm. Keep a record of all visitors and their previous farm visits.
- Farm supervisors should visit the youngest flocks at the beginning of the day and working by age to the oldest flock for the last visit in that day.
- Avoid contact with poultry outside of the organization.
- If equipment must come from another farm it should be thoroughly cleaned and disinfected before it comes onto the farm.
- Provide wheel dips or wheel spraying facilities at the farm entrance and allow only necessary vehicles inside the farm premise.
- Farms should be fenced.
- Keep doors and gates locked at all times.
- Absolutely no other poultry should be kept on the same farm premise
- No pet animals should be allowed in or around the poultry housing.
- All farms should have a vermin (parasitic worms, flies, insects etc.,) control plan which includes frequent monitoring of rodent activity. Adequate supplies of rodent bait must be maintained.
- All surrounding area around the poultry house should be free from vegetation, debris and unused equipment that could harbor vermin.
- Clean up feed spills as quickly as possible and fix any leaking feed bins or feed pipes because, spilled feed attracts vermin to the poultry house.
- Farms should have toilet and hand washing facilities separate from the poultry house.
- A dedicated changing facility for protective clothing and footwear should be provided at the farm entrance.
- Provide hand-sanitizing facilities at the entrance to each house.
- Provide well-maintained footbaths at the entrance to each poultry house.
- Clean footwear before using footbath with disinfectant to remove organic material, which could otherwise inactivate the disinfectant.
- The choice of disinfectant for the footbath needs to be one that has a broad

spectrum of activity and be fast acting because of limited contact time.

- Footbaths should be covered.
- Single-age broiler farms are highly recommended to reduce the cycling of pathogens and / or vaccine agents within the farm.
- Birds should be placed from similar age parent flocks of the same vaccination status.
- Depletion of birds should be complete before arrival of new chicks.
- Adequate down-time (time gap) between flock placements is essential.
- Drinking systems should be drained and flushed with an approved disinfectant before flock placement. Ensure that the system is again flushed with clean water before placement to remove any residue.
- Test water at least twice a year for mineral levels and microbial quality.

7.2 SANITATION AND DISINFECTION

Before placing new batch of chicks, house should be subjected to cleaning and disinfection as detailed below

1. Immediately after the liquidation of flock and prior to removal of litter Spray the poultry house with approved insecticide in accordance with manufacturers directions. Give sufficient time for insecticide to work.
2. Remove all organic matter in closed container. Either sale or dump it in isolated place. Remove maximum possible dust & dirt.
3. Protect electrical equipments, lights before house is subjected to water wash.
4. Clean the house with pressurized water jet. Ensure that entire house is thoroughly cleaned from top to bottom, inside and outside. Equipment, curtains, wire nets, iron structures, concrete structures, roof are cleaned properly and maximum possible organic matter is removed. See that proper drain is provided for dirty water. Not providing proper drain results in stagnation of dirty water surrounding the house and it will become a permanent source of infection if any was present in the previous batch.
5. Leave the house for drying.
6. Understand compatibility of disinfectants, detergents. Decide the disinfection program by using chemicals like quaternary ammonium compounds, idophores, liquid ammonia or other proven, commercially

available disinfectants from reputed manufacturers. One can also carefully use caustic soda to treat floor, parapet walls etc. Wash thoroughly, once the action time is over. Use compatible disinfectants for equipments and curtains.

7. Clean water tanks pipelines, feed bins etc with suitable disinfectant like Aquamax – Water lines and tanks at recommended dosages
8. Keep all disinfected equipment in place for reuse.
9. Fumigation – Understand the procedure. It needs to be done under strict supervision of uthorized person.

Rodent control

It is essential to have effective rodent control programme round the year. Physical killing and traps are used for rodent control Baits are used preferably immediately after depopulation of house.

7.3 FUMIGATION

The physical environment during fumigation is very critical for the fumigation to be effective. The following steps will help.

1. Increase relative humidity to 70-80%.
2. Ensure house temperature is above 21°C (70°F) as formaldehyde gas is not effective below this temperature
3. Wash all surfaces if possible or place pans of water in the house, it will help to increase relative humidity
4. The house should be sealed well

Fumigation methods

Formalin and potassium permanganate

These methods produce a violent chemical reaction that generates considerable heat and releases formaldehyde gas. Recommended dosage is 20 grams of Potassium permanganate is to be added to 40 ml of Formalin. Because of the violent chemical reaction, never use more than 1.2 liters of formalin in any one container. The container should be sufficiently bigger, at least 3 times the volume of disinfectant to prevent the mixture from bubbling over. The container must be placed on concrete or metal surface and not on litter material. Potassium permanganate is to be added to formalin and not vice versa.

Heating Solid Paraformaldehyde

This is probably the most convenient method of producing formaldehyde gas. Paraformaldehyde prills (pellet) are heated to a temperature of 218 °C (425 °F); generally 1 Kg of prills will be sufficient for 300 m3 (454 grams of prills for 5000 cubic feet).

