Feeding and Management of Brooder Chicken

Ailian Geng

Institute of Animal Husbandry and Veterinary Medicine, BAAFS

E-mail: ailiangengcau@126.com

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Outline

1. Biological characteristics, environmental requirements of chicken

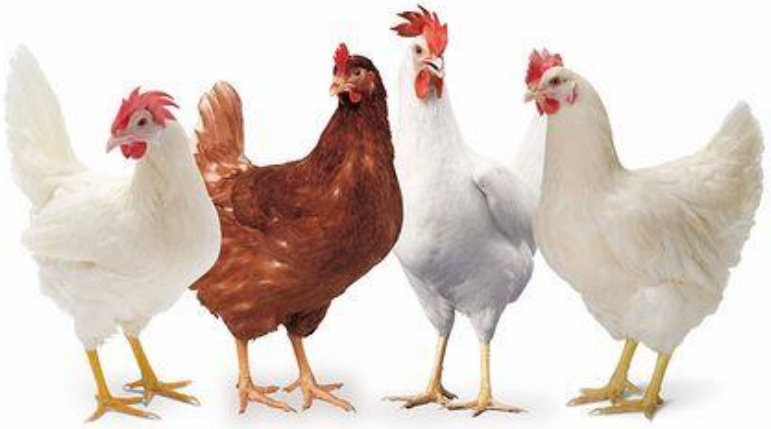
2. Feeding and management of brooder chicken

1. Biological characteristics, environmental requirements of chicken

1.1 Biological and behavioral characteristics

➢Chickens are short and take up little space

- **The vertical height of chicken is about 35 cm, and the space range is generally 50 cm, so the environmental impact range of the chicken is 50 cm space height.**



➢High metabolic activity

- **Adult chicken body temperature 41-42 ℃, about 5℃ higher than mammal's, breathing 36 times per minute, and heart rate is 300 times;**
- **Metabolic activity is the basis of the chicken life. Chicken life is short, and high utilization rate. In order to meet the needs of metabolism, it is necessary to provide rich nutrition and energy.**

➢Newborn chicks have poor thermoregulation

- **Body temperature of newborn chicks is slightly lower, about 39.6℃, and the lowest temperature can reach 33℃. After 10 days the body temperature becomes normal, maintaining 41-42℃.**
- **The ambient temperature required for one-week-old chicks is 30-34℃, 25-30℃ for 2-week-old chicks, and 20-25℃ for 3-week-old chicks.**

➢Rapid growth and high reproductive rate

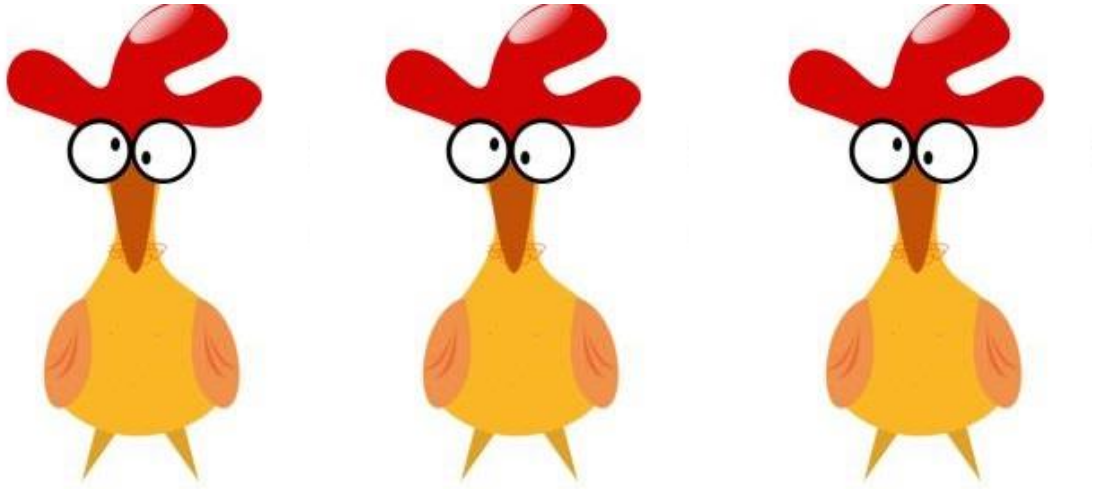
- **Chicks weigh 35-40 g when they first hatch.**
- **Broilers fed for 6-8 weeks can reach more than 2000 g, feed gain ratio is 2:1 or less.**
- **Normally a laying hen can lay 15-17 kg (280-320 eggs) a year, about 10 times its body weight.**

➢Heat resistance is poor

- **Chickens do not have sweat glands and mainly rely on respiratory heat dissipation to regulate their body temperature. If the ambient temperature is above 35℃ for a long time, there is a risk of heat death.**
- **Too low temperature will also affect the growth and development of chickens and performance.**

➢Nerve type: active

- **Chickens have sensitive sensory organs and are neurotic, especially in some small species. Any new sound, movement, and other sudden appearance will cause a series of stress responses, such as screaming, leaping, escaping and so on.**
- **Chicken often appears to pile up and easy to crush to death when the stocking density is high, resulting in less eggs or soft shell eggs, no-yolk eggs and other abnormal eggs.**

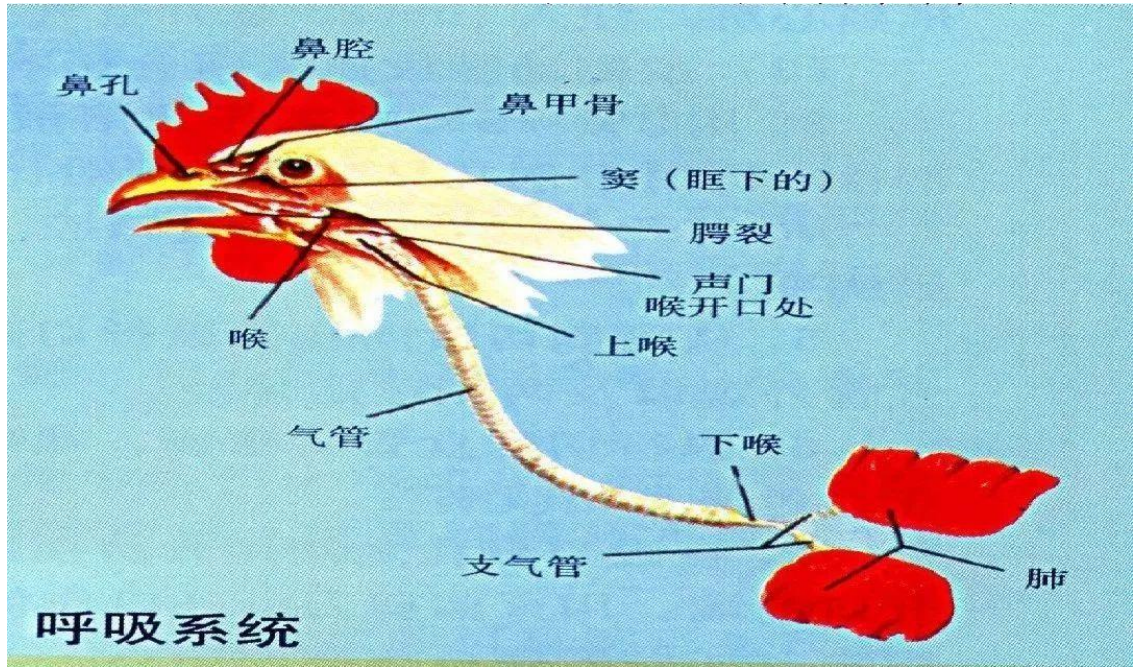


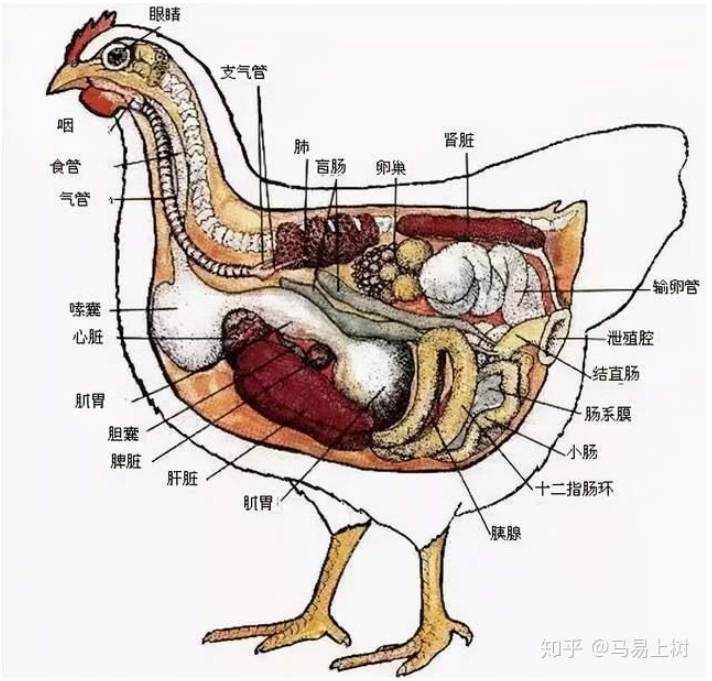
➢Fight and imitate

- **Chickens had a strong ability to recognize the nest, it can quickly adapt to the new environment.**
- **Chicken flock generally refuses a new chicken to enter, once the new chicken comes, they will fight, till the new order established, especially in the roosters.**
- **Chickens like to imitate others, like pecking, preening, etc.**

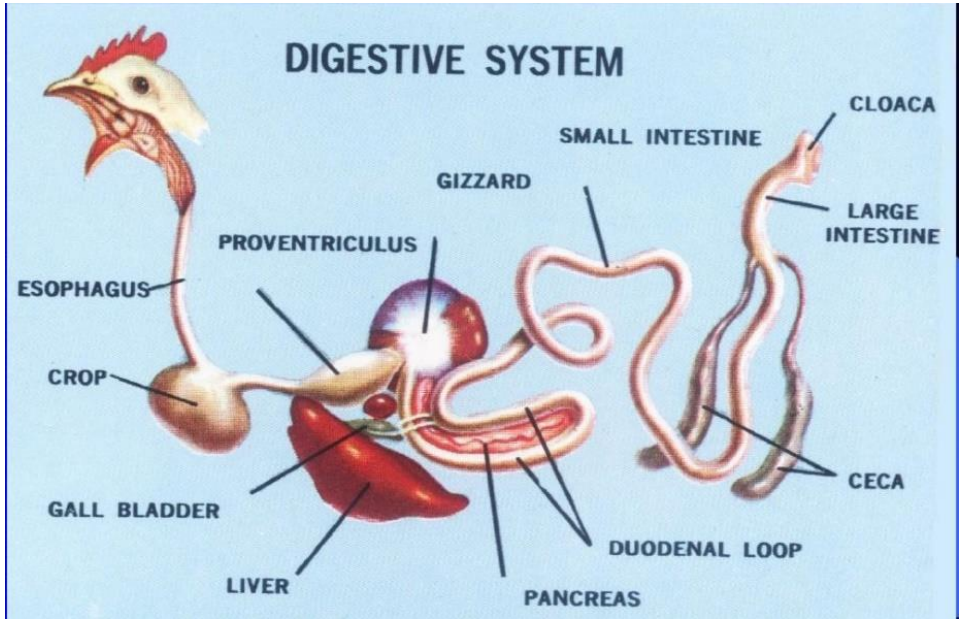
➢Disease resistance is poor

- **Chicken lungs are small and are connected to air sacs, which are connected to each other in various parts of the body, making it easy for some airborne pathogens to enter the body along the respiratory tract.**
- **Chicken genital tract and excretory hole are concentrated in the cloaca, easy to be contaminated by feces, also easy to suffer from salpingitis.**





- **The lack of a diaphragm in chicken's body cavity allows the infection to spread to vital organs in the chest.**
- **Chickens do not have lymph nodes, lymphatic system is not complete, the pathogens spread in the body, not easy to be controlled by their own, once infected, more prone to diseases.**
- **Compared with ducks and geese, chickens have poor resistance to diseases.**



➢Strong adaptability, suitable for intensive scale raising

- **Artificial incubation techniques provide a large number of chicks.**
- **Under the unified feeding and management conditions, the growth and development of chickens are quite evenly.**
- **By controlling the illumination time and intensity, egg production can be adjusted.**
- **Chicken drink less, and quickly, feces discharge is relatively thick, which brings convenience for cleaning.**

1.2 Environmental requirement

- Chicken performance is affected by both heredity and environment. Under bad environment, the production potential of high quality chicken can not be brought into full play.
- Under the condition of large population and high density, the environmental problems are more prominent and have a greater impact on the performance of chickens.