Formalin Vapors

A mixture of equal parts of water and formalin dispersed as an aerosol is a very efficient method. Use 28 ml of formalin per 25 m3 mixed with 28 ml of water, or 140 ml of formalin per 1000 cubic feed mixed with 140 ml of water. This should be generated as an aerosol using the necessary equipment.

Precautions

Formalin solutions and formaldehyde gas both represent a hazard to human and animal life. Operators must be trained and wear suitable protective clothing, respirators, eye shields and gloves.

8. BIRD HEALTH

8.1 VACCINES & VACCINATION

Proven vaccines, produced under rigid quality norms of management, from a reputed manufacturer should only be used for vaccination.

The very purpose of the vaccination is to protect flocks against infective agents. Vaccines should be scientifically innoculated / introduced into the flock to stimulate its immune system. To learn and adopt correct schedule and methodology of vaccination. Consult the local veterinary / technical expert and follow manufacturer's instructions. Vaccine should be stored in conditions specified by the manufacturer. All these factors will help to achieve expected immune response. Work out vaccination program depending upon local disease challenges like N. D. (Newcastle Disease), M. D. (Marek's Disease), I. B. D. (Infectious Disease), I. B. H. (Inclusion Body Hepatitis) etc.,

Guidelines for Water Vaccination

- Remove drinking water prior to vaccination for one hour in hot weather; decide withdrawal time judiciously for other seasons.
- Wash brush or scrub drinkers thoroughly to remove all dirt, droppings and slime. Do not use a sanitizer.
- Use only clean and pure water for the birds. Uncontaminated drinking water is essential to the health of the flock. Use suitable water treatment wherever necessary to provide potable water for the birds.
- Handle Vaccine properly
  - a. Follow manufacturer's instructions for vaccine reconstitution and dilution.
  - b. Do not use outdated vaccines – old products may not have adequate potency
  - c. Use adequate dosage – do not stretch vaccine.
  - d. Burn or disinfect all used and open vaccine containers after each vaccination to prevent accidental spread
- Prepare vaccine water mixture in a clean container such as a large bucket,

then administer to the flock by pouring it into pre-cleaned water troughs. Do not rely on automatic drinkers

- Move into the flock. Make sure that all the birds consume vaccine water and it is consumed in one hour or so.
- Use skimmed milk powder in chilled water for preparing vaccine water.

8.2 MEDICATION

In spite of following Biosecurity norms and properly vaccinating the flocks against prevalent disease, sometimes disease can strike. When it happens it is necessary to get veterinary help as early as possible. Diseases in poultry can cause high mortality and morbidity which result in heavy economic loss to the farmer. When sending dead birds to the Laboratory one should send at least 6 – 8 birds for proper diagnosis of the disease. Along with treating the affected flock, precautions to be taken for preventing the spread of the disease to other flocks if any in the same premises and to the neighbouring farms. Timely medication has got great economic value in Poultry as susceptible population is very large.

9. RECORD KEEPING

Accurate record keeping is essential to monitor the performance and profitability of broiler operation; to enable forecasting, programming and preparing cash flow projections. It also serves to provide an early warning of potential problems, and so is invaluable to all round good management. It is also essential for trouble shooting on farm.

Daily records should monitor

- Feed Consumption and analysis reports
- Water Consumption and analysis reports
- Maximum and minimum temperature
- Mortality
- Medication
- Vaccination
- Feed, gas,litter, deliveries, etc.

Record on flock basis

- Electricity Usage
- Gas / oil usage
- Stocking density
- Feed samples which should remain from each load delivered and stored in airtight , vermin-proof containers
- Feed consumption
- Body weights
- FCR
- Post Mortem results
- Floor space / bird during life of the flock.

APPENDIX - I

BROILER PERFORMANCE INDEX

The broiler industry uses numerous terms to express broiler performance, and the methods most used are briefly outlined below:

1. Feed conversion Ratio (F. C. R.)

Feed conversion ratios tell us the efficiency of broiler bird to convert feed into live broiler weight

$$\frac{\text{Total kg of feed consumed by a batch}}{\text{Total kg of live weight of broilers sold}} = \text{Conversion}$$

Example:

$$\frac{8750 \text{ kg (Feed)}}{5000 \text{ kg (Live wt)}} = 1.75 \text{ (F. C. R.)}$$

2. Livability %

$$\frac{\text{No of Live birds sold}}{\text{Total number of chicks started}} \times 100$$

3. Avg. Weight per bird

$$\frac{\text{Total weight in kg of broilers sold (kg)}}{\text{No. of chicken sold}}$$

4. European Efficiency Factor

$$\frac{\text{Livability \% x Average Body Weight}}{\text{Mean age x F. C. R.}} \times 100$$

APPENDIX - II

BROILER PERFORMANCE GOALS - VENCOBB400

TABLE : 1 (FOR STRAIGHT RUN BIRDS)

Age in Days	Mortality %	Body Wt. (Gms)	Cumulative Feed Consumption (Gms)	Cumulative FCR (Pelleted Feed)
7	0.80	190	182	0.96
14	1.25	450	549	1.22
21	1.50	850	1122	1.32
28	2.00	1375	1966	1.43
35	2.75	1925	3042	1.58
42	3.50	2550	4335	1.70