➢Temperature

- Chicken’s body temperature does not vary with the ambient temperature.
- The temperature requirements vary with breed, age, sex, growth and development, physiological state, and etc.
- Under normal feeding and management conditions, the suitable temperature for laying eggs is 13-25℃.
- The temperature had better not exceed 32℃ in summer, and not be less than 5℃ in winter for laying hens.

Table 1 Temperature requirement for the chickens

Varieties		Room temperature(℃)			Using brooders
		The best	The highest	The lowest	
Layer	0～4 weeks	22	27	10	0~3 weeks 32～35℃, decrease to 21℃ at 4 weeks
	Chicks in warm house	31	—	—	
	Grower chicken	18	27	10	
	Laying hens	24～27	30	4	
Broiler	0～4 weeks	24	30	24	0~3 weeks 29～35℃, decrease to 16℃ at 4 weeks
	Chicks in warm house	31	32	27	
	4～8 weeks	20～25	30	10	
	brooders	21	27	4	

➢Relative humidity

- Effect of relative humidity on chickens is usually synergistic with temperature, and high humidity has a great effect on production.
- The proper relative humidity range is 60-65%.
- When the ambient temperature is appropriate, 40-80% humidity has little effect on chickens.
- The relative humidity in winter is above 85%, which has great influence on egg production.

Temperature and humidity meter

➢Airflow rate

- Air flow mainly affects the convection heat dissipation of chicken. In high temperature season, increasing airflow rate can alleviate the adverse effects of high temperature.
- In order to maintain uniform indoor air environment and normal ventilation, 0.1-0.2 m/s is the best, should not exceed 0.25 m/s.
- When the weather is hot and temperature is high, the indoor airflow rate had better be kept above 0.5 m/s, and the longitudinal ventilation is ideal to reach about 1.5 m/s.

Portable anemometer

➢Air pressure

- In the plains, changes in air pressure had no effect on chickens.
- Above 3,000 m, chickens develop symptoms of altitude sickness, mainly manifested by lack of oxygen.
- At high altitude, due to lack of oxygen, it is easy to cause embryo death and reduce egg hatching rate. The hatching rate can be significantly increased by adding oxygen to the incubator.

Air pressure meter

➢Lighting

- **Chickens are very sensitive to light, and light is closely related to their reproductive activities.**
- **Chickens need different level of light, different length of light at different stages of growth.**

Illuminance meter

Table 2 Light requirement for brooder chickens

Stages	Physiological characteristics	Lighting programs
Brooding period, 0-3 wks	Incomplete physiological function, poor eyesight, and low activity and feed intake.	Bright light at the first 2-7 days, 20 lx
Growing period 3-18 wks	The activities and feed intake increase	Less than 12 h lighting, 5 lx

Lighting plan for open-type chicken house

- **In season flocks**: flocks that are reared in open-type house and mature in gradual extension of natural light.
- **Out of season flocks**: flocks that are reared in open-type house and mature in gradual shortening of natural light.
- From 12 weeks to the first light stimulation, exposure should not be shortened and should not be less than 12 hours.

Lighting plan for in-season flocks

- From 12 weeks to the first light stimulation, use natural light;
- 145 to 147 days, add 1 to 1.5 hours,
- See the first egg, add 1 hour,
- 5% egg-laying rate, 16~16.5 hours.
- Under free range condition, the chicken is seasonal, and need artificial lighting when necessary.

➢Air quality

- There are more harmful gases, particulate matter and harmful microorganisms in the chicken house than in the general livestock house, and the chicken has high requirements for air quality.
- Ammonia concentration in the chicken house should not exceed 15 mg/m^3, hydrogen sulfide should not exceed 17 mg/m^3, and carbon dioxide concentration should not exceed 0.25%. .
- When the total amount of microorganisms in the air of caged chicks exceeds 130,000 $/m^3$, of which E. coli accounts for 1.5%, clinical E. coli diseases can be caused and preventive measures should be taken.

➢Noise

- **Noise can have adverse effects on nervous system, endocrine, circulation, reproduction, digestion, behavior and production performance of chickens.**
- **Noise can cause egg breakage and decrease egg production.**
- **Light music can quiet laying hens and prolong the laying cycle.**
- **It is generally considered that the sound below 60 decibels is not harmful to body.**
- **Good greening can reduce external noise above 10 decibels.**

2. Feeding and management of brooder chicken

2.1. Preparation before brooding

➢Choose the keeper

- **Work carefully.**
- **Highly responsible.**
- **Pre-job training.**
- **Strictly implement technical measures.**

➢Preparation of brooder house

- 7 days before entering the brooder house, the house and equipment should be inspected, installed and maintained, and the brooder house should be thoroughly disinfected with 3% caustic soda solution.
- 5 days before entering the brooder house, the house should be thoroughly disinfected by useing sodium hypochlorite disinfectant, and the lights are adjusted.
- 3 days before entering the brooder house, the house temperature should be preheated to 33-35℃ and the relative humidity about 65%.
- Prepare the brooder feed, glucose, electrolytic multivitamins and clean drinking water.
- Prepare vaccines and medicines.

- **Clean, rinse and disinfect**
- **Clean the brooder house, then rinse under high pressure, then spray, disinfect the chicken house and equipment.**
- **All the equipment must be cleaned and soaked in disinfectant.**

- **Fumigation disinfectant can choose potassium permanganate and formalin.**
- **Potassium permanganate 16 g, formalin 32 mL and water 16 mL per cubic meter of space, in ceramic containers. Seal doors, windows and air vents, close the chicken house, use fumigation disinfection. After 24 hours, the doors and windows were opened for ventilation.**
- **Ventilation should not be less than 48 hours, and there should be adequate ventilation.**
- **After cleaning and disinfection, the chicken house had better be idle for a period of time, so as to facilitate the self-destruction of pathogenic microorganisms.**

- A disinfection pool is set at the door of each chicken house;
- Install ultraviolet disinfection lamp;
- If there is no disinfecting tank, place a disinfecting basin, so that the personnel into the chicken house can foot disinfectant, cutting off the transmission of diseases.

Disinfecting tank at main gate

➢ Preparation of brooder chicken

- **Brooder chicken should conform to the requirement of the breed's characteristics.**
- **It is best to come from the regular farms who have "production management permit", "epidemic prevention certificate" ,etc.**
- **Whether or not to have the Marek vaccine?**
- **Whether the chicken is in normal condition?**
- **Whether the weight is up to standard?**

➢ Transportation of brooder chicken

- **Pay attention to transport time;**
- **Pay attention to transport density;**
- **To keep warm in winter, to prevent heat and ventilation in summer.**
- **Check the condition of chickens during transportation, and properly ventilate and cool them down.**

➢Pre-heat of brooder house

- **Preheat the brooder house in advance so that the brooder chicken arrive at the house and be in a warm and comfortable environment.**
- **Preheat the brooder house at least 24 hours before in summer, at least 48 hours before in winter.**
- **Before the chickens arrive, the horizontal temperature at the chicken height in the house should reach 33-35℃.**
- **Temperature at the top of the top-layer brooder cage shall not exceed 35℃.**

Stove

Electric brood cage

➢Brooder chickens enter the house

- **Fill the drinking fountain with water, the water temperature preferably close to room temperature, 25-30 ℃.**
- **When the vehicle with the brooder chickens arrive, remove all the boxes from the vehicle and place them in the house. If they are stacked on the floor, put an empty box or something at the bottom to keep them warm.**
- **Quickly distribute the brooder chickens evenly to the cages or the net.**
- **After placing the brooder chickens, check the working status and temperature of the equipment again.**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Farmers can brood the chickens under simple condition

2.2 Feeding and Management of brooder chicken

➢Drinking

- **Drinking water as early as possible. Early drinking water can prevent dehydration of brooder chicken, promote yolk absorption, improve the survival rate.**
- **It is best to provide clean warm water, water temperature 20-25℃.**
- **Drink freely. Chickens transported over long distances can drink 5% glucose water first, but should avoid binge drinking.**