BROILER PERFORMANCE GOALS - VENCOBB400 Y

TABLE: 2 (FOR STRAIGHT RUN BIRDS)

Age in Days	Mortality %	Body Wt. (Gms)	Cumulative Feed Consumption (Gms)	Cumulative FCR (Pelleted Feed)
7	0.80	190	180	0.95
14	1.25	450	540	1.20
21	1.50	850	1115	1.31
28	2.00	1400	1975	1.41
35	2.75	1980	3050	1.54
42	3.50	2620	4405	1.68

Note:

These performance goals are based on actual farm results under good management, environment and well balanced feeding conditions. However, performance can be substantially affected by diseases, management practices, variation in nutrients etc. Therefore, the goals mentioned in this guide in no way constitute guarantee / warranty of the performance.

APPENDIX - III

VENCOBB400
SUGGESTED FEED SPECIFICATIONS

TABLE: 3 (Straight Run)

AGE IN DAYS	0 -14 DAYS	15 – 28 DAYS	29 – CULLING
FEED TYPE	PRE-STARTER	STARTER	FINISHER
ENERGY, K.Cal/KG	3000	3125	3250
CRUDE PROTEIN %	22.5	21.0	19.5
CALCIUM %	0.94	0.92	0.88
AV.PHOSPHORUS %	0.45	0.42	0.40
CRUDE FIBRE %	<4	<4	<4
T.LYSINE %	1.42	1.25	1.14
DIG LYSINE %	1.25	1.10	1.00
T.METHIONINE %	0.62	0.58	0.54
DIG METH %	0.57	0.53	0.49
T.M+C, %	0.96	0.92	0.85
DIG M+C %	0.90	0.81	0.75
T.THREONINE %	0.86	0.78	0.74
DIG THREONINE %	0.77	0.71	0.66
T.TRYPTOPHAN %	0.30	0.29	0.27
DIG TYP %	0.22	0.2	0.18
T.ARGININE %	1.53	1.35	1.25
DIG ARGININE %	1.35	1.2	1.08
ENERGY / CP	133	149	167
DIG METH / DIG LYS	46	48	49
DIG M+C / DIG LYS	72	74	75
DIG THRE / DIG LYS	62	65	66
DIG TRYP / DIG LYS	18	18	18
DIG ARG / DIG LYS	108	109	108
SODIUM %	0.16-0.18	0.16-0.18	0.16-0.18
CHLORIDE %	0.18-0.22	0.18-0.22	0.18-0.22

Note: Crude Protein levels may be reduced by 0.5 to 1.0 % while adding synthetic L-Threonine in ration

VITAMIN REQUIREMENTS PER TONNE OF FEED

TABLE: 4

NAME	UOM	PRE-STARTER	STARTER	FINISHER
VITAMIN A	MIU	15.0	13.5	11.0
VITAMIN D3	MIU	5.0	4.5	4.0
VITAMIN E	G	70.0	60.0	50.0
VITAMIN K3	G	4.0	3.5	3.0
VITAMIN B1	G	4.0	3.5	3.0
VITAMIN B2	G	9.0	8.0	7.0
VITAMIN B6	G	4.0	3.5	3.0
VITAMIN B12	G	0.0225	0.02	0.017
NIACIN	G	70.0	60.0	50.0
CALCIUM D PANTOTHENATE	G	16.0	14.5	12.0
FOLIC ACID	G	2.5	2.25	2.0
BIOTIN	G	0.160	0.145	0.120
VITAMIN C COATED	G	100	90	75
CHOLINE	G	900	900	900

TRACE MINERAL REQUIREMENTS PER TONNE OF FEED:

TABLE: 5

NAME	UOM	DOSE
MANGANESE	G	100
IRON	G	90
ZINC	G	80
COPPER	G	15
IODINE	G	2
SELENIUM	MG	300

VITAMIN REQUIREMENTS PER KG OF FEED

TABLE: 6

NAME	UOM	PRE-STARTER	STARTER	FINISHER
VITAMIN A	IU	15000	13500	11000
VITAMIN D3	IU	5000	4500	4000
VITAMIN E	MG	70.0	60.0	50.0
VITAMIN K3	MG	4.0	3.5	3.0
VITAMIN B1	MG	4.0	3.5	3.0
VITAMIN B2	MG	9.0	8.0	7.0
VITAMIN B6	MG	4.0	3.5	3.0
VITAMIN B12	MG	0.0225	0.02	0.017
NIACIN	MG	70.0	60.0	50.0
CALCIUM D PANTOTHENATE	MG	16.0	14.5	12.0
FOLIC ACID	MG	2.5	2.25	2.0
BIOTIN	MG	0.160	0.145	0.120
VITAMIN C COATED	MG	100	90	75
CHOLINE	MG	900	900	900

TRACE MINERAL REQUIREMENTS PER KG FEED

TABLE: 7

NAME	UOM	DOSE
MANGANESE	MG	100
IRON	MG	90
ZINC	MG	80
COPPER	MG	15
IODINE	MG	2
SELENIUM	MG	0.3

VENCO

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