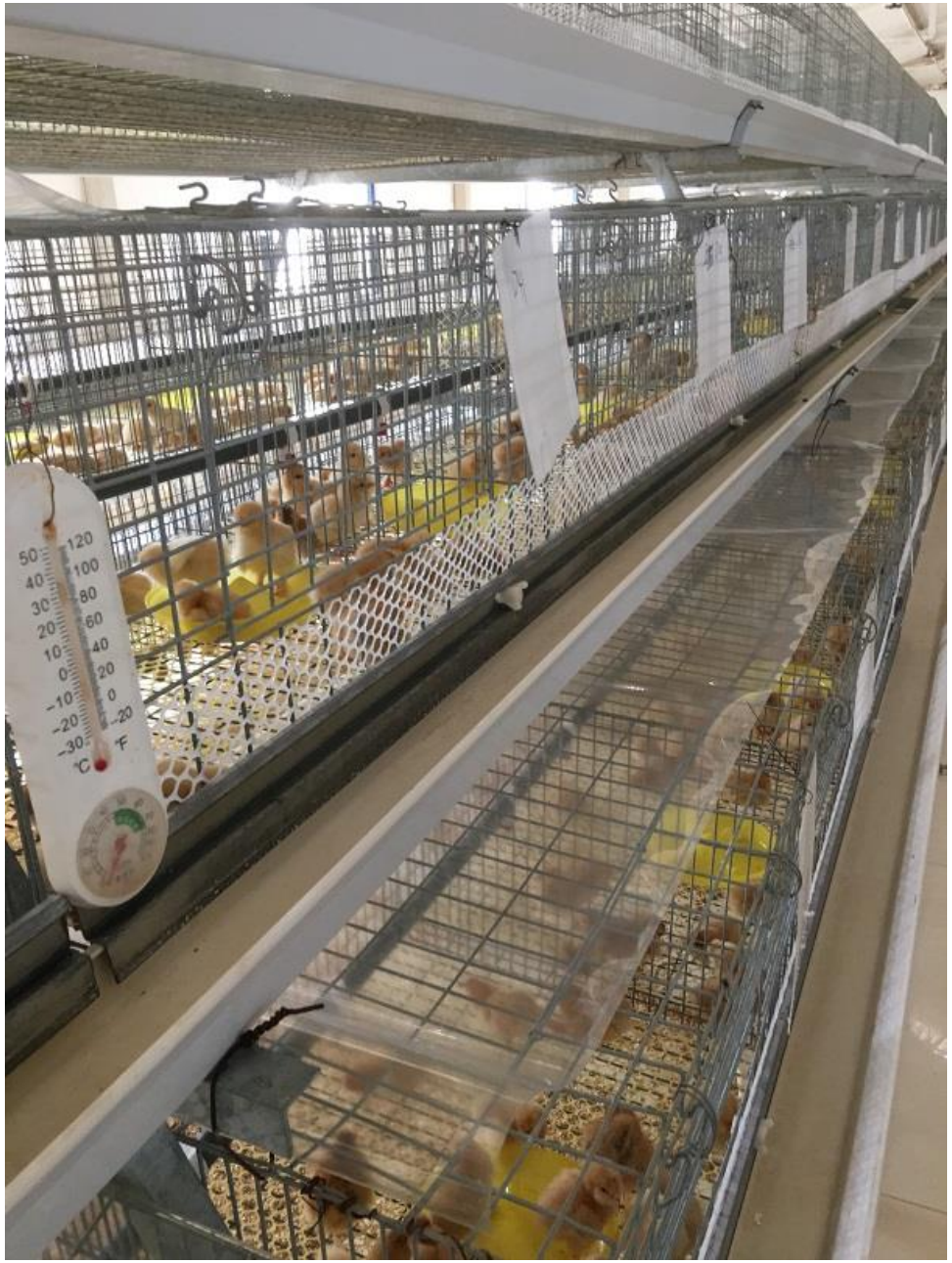
- **Vitamins and electrolytes can be added to water during the first 3-5 days to relieve stress.**
- **Change the drinking water every day and clean and disinfect the drinking water fountain.**
- **The height of water fountain should be adjusted with the increase of chicken's age and 2 cm higher than chicken's back.**

➢Prevent pullorosis in chicks.

- **Add electrolyte multivitamins in the drinking water, or add 0.2% potassium permanganate, 2-3% salt, 3-5% multivitamin glucose for the first 3-5 days.**
- **The chicken house is hot and the water is easy to spoil. Each addition is enough to drink for 6 hours.**
- **Change the water 3-4 times a day and discard the remaining water before changing.**
- **Clean the trough with each water change (twice a day).**

➢Provide the starter feed

- **Time: 2-3 hours after drinking water;**
- **Attention should be paid to wet granule broken feed.**
- **Powder had better be soaked for 2 hours before feeding;**
- **If wet feed is used, the water to feed ratio is 1:1.**
- **Sprinkle lightly on paper or the plates.**
- **Use the wet feeding for the first 4. Expanded feed can be fed directly.**



Shunyi

- **Ensure adequate feeding area and adopt the principle of less feeding and more frequent feeding.**
- **Use free feeding, feeding low intensity and high frequency, feeding 4 to 6 times a day.**

Note: There should be no leftover in the feed trough at night to prevent mold from occurring after a long feeding time.

➢Temperature and humidity

- **“Adjust temperature according to the condition of the chicken", the comfort of the chicken first.**
- **When the temperature is suitable, the brooder chicken are evenly distributed and cheerful.**
- **When the temperature is low, they huddle close to the heat source, and emit high-pitched calls;**
- **When the temperature is high, the brooder chicken stay away from the heat source, spread their wings, breathe with their mouth open, feel sleepy, or lie on the bottom of the cage and stretch their necks.**
- **The temperature should not be too high or too low, temperature difference should not exceed 3 ℃.**

- **Humidity is not as important as temperature, but in some cases, too low humidity can dehydrate brooder chicken and increase mortality.**

➢Ventilation

- **Proper heat preservation and ventilation in the early stage of chick rearing have great influence on the body development, health and disease resistance of the flock.**
- **Poor ventilation can put young chickens at risk of respiratory diseases.**
- **Prevent “evil wind" and temperature fluctuations.**

- Natural ventilation and negative pressure ventilation are usually adopted.
- In winter, the fan implements minimum ventilation, and the corridor door do not feel cold wind;
- In summer, according to the ambient temperature, the ventilation volume should be appropriately increased and the wind speed over the back should be adjusted to the ideal body temperature of chicken.

Type, weeks of age	Air exchange volume ($m^3/h*kg$)			Air velocity (m/s)		
	Winter	Transition period	Summer	Winter	Transition period	Summer
Layers: 1 - 9 weeks old	1.00		5.0		0.2-0.5	
Broiler house:1 -9 weeks old	1.00		5.5		0.2-0.5	

➢Disinfection

- **Disinfect every 3 days.**
- **During the disinfection period, attention should be paid to the dosage form of disinfectant.**
- **The acid and alkali type should not be used at the same time, and the dosage form should be changed every other batch.**
- **Do not use disinfectant during the vaccinnation.**
- **Apply 2% caustic soda to the ground every 2 weeks to prevent parasites.**
- **Disinfection facilities at the entrance to the brooder house should be complete.**

➢Daily Feeding

- **Insist on adding less, prevent waste of feed, and lure chicks to eat.**
- **Generally, brooder chickens are fed approximately every 4 hours for the first week, then reduced daily until they are fed 3 times a day.**
- **The use of a wet mix for the first three days enables the chickens to consume the finer concentrate (multivitamins and minerals) of the feed at the same time and also increases palatability.**
- **Keep the tray or trough full throughout the brooding period to allow the chickens to feed freely. It is better to finish feeding before lights out every night, and don’t leave leftovers.**
- **Feed should not be moldy.**

- **There is a transition when changing feed, which generally takes three days:**
- **Day 1:70% old feed and 30% new feed;**
- **Day 2: 50% old feed and 50% new feed;**
- **Day 3: 30% old feed and 70% new feed;**
- **Day 4: 100% new feed.**

➢ Lighting

- **Light plays an important role in feeding, drinking, exercise and health of brooder chicken.**
- **Newborn chicks are exposed to 23-24 hours of light for the first 1-2 days, with light intensity of 20-30 lux at feeder height, allowing water and feed to be easily found and fed.**

- **From the 3rd day to the 2nd weekend, the light duration gradually decreased to 15-16 hours, and the intensity gradually decreased to 5-10 lux.**
- **After the third week, the exposure time gradually decreased to 8-9 hours per day, with the same intensity.**
- **The lighting shall be subject to the position of the middle cage, and the light shall be bright and uniform.**
- **The light controller shall be adjusted well and the light meter shall be used for repeated calibration.**

8. Debeaking (Beak trimming)

- Objective: To reduce death, pecking addiction and feed waste.
- Time: Laying hens are usually debeaked at 6-10 days old, and at the coolest part of the day is chosen.
- Methods: Half of the upper beak and 1/3 of the lower beak were cut off with hot blade, infrared debeaking, etc.
- The operation should be carried out by skilled specialists.

- **To ensure the quality of debeaking, it is necessary to strengthen training and monitoring of the operators.**
- **Do not feed chickens 6 hours before debeaking;**
- **Vitamin K3 (3-5g/L) should be added per liter of water within 3 days before and after debeaking.**
- **Vaccination should not be given before or 3 days after debeaking.**
- **Chickens are not debeaked temporarily when they are sick.**
- **The best feed for chicken is powder feed after debeaking.**
- **Chickens were fed with starter or anti-stress feed with high nutrient content within 1 week after debeaking.**

- **The feed thickness in the feed tank was appropriately increased after debeaking.**
- **Brooder chicken that have just debeaked may have difficulty drinking from the nipple drinker, so lower the water pressure or manually open the drinker to help them drink.**
- **Feeding restriction shall not be carried out within 7 days after debeaking.**
- **Clean blade and guide hole of the debeak machine regularly.**

➢Group feeding

- **Males and females were fed in groups at the age of 1 day.**
- **Male and female were mixed feeding at the age of 1 day, group feeding at 42-60 days old , in order to better manage and batch out of the market.**
- **The size of each flock had better be 300-500 for free range.**
- **Too large chicken flocks will affect the weight gain and evenness of chickens.**

➢Stocking density, drinking space, feeding space

- **Density depends on breed, temperature, drinking and feeding space, etc.**
- **The density was 20-25 birds /m^2 at 0-4 weeks,10-12 birds /m^2 at 5-8 weeks for ground raising.**
- **Compared with ground raising, net raising can increase by 50%, and the cage raising can increase about 1 time.**
- **Feed space: 0 to 6 weeks: feed trough 4 cm per chicken, 40-50 chickens per bucket;**
- **Each chicken occupies a drinking space of 1.5 cm, 8-12 chickens/nipple.**

Raising system	1-6w (chicken/m^2)
Cage	≤38
Net flat raising	≤25
Ground level raising	≤25

➢ Daily house cleaning and disinfection

- **Brooder chickens begin to shed villi at 15 days of age. It is necessary to increase the number of cleaning in the house to keep the house clean.**
- **Spray clean water properly before cleaning, and clean it when it is slightly dry to prevent villi and dust suspension in the air and prevent the occurrence of respiratory diseases.**

- **Disinfecting the chicken once a week, disinfecting the indoor environment once a week, alternately using two different disinfectants.**
- **Sterilize the chicken or the environment with a probiotic solution of 0.1%-0.3%.**
- **The disinfectant used is usually iodine preparation.**
- **Venues and playgrounds should also be disinfected regularly, using outdoor disinfectants (such as caustic soda, acid preparations, chlorine preparations).**
- **Rats and flies should be destroyed regularly.**

➢Immunization and medication

- **Maternal antibody levels of NDV, H9 and H5 in 1-day-old chickens were monitored in laboratory when conditions were available.**
- **The age of first immunity was determined according to the level of maternal antibody.**
- **Routine use of antibiotics should be controlled unless chickens are sick.**
- **Probiotic agents can be added in drinking water to regulate intestinal flora.**

Nose drop and eye drop

Be a happy and healthy chicken!

Thank you!